NCIEST-2019

National Conference

On

Innovation in Engineering Science & Technology-2019

Organized By

Department of Electrical Engineering

Department of Computer Science & Engineering

Krupajal Engineering College, Bhubaneswar, Odisha, India

National Conference on Innovation in Engineering Science & Technology-2019
(15th-16th November 2019)

CONFERENCE PROCEEDING

Organized By:

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<u>Chairman's Message</u>

I am pleased to welcome you to the national conference on innovation in engineering science and technology NCIEST-2019.The theme of innovation in engineering technology refreshes your ideas in various fields of engineering. To mark this event, the department is going to publish a proceeding comprising all the technical papers presented in the conference. This is a multi disciplinary conference with the objective of bringing together scientists, professors and research scholars from India in the broad areas of computer science, electrical, Electronic communication technology and engineering.

I wish the conference a grand success and hope it contributes immensely in the area of computing and engineering.

With Warm Regards

Dr. Bhabani Charan Rath
    CHAIRMAN
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A smart energy management device for ideal construction and real-time use

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Abstract: Distribution network planning and management has become a very challenging job, particularly with the rapid expansion of intermittent renewable energy sources (RES). The method suggested in this work aims to increase the profit of distribution network operators while maintaining fluidity and reliability of real-time decisions and taking into account production uncertainty. It consists of a real-time control and data acquisition model, a model for forecasting the intermittent parameters of RES based on neural networks, a long-term planning model based on the optimal placement and size of RES and BESS, and a fourth hourly planning model for scheduling the energy distribution between energy sources. It is an intelligent energy management system dedicated to the management of grid-integrated RES and battery energy storage systems (BESS). The fundamental building blocks of this model are the non-dominated sorting genetic algorithm and the entropy-TOPSIS method (technique for order of choice by similarity to ideal solution). With regard to short-term scheduling, the findings of testing on a modified IEEE 33 bus network showed that the system is successful in maximizing profits and significantly reducing CO_2 emissions, in addition to power losses and voltage drops.

Introduction

Due to rising CO_2 emissions and the price of electricity, there has been a significant shift in the energy sector worldwide. Renewable energy sources (RES) are replacing fossil fuel energy with a reasonable price and zero CO_2 emissions [1]. Morocco, a country in North Africa, has adopted this strategy in light of its geographic location and the significant potential it has for solar and wind resources [2]–[4]. Due to their stochastic and intermittent character, renewable energies like wind turbines (WT) and photovoltaic panels (PV), which are important drivers of the energy transition and sustainable development, present a number of difficulties [5]. Since the cost of battery energy storage systems (BESS) fell by 45% between 2012 and 2018 [5] and is still falling, they offer a promising way to handle the intermittent nature of RES. BESS can manage and control voltage, lessen reverse power flows, ensure power in the event of an interruption, and smooth production, among other network services [6]. The network benefits from the combination of RES with storage in a number of ways. Their planning is crucial in order to receive the greatest advantage during the installation [7].

The three foundations for the green energy of the future are decentralization, digitization, and decarbonization (3D) [8]. The 3Ds are responsible for redefining the energy industry and opening the door for a grid that is smart, dependable, and becoming more and more autonomous. Reliance on big generation facilities will be reduced with the integration of smaller and dispersed RES and BESS into the grid, which will also result in lower CO_2 emissions and loss of communication. Additionally, in the midst of complicated changes in the energy market, effective monitoring and administration of these decentralized generation sources will help guarantee system efficiency. All ideal choices that are planned and put into action to guarantee energy availability at the lowest possible expense are included in the energy management concept. It is a crucial idea that is meant to assist distribution network operators (DNO) in overcoming the difficulties presented by rising energy prices, production uncertainties, and changing load patterns [10]. Therefore, in order to meet these challenges, it is necessary to create a reliable intelligent energy management system outfitted with artificial intelligence methods and information technology skills.

Nonlinear control of an induction motor accounting for impacts of rotor resistance variation and saturation

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Abstract: Electrical motors today demand a higher level of accuracy and dependability. One of the most reliable and easily maintained actuators is the induction generator. A solid understanding of the physical phenomena influencing its functioning is necessary for their control. To accomplish the desired performance, two key phenomena saturation and heating must be considered. In order to control rotor speed and flux, we will create a nonlinear control law based on the "Back stepping" technique in this paper. This law accounts for the impacts of rotor resistance variation and saturation. We'll evaluate the control's resistance to temperature increases. The MATLAB/Simulink environment is used to simulate this control technique in order to study it.

Keywords: Back stepping, Heating, Magnetic saturation, Nonlinear control, Rotor resistance variations

Introduction

The primary benefit that enables induction machines (IM) to hold a significant position in industrial applications is their high reliability. The creation and application of linear [1] and non-linear [2][6] control strategies are made possible by more accurate modelling of the physical phenomena governing the operation of IM, enabling IM to perform as well as or better than a DC machine [7]. State models with constant parameters are produced by well-known simplifying assumptions (isotropy of the machine, parameters invariance, and ignored saturation [8]). However, owing to saturation [10][13] and temperature rise [14][18], the stator and rotor's inductances and resistances are variable. These presumptions have limitations and only apply to the design of linear control laws at a specific set operating point. Depending on the complexity and the knowledge of the IM parameters, nonlinear control strategies are developed based on the linear model without saturation [2], [17], [18], or on the model with saturation [3], [11], [19], [20]. These strategies enable for the accurate following of speed and flux references.

The inductances (stator, rotor, and magnetizing) of the IM machine depend on the magnetizing current, so in this paper, starting from a nonlinear model of the rotor flux [16], we create a nonlinear control law based on the back stepping technique (NLB). To determine the control voltages, we use the rotor flux orientation (FOC), which is most frequently used in the literature. In this article, the robustness of this control rule with regard to heating will be examined and discussed. The viewer may consult Table 1 for a list of the symbols used.

Impact of cheap energy-saving steps on the use of electronic appliances

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Abstract: Energy-saving techniques use less energy without sacrificing the comfort of the consumer in order to cut costs and the environmental effect. Power savings when using electronic devices are greatly aided by low-cost energy conservation methods. In order to examine the effects of low-cost energy conservation measures (LCECM) in real-time operations, the paper compares two distinct facilities that use air-conditioning applications. By reducing the air conditioning's running duration and raising its set temperature at both facilities, the impact was observed while ensuring that occupant comfort was not compromised. Pre- and post-experiment readings were used to analyze the data in accordance with IPMV Protocol A, which governs worldwide performance measurement and verification. By using a t-Test in the SPSS program, the result of the IPMVP was further examined. The findings showed that conserving energy had a cumulative effect on the environment, the expense of importing fossil fuel, and carbon footprint. The study's limitations are the limited resources and restrictions on the respondents used to assess energy conservation.

Keywords: Commercial building, electronic devices, Energy behavior, Energy saving, Low-cost energy conservation

Introduction

Our planet's limited supply of fossil fuels is running out every day. It is advantageous for both individuals and our larger energy systems to conserve energy whenever feasible [1]. Energy conservation is a low-cost strategy that can be implemented at any facility by fine-tuning controls and software utilization [2]. It is not necessary to buy energy-efficient goods to decrease energy usage at home and increase energy savings [3]. Huge potential for energy savings exists in administrative and remedial actions [4]. Its primary administrative and corrective actions, which include training, are simple to execute and have a rapid payback period [5]. The Programme for energy conservation will be strengthened by increasing energy efficiency through behavioral instruction in the use of renewable energy sources and the application of affordable measures for energy conservation [6], as well as through the disclosure of energy data and the digitalization of the energy market [7]. Adjustments to energy consumer behaviour have a significant potential to reduce utility costs [9]. The typical home's utility bills include prices for heating and cooling [10]. Significant savings can be achieved by reducing the intensity and regularity of heating and cooling [11][13]. The paper aims to raise awareness of and encourage energy-efficient practices when using electronic appliances in household and business applications by using the example of air conditioners.

If building occupants receive structured, customized LCECM instruction regarding energy-saving behavior. According to studies, building occupants can change their behaviour regarding energy use by putting the taught tips and guidelines into practice [12], [13], which will result in an efficient use of energy for the building as a whole. The majority of us are aware of LCECM, but we often neglect or disregard it because we have an ingrained belief that it is unimportant [11], [14]. If it becomes a routine, though, it can be done every day [14]. To increase the energy index of any structure through such LCECMs, the Indian government launched the energy conservation building code (ECBC) 2016 [15]. However, it is left as a possibility and not required [16]. Assume that ECBC requires its implementation to be obligatory [4], [17].

Computer-controlled solar cell split source converter for an induction motor

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Abstract: Despite the fact that electrical energy is essential for everyday life, its consumption is steadily rising. In addition to the issue of pollution brought on by the use of energy generation, such a rise is a significant problem that makes us consider substituting alternative energy for conventional energy. In terms of usage, solar energy is a viable option. Additionally, using solar energy poses no environmental risks. In this effort, a 3-phase induction motor (IM) will be run by an integrated solar system that operates during the day. To find the results and validate them using the same elements of the suggested algorithm, the research starts by simulating the system in the MATLAB/Simulink Programme. The system uses 1080 W of photovoltaic (PV) modules, but the PV array serves as the split source inverter's (SSI) primary source of power. In order to regulate this SSI, sine pulse width modulation is used. (SPWM). A computer linked to the system via Wi-Fi, the 3-phase IM (373) W, keeps account of the maximum power point tracking (MPPT) incremental conductance (INC) method. The system's effectiveness and adaptability are shown by the outcomes.

Keywords: Computer modeling, Induction motor, LC filter, Maximum power point tracking, Photovoltaic PV, Split source inverter

Introduction

The wonderful alternative energy source known as renewable energy is one of the answers to the growing depletion of fossil fuels [1], [2]. To satisfy the needs of energy used in everyday industries, agriculture, and irrigation, as well as the population's energy use, including solar energy. And the reason for this is dependability and poor upkeep [3], [4]. One of the most crucial criteria for the induction motor (IM) is the ability to control speed [5]. As the speed is reliant on the speed of the rotor field made accessible by the stator, the frequency is variable. Furthermore, a changeable voltage is required [6]. V/f approach is the name of this technique. The inverter is equipped with panels and the inverter in turn feeds the IM. The suggested method of regulating the IM's rotational speed is shown in Figure 1. A major electric energy solution is solar power. When the monthly averages of a solar radiation total that falls on the horizontal surface of every location in Iraq are discovered [7], [8], it is possible to assess Iraq's potential for PV energy by understanding the amounts of solar radiation that fall on various places throughout the year. According to Figure 2, these rates reach their peak radiation (W/m²) in the winter. Summertime is when these numbers are highest. The yearly spatial distribution of solar irradiance from Iraq is shown in Figure 3. These statistics indicate that Iraq is generally rich in solar energy, which can be used for a variety of solar energy uses [9]. The photoelectric system has several advantages, including high dependability because it is a free source and low maintenance because its pieces are permanent.

The maximum power point tracking (MPPT) formula is used to increase the photovoltaic system's energy efficiency. MPPT can actually be carried out in a number of different methods. The INC methodology was applied in this study. Figure 4 illustrates the INC method used to execute MPPT. Following the application of the MPPT algorithm to different radiation values, Figure 5 shows the current and power. The INC method is based on the assumption that the power derivative of PV output is equivalent to zero. When a switch is made quickly, the outputs of this method are essentially effective because the MPP moves to the left as PV radiation decreases. This method is thought to be among the most effective in terms of performance, but it is costly and has a difficult control circuit. The ideal

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tracking accuracy, speed, steady-state error, and efficiency requirements for an MPPT system are all present [10]. According to the data in, the ratio of solar energy produced to voltage acquired using the INC method is zero. (1)

A powerful hybrid biomechanical energy-harvesting device that uses human motions for low-power applications

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Abstract: The biomechanical energy harvesting system (BM-EHS) generates electricity from everyday human activity. One possible alternative technology for implantable and wearable electronic devices without batteries is the BM-EHS. In this manuscript, two different vibration source-based human behaviors are used to model the hybrid BH-EHS. The combination BM-EHS combines the piezoelectric (PE) and electromagnetic (EM) based EHS. The PE-EHS is modeled using a mass-spring-damper system and PE stack, and it is based on the walking and jogging movements of humans. With shaft conversion and a DC motor, the EM- EHS is designed to mimic the knee and hip movements of a human. MATLAB/Simulink is used to simulate the PE, EM, and hybrid BM-based EHS, and performance outcomes are realized separately. The PE-EHS harvests 53.18 mW of electricity with an average output voltage of 0.5 V. Similar results are obtained by the EM-EHS, which harvests 30.6 mW of electricity at a load voltage average of 0.567 V. The hybrid BM-EHS generates 86 mW of electricity and achieves an average load voltage of 0.79 V. In comparison to the current EHS, the proposed BM-EHS has improved energy efficiency and better power harvesting for the specified load circumstances. Overall, low-power applications can be powered by the harvested electricity.
Keywords: Boost converter, Electromagnetic, Energy harvesting, Human motions, Piezoelectric Power

Introduction

Utilizing routine tasks, the biomechanical energy harvesting system (BM-EHS) produces electricity. It is one of the enticing alternatives to batteries that can be used to power wearable and handheld electronics. Portable electronic gadgets include laptops, computers, and cell phones. These devices run on batteries, which have a finite quantity of energy. The weight of the battery, the power requirements of portable devices, and running time are always trade-offs. The BM-EHS allows for the long-term power generation from routine human actions. Thus, one of the most effective energy sources is human force. Using an energy harvester mechanism, human body parts like body heat, exhalation, blood pressure (BP), arm motion, finger motion, footfalls, and heartbeat can generate electricity [1], [2]. On the other hand, there has been a huge increase in the energy harvesting from people walking and jogging. Energy is produced when people stroll or run, and it is simpler to collect this energy and transform it into higher-quality electric energy. Three main energy sources associated with human walking are vibrations, body inertia, and foot impact [3].

The energy used by the human body can be derived from thermal, chemical, and kinetic energy sources. Numerous energy harvesting devices, such as the turbo electric generator (TEG), piezoelectric generator (PEG), electromagnetic generator (EMG), and many others, are available to draw electricity from these human body sources [4], [5]. The PE-based EHS harvests energy from human body parts using techniques such as frequency up-conversion, non-linearity, harvester circuits, and spring pendulums. For energy conversion, the PE-EHS makes use of human body components like the lower limbs, human thigh, walking, footwear, electronic skin, and shoulder straps. PE-based EHS recently created the stretchable and Nano-crystal based PE nano-generator. The TE-EHS, in comparison, converts energy using human body parts like skin, cloth, and arms as well as wearables like shoes and

wristbands. Recently, TE-based EHS created the flexible, Nano-crystal, cantilever, and TE fabric-based PE nano-generator [6], [7]. The EM-EHS converts energy using human motions such as hip, knee, watch, walking, arm, and leg actions.

Design and management of a symmetrical grid fault-proof DFIG with SMES storage

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Abstract: In this article, a novel design and reliable control for DFIG-based wind conversion systems are presented. The system is made to lessen issues caused by abrupt changes in wind speed and to increase the DFIG's susceptibility to grid faults to prevent disconnecting the wind system from the electrical grid. A specific superconducting magnetic energy storage (SMES) scheme and its control are suggested in order to improve the DFIG behavior, power fluctuation, and to safeguard power devices under symmetrical faults. The control structure and strategies were applied in the MATLAB/Simulink environment to verify this research. When the simulation results were compared to those obtained using conventional control strategies, they revealed an improvement in the way these types of wind conversion systems work, demonstrating the validity and efficacy of the suggested approach.

Keywords: Doubly fed induction generator, Energy storage, Power fluctuation, Superconducting magnet, Voltage sag, Wind power generation

Introduction

Clean energy like wind has made significant strides in recent years in addressing the environmental damage brought on by traditional power sources. Their integration into the electrical system has been supported by technological advancement and the growth of wind systems [1]. This extensive wind turbine integration into the grid is particularly true for wind systems that have DFIGs (dual feed induction generators) [2], [3]. This dominance of DFIG is a result of its benefits, including variable speed operation, converters that are only sized at a small portion of the DFIG power rated, and decoupled active and reactive power management [4]-[8]. The rotor of the DFIG depicted in Figure 1 is connected to the grid via two power devices; the first is a rotor side converter (RSC), which is positioned after the rotor, and the other is a grid side converter (GSC), which is positioned prior to the grid. These two power device systems are connected by a DC bus. Decoupling of the active and reactive abilities is managed by the RSC. The GSC is regulated to maintain the reactive power near zero and stabilise the DC link voltage. Direct torque control (DTC), direct power control (DPC), adaptive fuzzy power control, and vector control (VC) were the advanced methods used for the best DFIG functioning under normal circumstances [9]-[12]. The DFIG must add to the stability of the electrical grid in the event of a disturbed network regime while still being a part of the network.

Two barriers prevent the DFIG from operating properly: (1) a sudden and erratic change in wind speed, which results in fluctuating power output; and (2) an electrical network fault, which results in over current in the rotor's winding and an overvoltage in the DC link, which can affect the operation of the WT-based DFIG and potentially harm the power device. Two categories of solutions are presented in the literature; the first is the contribution to the command algorithm, and the second is the use of extra equipment [8]. This proposal is a new design of an additional energy magnetic storage system (SMES), and its reliable control. It can ensure improving the behaviour of the DFIG system, protecting the electronics power device of the DFIG system, and participating in

system services. This system's design guarantees optimal time response, power flow regulation, and extremely effective energy storage [16, 17]. During the grid disturbance regime, the SMES is utilized to maintain the wind system, preserve the Smooth power output from the DFIG that is connected to the electrical infrastructure. The model in question has been created in the MATLAB/Simulink environment, and the results of the simulations obtained confirm the efficacy of our model.

A three-phase asynchronous motors universal model for study of electrical power systems

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Abstract: It is essential to create models that enable the analysis of three-phase asynchronous motors (TAM) because of their high prevalence in the world's energy usage and the impact they have on how electrical systems function. This leads to the universal TAM model presented in this paper, which is founded on the correlation between the TAM's active and reactive power and the deviation in voltage and frequency. It can be used to model these motors in studies of electrical power systems and is very helpful for general-purpose TAMs. The model's input parameters were derived from a statistical study of 70 TAM belonging to various classifications. By contrasting the findings with those derived from the equivalent circuit's solution, which shows the validity of the results with less than 6% errors, the results are validated.

Keywords: Electrical power system, Modeling of electrical systems, Response to voltage and frequency, Three-phase asynchronous motors, Universal model

Introduction

One of the key elements of electrical power networks is a three-phase asynchronous motor (TAM) [1] through [3]. It is necessary to use models that mirror its behaviour and are simple to represent in power flux and stability studies because of this [4]. As a result of TAM's significance, numerous studies have been conducted on them. These studies have mainly focused on improving technology to raise the level of efficiency [5, 6], on control strategies in the TAM's drive system to ensure the maximum operational efficiency [7], and on techniques to estimate the operational efficiency of TAM [8]. Few studies, though, have examined how to accurately represent TAM in electrical power networks. TAM continuous power or impedance models are frequently used in studies [9], [10]. The voltage collapse that happened on the West Coast of the United States in 1996 is an illustration of the effects of this error, and its causes could not be adequately explained until better modelling of TAM was carried out [11]-[14].

The equivalent circuit of the TAM has been used by some writers to analyse electrical power systems [11], [15]-[17]. This technique necessitates understanding of the circuit's parameters, which almost no manufacturer provides. Due to this, it is necessary to model the TAM in order to compute these parameters using different software [18]-[20] or by including it in the electrical network analysis software [21]. It is demonstrated in [22] that the TAM can be represented by the conventional linear ZIP model. It is also a component of network analysis tools. In that study, it is described how the parameters of the ZIP model, including the kind of mechanical load driven by the motor and its magnitude, can be determined from knowledge of the precise equivalent circuit parameters of the

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motor. The challenge still remains in figuring out the comparable circuit's parameters using other software. This article makes an attempt to address this issue by presenting a per-unit universal model that can be used with any general-purpose motor, whether it operates at medium or low voltage.

Assessment of voltage consistency with PMUs and STATCOM

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Abstract: Voltage instability has been a major worry for researchers and utilities for the past few decades due to the numerous instances of system blackouts brought on by voltage instability that have been documented in different parts of the world. The advancement of synchro phasor technology makes it possible to monitor and control the voltage stability of the system in real time. This study recommends placing strategically positioned phasor measuring units (PMUs) to monitor the voltage stability margin online and control it with a static synchronous compensator. (STATCOM). STATCOM has been installed at the critical bus in accordance with the minimal reactive and real power loan ability for the majority of the line outages. STATCOM injects reactive power into the bus based on the discrepancy between the bus voltage and its standard value. Bus voltages are determined using PMU measurements at regular periods, and reactive power is then added to the bus as needed. By adding reactive power, STATCOM has increased the voltage stability margin, which is continually monitored. The efficacy of the proposed method for online monitoring and management of voltage stability margin (VSM) has been demonstrated using simulations on the IEEE 14-bus system and the New England 39-bus system.
Keywords: Nose curves, PMU, STATCOM, Voltage stability, VSM.

Introduction

The maintenance of voltage stability is essential for the secure operation of power networks. Voltage collapse may occur in a sizable area as a result of voltage instability, which may cause unacceptable low voltages to develop in a sizable part of the network [1]. To prevent voltage breakdown, the system has been told to employ a number of control strategies. Voltage instability has several major reasons, one of which is a lack of reactive support. Transmission of reactive electricity is difficult, particularly under duress. Voltage instability therefore seems to have a workable answer in the form of local reactive support at critical buses. Power electronics technology advancements have led to the creation of flexible AC transmission system (FACTS) controllers, which can effectively regulate the voltage stability of the system [2]. By injecting reactive power into the bus, a static synchronous compensator (STATCOM), a shunt controller that belongs to the FACTS family, can widen the voltage stability buffer. The P-V and Q-V curves-based method has been frequently used since Tokyo's voltage collapse to determine the ideal location and size for STATCOM [5], [6]. These techniques require a lot of effort and room.

Several heuristic techniques have been used to identify the location and size of FACTS devices. Mixed integer linear and non-linear programming has been used to find the ideal shape and placement of FACTS devices. Even so, [7]-[11], local minima and computational effort present a problem. Particle swarm optimization, a type of evolutionary computation, can be used to solve the STATCOM size and allocation issue. (PSO). Lei and Fei proposed an inventive nonlinear (IN) H-control for STATCOM to improve the voltage stability of the power system network [21]. As a consequence of injecting or absorbing reactive power, it has been proposed that STATCOM should directly control power based on the transit of active power [23]. This research recommends using phasor

measurement devices to track and control the voltage stability of online STATCOM systems. The system's critical bus, as determined by the continuation power flow (CPF) technique [25], has been properly located here because STATCOM placement is an offline strategy. However, it has been proposed that the online systems use bus voltages monitored by phasor measuring units at regular intervals to monitor and adjust the voltage stability margin due to the reactive power injection by STATCOM to the important bus.

Analysis of the performance of a standalone synchronous reluctance generator in an imbalanced environment

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Abstract: Due to its easy control and low cost, a standalone self-excited wind energy conversion system (WECS) is thought to be frequently used in remote regions. The performance analysis of an independent self-excited reluctance generator (SERG) under balanced and unbalanced operations is presented in this article. In addition to the unbalanced voltage factor of SERG, an asymmetrical component is suggested to acquire the positive and negative sequence components of voltages and currents. The obtained results have been verified and contrasted with experimental findings from a laboratory prototype of a 5.5 kW synchronous reluctance generator powered by a dc motor as a prime mover under unbalanced loads and excitation capacitors. The contrast confirms that the suggested model is appropriate.

Keywords: Abnormal operation, Excitation capacitance, Positive and negative sequence, Symmetrical components, Synchronous reluctance, Unbalanced loads

Introduction

Renewable energy sources (RES) are now a vital energy transformation to reduce carbon emissions because of rising energy demand and climatic changes. Recently, RES have attracted a lot of interest on a global scale. especially geothermal, solar, wind, hydro, and sun energy [1]. According to the International Renewable Energy Agency (IRENA), wind energy has experienced the fastest growth over the past 20 years, increasing by a whopping 7.5 gigawatts (GW) from 7.5 GW in 1997 to 700 GW by 2020. As a result, wind energy has gained popularity for both disconnected and grid-connected devices [2]. The best generators for wind energy conversion devices are the permanent magnet synchronous generator (PMSG) and the doubly fed induction generator (DFIG). (WECS). Due to demagnetization at greater temperatures and cogging torque effects, the use of rare earth magnets in PMSG is the main restriction. Additionally, the price of PMSG, which has increased in variety in recent years, motivates scholars to look for new substitutes [2]-[5].

Regarding DFIG, its design and capacity to produce dual output through both the stator and the rotor make it an appealing option for integrating WECS into the grid [6]. As a consequence, the power converter's size is reduced to 30% of its stator rating and includes a harmonics filter. Additionally, because the power converter receives the necessary excitation for DFIG from the rotor circuit, there is no need for an external supply of reactive power. But the existence of slip rings and brushes necessitates routine repair, making the use of DFIG in offshore applications less dependable and more expensive. Additionally, its size prevents it from being used in tiny stand-alone applications [7], [8]. As a result, a stand-alone self-excited WECS is a preferred option in isolated locations; stand-alone WECS frequently employ the self-excited induction generator (SEIG) [9]. due to a variety of benefits, including the lack of brushes, reduced maintenance requirements, lower costs, and the ability to regulate power at

different rates [10]. On the other hand, the voltage regulation performance of conventional brushless self-excited generators is subpar and necessitates a magnetizing current from an external excitation source, such as extra excitation capacitances. The variation in speed and load has a major impact on SEIG's output voltage and frequency as well. These drawbacks have been developed and researched in order to improve electricity quality, which raises installation costs [10]-[13].

Analysis of a linear motor for a home elevator application with symmetrical EMF vectors

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Abstract: For higher thrust lifting action, the linear permanent magnet synchronous motor (LPMSM) has become a competitive option to other linear motors. LPMSM could help with energy conservation while also being appropriate for applications needing higher thrust, like elevators, thanks to advancements in permanent magnet technology. The larger dimension of the current LPMSM, however, necessitates more room in order to accommodate a household elevator. A new LPMSM with increased thrust capacity has been suggested as a solution to this problem. This study models and analyses the new LPMSM in terms of force and back EMF. The new LPMSM is given a symmetrical EMF vector for better efficiency. Four LPMSM models for reverse EMF and force are investigated. The findings show that, when compared to the other poles, the 6 slot 4 pole has the greatest back EMF. The proposed LPMSM at the conclusion of this study is a symmetrical EMF vector as a suitable combination of slot and pole.

Keywords: Elevator application, EMF constant, Force constant, Linear motor, Symmetrical vector

Introduction

The world is transitioning to an ageing civilization today. Numerous locations have reported rising ageing rates and their effects on society [1]-[4]. Malaysia also experiences a comparable circumstance [4]. The population of Malaysia is ageing as a consequence of declining fertility and mortality rates, improved life expectancy, and population growth. By 2030, Malaysia is predicted to be an ageing country with 15% of the people being over the age of 65. Therefore, a support structure must be created to assist the elderly population in maintaining their independence. Improving the self-mobilization system is one of the support systems that could benefit the elderly people. A wheel chair with better movement control has significantly aided old people in moving horizontally [5]. However, the elderly population must rely on expensive conventional elevators that are impractical to place in their homes for vertical movement. Nowadays, the majority of home builders prefer to construct settled homes with two stories or more. In order to ensure that it is feasible and affordable to be installed at least for a double storey home, a small and inexpensive elevator system known as domestic elevators is needed to promote independent living for the elderly.

This system will benefit disabled persons in addition to the elderly [6]. Some researchers have specifically included the Cloud and Mobile Device Control Feature to promote an IOT-based smart home system in order to make the domestic elevator system accommodating to this set of individuals [7], [8]. The modern domestic elevator system then utilizes either permanent magnet synchronous motors (PMSM) or rotational type induction motors (IM) as the electric motors [9]. Gears will be used to transform the rotational motion created by IM or PMSM to linear

motion. The elevator vehicle is then moved up or down using linear motion. For instance, using the IM or PMSM necessitates the use of a separate chamber known as the motor room, which houses the motor and its control panel. Typically, a level above the top floor is needed, which is uneconomical in terms of space occupancy. According to some studies, the traditional elevator system takes up roughly 30% of the overall floor space in structures taller than 250 meters [10]. A linear motor can be used as an electric drive for the domestic elevator system to resolve this issue. In addition to eliminating the motor room, using a linear motor as an electric machine in a home elevator system also allows for its use as a counterweight [11].

Power control for AC/DC systems with 3-phase and 1-phase ILC that is interconnected

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Abstract: The efficacy of power converters in AC/DC hybrid micro grid system (HMGS) is continuously evaluated for accurate power sharing, transient stability, and load dynamics. To accomplish optimal power flow, the currently used control techniques are either complex or constrained. For interlinking converters (ILCs) connected to interconnected AC and DC grids, this paper suggests a modified decentralized droop control system. A three-coordinated model with corresponding axes for AC frequency, ILC power, and DC voltage is suggested. The AC frequency droop and the DC voltage droop that result from excess are necessary for the power sharing through the ILC. The three and single phases of ILC are intended for the control system. The obtained findings are contrasted with those of the double loop control technique, which exhibits more precise power sharing and lower frequency deviations. Under islanded mode, the ILC operates autonomously and transmits electricity in both directions. MATLAB/Simulink is used to run the exercise.

Introduction

A thorough discussion of the detailed micro grid (MG) design with converter control is provided in [1]. Decentralized control schemes for MG operate without a communication connection and include adaptive voltage droop control, line impedance droop control, angle droop control, through droop control, and control of angle, line impedance, and virtual impedance [2]. An established technique for managing and operating single-phase inverters linked in tandem to MG while minimizing harmonic distortion [3]. By controlling the voltage and current, interlinking converter (ILC) performance is always discussed for stability, excessive power losses, the problems are highlighted, and analysis is done [4]. For controlling MG with renewable energy sources (RES), centralized control using particle swarm optimization (PSO) technique with maser and slave concept is suggested [5]. The current trend of electric vehicles is drawing researchers to integrate MG, nano grid (NG) for two-way power flow through energy storage system (ESS), and the power quality issues associated with the grid are addressed with the best solution by tying filter and restorer together [6].

Contained band variable switching frequency pulse width modulation (CB-VSFPWM) is a control method created to lower the total harmonic distortion (THD) in a single-phase inverter [8]. A modified reverse current flow technique for the radial system is suggested to get the most output power possible for a cluster MG [9]. In order to integrate PV and proton exchange membrane fuel cell (PEMFC), a multi-port DC-DC boost converter is created [10]. For smooth power production without fluctuations and to maintain stable voltage and frequency, a fuzzy logic controller is developed to drive and control the PV wind and battery system [11]. A cyber cooperative control is

created for ILC in order to identify false signal attacks because there is always a risk when controlling MG through communication-based control and MG have a high likelihood of being attacked by cyber security [13].

Utilizing a model-based algorithm in the antilock braking system to enhance regenerative braking on electric cars

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Abstract: With an 8–25% range, electric cars (EVs) need more effective regenerative braking systems, so designers must create them. The antilock braking system (ABS) was selected because it provides a number of benefits, including improved safety concerns, vehicle maneuverability, etc. The measurement results showed that ABS required more time to stop the wheels even when the tire rotation speed was the same. Less differentiation in magnetic flux with respect to time led to a reduced induced emf in the generator. At 4500 pm, ABS 50 Hz performance was 19.5%, while hydraulic brake performance was 21%. ABS increased the friction frequency with the wheels from 10 to 50 Hz using model-based algorithms (MBAs). The ABS graph moved closer to the hydraulic graph as the frequency rose, and the ABS efficiency improved. Despite the fact that ABS falls short of hydraulics in halting wheel rotation, it improves battery temperature and energy savings. Wheel stop-times that are longer give the wheel's rotational kinetic energy more opportunity to be converted into electricity.

Introduction

Electric vehicles (EVs) are a practical solution for cutting down on fuel usage and air pollution brought on by combustion engines [1]. Due to their ability to recover energy while operating, EVs are also more effective than internal combustion engines. One way to restore is through regenerative braking [2]. Regenerative braking makes use of the kinetic energy generated during the stopping process, which causes the wheels to keep turning even after the brakes have been applied. Electricity is created from this kinetic energy and is then kept in batteries. As a consequence, the vehicle's speed and the battery's state of charge (SOC) limit regenerative braking [3]. Vehicle equilibrium is provided by ABS. The driver keeps control of the vehicle while applying the brakes. The reason ABS is reliable is that it employs a model-based algorithm (MBA) or a rule-based algorithm (RBA) to regulate the fluid pressure in the brakes [5]. The MBA requires a sizable quantity of data input and mathematically models the braking process. It's more exact. RBA, meanwhile, builds its algorithm on the crucial elements of the control action. It is less difficult.

In this research, we modelled the use of regenerative braking in EVs using the power train components (induction motor, generator, and battery). The vehicle's NVH (noise, vibration, and harshness) behaviour will be improved by accuracy in power train component placement [6]. The induction motor rotated the driving wheel (DW) through the pulley in a one-to-one ratio to produce the same amount of power. The various axles allowed for a more stable rotation [7], while the double speed increased the generator's fluxes [8]. The antilock braking system's

regenerative stopping mechanism is explained in Section 2 of the essay. (ABS). The elements of the regenerative braking system in this research are covered in Section 3. The findings of the observations and speed calculations are presented in Section 4. The optimal regenerative braking result is found in Section 5. Because of the 30% to 50% energy loss during braking, electric vehicles (EVs) and regenerative braking are closely linked [9]. Recovery from regenerative deceleration can range from 8% to 25% [10].

Performance evaluation of a controller for a two-stage grid-connected solar PV system based on voltage sensor less technology

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Abstract: For a two-stage, three-phase grid-connected solar photovoltaic (PV) system, a sensor-free DC-link voltage controller based multifunctional inverter is suggested in this study. First, the proposed scheme includes an outer voltage controller that manages power-sharing between the PV system and the utility grid and necessitates knowledge of DC-link voltage. Second, the VSI can serve as a compensator for harmonics in the grid current that are caused by non-linear loads. The proposed active power controlling grid reference current signal scheme replaces the conventional controller and necessitates the expensive, expensive high voltage sensor to detect DC-link voltage, increasing hardware complexity and decreasing reliability. The suggested active power management strategy performs on par with a typical voltage sensor-based voltage controller. MATLAB/Simulink software is used to thoroughly verify the efficacy of the suggested method for a two-stage, three-phase grid-connected solar PV system when feeding nonlinear loads with fixed and variable irradiance.

Keywords: PV, Inverter, DC-link Voltage, VSI, nonlinear loads.

Introduction

The demand for electricity is rising alarmingly fast right now all over the world. Electric utilities' concern about the need to create alternative, renewable, and sustainable sources of energy has grown as non-renewable energy sources are rapidly running out [1], [2]. Solar photovoltaic (PV) energy is one of the RES that has attracted recent global interest and investment as a sustainable and environmentally friendly method of producing electricity for people [3]. It is also one of the main components in the spread of distributed energy generation (DEG) systems. Additionally, the use of numerous nonlinear loads has multiplied in the commercial and industrial sectors today, which has made the issue of non-sinusoidal currents entering the electrical power network worse and is negatively affecting the power system's efficiency and dependability [4]–[9]. As a result, experts are now interested in ways to improve the power quality (PQ) in the electrical distribution system. The usefulness of PV generation systems has been improved in response to this need. The device should also provide power quality conditioning in addition to providing the grid with the necessary active power or meeting load demand [10].

Utility PQ problems like current harmonics, declining point of interface (PoI) voltage, load unbalancing, and low power factor in electric distribution systems have all been addressed in the past [11], [12]. The synchronous reference frame theory (SRF) [14], instantaneous symmetrical component theory [15], and instantaneous reactive power theory (IRPT) [16] based control algorithms have all been thoroughly explored in order to address PQ issues in distribution networks. Through a hybrid DC-DC converter for a three-phase system, the study published by Zakzouk et al. [17] suggests a decentralized control mechanism for the efficient management of power flow from PV systems to the grid. In [18], a multifunctional inverter is discussed without using sensors for the converter, along with feeding electricity to the grid from a solar PV system. To estimate the PV parameters, such as voltage and current, Bengourina et al. [19] introduced a Kalman observer, thereby reducing the number of physical sensors and providing information to the MPPT algorithm [20], [21] to have the most power from PV. It is important to note that

in [22], the standard active current is generated using a fixed grid voltage and is not adaptable to changes in POI voltage. In contrast to the decoupling capacitor DC voltage estimation suggested in this paper, which uses solar PV parameters and the peak amplitude of the voltage at the grid and load interface, the decoupling capacitor DC voltage is estimated in the papers [23], [24] based on solar PV parameters and fixed grid voltage.

DC micro grid voltage control using PV and battery-coupled SEPIC converter

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Abstract: This study examines the use of single-ended primary-inductor converters (SEPICs) linked to photovoltaic and battery systems to regulate the voltage of DC micro grid systems. When compared to buck and buck boost converters, the SEPIC converter, a DC-to-DC boost converter, can generate non-pulsating DC current with fewer ripples. The demanding state necessary for maximum power point tracking (MPPT) applications and battery charging is non-pulsating DC current. The converter simulation for both open and closed loop systems is presented in this article. First, the proposed PV coupled SEPIC converter and the battery coupled buck boost converters are integrated to control the voltage in the micro grid. The output voltage, ripple voltage, and power are compared with the traditional techniques. The proposed technique has resulted in a ripple voltage reduction from 0.3 V to 0.1 V. Second, for the purpose of regulating the voltage of the DC micro grid system, separate PI and PID processors are used in conjunction with SEPIC and buck boost converters. When the results of the closed loop analysis are measured against time domain specifications, it becomes clear that the PID controller provides a superior response. A prototype has been created to test the simulation findings after the proposed system is simulated using MATLAB/Simulink.

 Keywords: Buck boost converter, DC micro grid, Photovoltaic, PID controller, SEPIC converter

Introduction

Due to the ongoing need for energy, grid-connected photovoltaic devices are very common today. By providing financial support, many nations promote PV-fed power production systems. Less than 20% of solar energy is always converted into usable electricity by photovoltaic (PV) panels, and this efficacy drops even further depending on the load and panel temperature. The maximum power point tracking (MPPT) method combined with a power point tracker is used to increase efficiency. Using a PWM-controlled DC-DC converter, a PV coupled single-ended primary-inductor converter (SEPIC) converter can produce or track more electricity from the solar panels [1]–[4]. It provides information on how to get the most electricity possible out of a PV panel without using a microcontroller. PV panels can generate the most electricity possible in any atmospheric situation, and controlled PWM technology can increase efficiency [5].

PV panels can be used to their full potential by connecting circuits with loads through [8]-[17]. The merging of nearby loads and DC-operated generators is known as a microgrid. The benefits of a DC microgrid over an AC one includes: (i) a DC power system that operates with fewer converters is more efficient; (ii) a DC power system that requires fewer components is more dependable; (iii) a DC power system that requires fewer components also results in lower costs; and (iv) a DC power system that is more resilient and simpler when subjected to disturbances. When operating in grid-connected mode, it can provide power to the grid when it is needed and absorb power from the grid when it is in surplus. The PV fed SEPIC converter system is not covered in the aforementioned publications. Section 2 presents the system setup and DC microgrid model. The comparison of the proposed and

standard DC microgrid systems is covered in Section 3. This part also covers closed loop systems that are PID and PI controlled. The following sections 4 describe how the proposed system's hardware is implemented. The findings are concluded in Section 5. PV source is provided to the SEPIC converter using the MPPT method, and source from the battery is provided to the buck boost converter through a filter that is integrated with the DC grid.

Grid-tied modular energy storage with a simplified management system

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Abstract: Renewable energy networks and microgrids are becoming more prevalent. They need a network energy storage gadget to function normally. Common high-voltage storing technologies have a lot of drawbacks. If not handled carefully, there may be a danger of fire or electric shock. Used batteries cannot be used in a way that is both secure and efficient. The quality of the output voltage curve is adversely impacted by using a limited number of levels. It is possible to separate large components into smaller ones so that they can be serviced and replaced separately. The paper suggests a method for creating an energy storage system that uses small battery assemblies that are connected to separate cells in a modular multilevel converter rather than a concentrated battery. The possibility of energy accumulation and return to the network is ensured by a solution that guarantees the minimization of sensors.

Introduction

Alternative energy sources are used in contemporary electricity grids. Numerous studies, such as [1] and [2], concentrated on working point optimization for different power sources. To coordinate alternative sources and the electricity grid, there are numerous tools [3][5] and instruments [6][8]. Grid-tied energy storage is required to obtain power balance. The conventional energy storing circuit, however, has a number of drawbacks:
- In contrast to the modular multilevel converter (MMC), switching losses that prevail at low loads result in efficiency reductions that are only marginally load-dependent.
− Even in multilevel classical inverters, the DC link utilization factor is lower than in the MMC because the MMC has an immensely higher-level count [9].
− Used batteries require a more complicated device for balancing and protecting the batteries, making them incompatible with the traditional circuit.
− To make a single storage simpler to transport and install, it is more challenging to divide it into sections.
− Installing a high-voltage battery can be risky. Work must be done in part while being exposed to excessive voltage.
− Modernizing traditional energy storage is challenging because monolithic storage is extremely susceptible to cell heterogeneity.

These factors have led to the development and introduction of a new breed of storage devices based on the modular converter structure described by Dekka et al. [10]. After the adoption of renewable energy sources, the development of modular multi-level storage systems began. Examples of these advancements in electronic

transportation include [11] and [12]. In both of these papers, the design of a three-phase energy storage device is suggested. This design includes a delta connection between the phases and a complex module structure that enables parallel module connections at low voltages. Although Yang et al.'s [12] calculations of efficiency and economic efficiency show that MMC with battery energy storage with such a complication of the structure are more efficient than classic ones, such complications are unnecessary for a drive in an AC network with constant parameters (the amplitude of the first harmonic and its frequency). A less reliable module structure is suggested by Forstl et al. [13] that is simpler and has less structural redundancy because there are fewer active keys.

For use with two-wheeled electric vehicles, an AC-DC UPF charging circuit

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Abstract: Extinction and the release of greenhouse gases from fossil fuels caused a change in the energy sector, which resulted in the production of zero-pollution energy from non-conventional natural sources. In this new age, electric vehicles (EVs) are popular as a way to combat global warming. Electric vehicles (EVs) are not very common due to storage system limitations, but they are essential and advised for (public/personal) transportation in order to decrease vehicle pollution. A DC source is used to power the EV's (battery). (Converting the available AC supply to DC). The conversion procedure reduces the power factor of the input source, which is a worrying factor. This study examines the power factor problem that arises when EV batteries are being charged. The goal of the paper is to charge the EV's battery using AC-DC conversion while preserving the source side's unity power factor. MATLAB/Simulink software is used to create the model and explain the findings (for three different battery levels).
Keywords: AC-DC, Battery, Charging, Electric vehicle, Unity power factor

Introduction

The release of carbon dioxide into the atmosphere causes global warming, which destroys the ozone layer and damages the ecosystem for all living things. One significant system that adds to the ozone layer being destroyed and the Earth's temperature rising is the use of IC engines in vehicles that run on crude oil products [1]. Stability in climatic circumstances influenced by humans can be attained with the transition of vehicle systems to sustainable sources like PV-solar systems. The use of electric vehicles (EVs) [2]-[5] demonstrates a forward-thinking step towards resolving environmental problems on a worldwide scale. Electric cars that run on solar energy are also gaining popularity [6]. Using electric vehicles instead of gasoline-powered ones can considerably lower operating costs while preserving the environment. The primary barrier to using EVs is their limited operating range. The efficacy and range of EVs can be improved with the use of cutting-edge converter and battery technology.

The wheel of an EV is driven by an electric motor through a gear system, making them cars that only use electrical components and converter technology. In-vehicle charging for EVs is currently popular, which is made feasible by advancements in power electronics technology in the automotive industry. After being converted to DC type by an AC-DC converter, the battery system that is mounted on the board of an EV is charged [8, 9] from the grid (AC) source. The motor is powered by the battery, and the EV's wheel is linked to the motor's mechanical output via the gear system. A review of the problems with the power quality that arose when connecting electric cars to the distribution system and different solutions have been made in [10]. A grid reactive voltage regulation method that lowers power losses, improves voltage stability, and optimizes the system to lower EV charging costs has been suggested [11]. With a power factor and total harmonic distortion of 0.9999 and 2.16%, respectively, a single stage power conversion-based single phase multifunctional integrated converter for EVs has been suggested in [12]. According to a hierarchical control design for frequency regulation of a multi-area EV to grid application suggested

in [13], the primary control period was more adversely impacted by the V2G operation than the secondary control period. For lithium-ion batteries used in EVs, a battery management system based on automotive drive cycle measurements has been suggested [14]. According to research published in [15], a novel energy regeneration system for BLDC motor-driven electric vehicles can improve the effectiveness of the EV motor drives. It has been suggested in [16] that smart micro grid scheduling that takes electric car battery swapping stations into account lowers system costs by 72%. In a fuel-cell hybrid electric vehicle, Salado et al.'s [17] electronic platform for multiple energy harvesting devices was introduced along with a multiple MPPT-EMS.

Analysis of single-phase, single-stage grid-connected photovoltaic system's overall harmonic distortion

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Abstract: This research discusses the problem of poor power quality with a particular emphasis on the impact of grid-connected PV systems' total harmonic distortion (THD). First, a grid-connected PV system with a single-phase, single-stage has been created to track the harmonic distortion patterns as well as the output values of voltage and current. Since maximum power point tracking (MPPT), which extracts the maximum output power, voltage, and current from the PV system without fluctuating, is proven to be the first stage in THD reduction, MPPT was put into place. Additionally, using a good filter lowers the THD amount in a PV system. As a result, the THD analysis will be the main focus of this research to address the power quality issues in the grid-connected PV system. The outcome demonstrates that, in the case of grid-connected PV systems working under various solar irradiances, the THD value for current, ITHD analysis, is more important than the THD value for voltage, VTHD analysis. As a result, the performance of THD values will improve as solar irradiance increases because it will raise the rated values of generated power and current.

Keywords: Grid-connected PV, MPPT, PV system, Single phase single-stage, Total harmonic distortion

Introduction

Alternative energy sources, particularly the use of renewable energy, have been increasing in popularity as clean energy demand and awareness of global warming have increased. (RE). Solar photovoltaics (PV) was the most widely used RE source among the other RE sources in 2019, with installed electricity capacity increasing by more than 200 gigawatts (GW). However, COVID-19's rapid spread and late 2019 appearance led to the disease becoming a global pandemic by early 2020. This pandemic consequently led to health problems and fiscal crises on a global scale [1]. The energy industry, including RE, was also impacted by the recession. Carbon dioxide, carbon monoxide, sulphur dioxide, and many other pollutants are just a few of the impacts that conventional non-renewable sources will have on the environment [2]. Single-stage, double-stage, and multi-level solar PV systems are frequently used in grid-connected PV systems [8]-[11]. Typically, a double-stage converter that consists of a DC/DC converter and a DC/AC converter, also known as an inverter, is used to connect a PV system's DC source to the load and then the grid.

However, the typical approach using a double-stage inverter calls for a number of extra components, which raises the implementation cost and results in a slow transient response as well as conduction losses. As a result, earlier studies have found that single-stage inverters are highly efficient, inexpensive, and simple to use [12]. However,

problems with the power quality system are brought on by the expanding use of PV in distribution networks [13]-[15]. In conclusion, it is critical to analyse power quality problems like total harmonic distortion (THD) in order to track the operation of the electric network in the grid-connected PV system. The significance of THD and various approaches to lowering THD at various stages in a PV system have been fully covered in [18] and the references therein. Recently, a novel approach to THD reduction using adaptive filters was put forth in [19]. More than 70% of the reduction was achieved before and after using the suggested filter in [19], but the adaptive filter is heavily dependent on the filtering coefficients.

A practical monitoring system for single-phase voltage and current signals on power lines using an asynchronous interrupt-driven sampling method

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Abstract: This research has created a practical monitoring system that uses an asynchronous interrupt-driven sampling technique. Power-line single-phase voltage and current signals as well as their associated data, such as RMS values and harmonic contents, are meant to be collected by this system. The voltage and current signals are acquired by the device using a voltage transformer and a current transducer. The device uses a microcontroller to handle data acquisition, calculations, and wireless data transmission. Development of the system's hardware and microcontroller software, as well as Bluetooth-enabled monitoring software for portable devices, are all part of the creation process. In the course of the study, a brand-new sampling technique was created to deliver precise timings throughout the acquisition procedures. This method used interrupt mechanisms to asynchronously control some peripherals involved in the acquisition process. After some testing, it was determined that the system employing this method could effectively control the timings for the synchronous acquisition sequences. Additionally, the system's use of Bluetooth interfaces made it possible to use portable devices for actual tracking.

Introduction

Numerous areas presently use monitoring systems. Some related studies, like those covered in [1]-[13], have been done and have introduced novel power electronics techniques. One illustration of a monitoring activity that is frequently used is monitoring power-line voltage and current. A dependable analogue to digital sampling device is required when power-line voltage and current signals are being monitored. The timing accuracy of the sampling process is crucial because it will influence how well digital data represents immediate signal amplitudes. Timing errors will decrease the precision of both the observed values and the digital data that has been obtained. To create a monitoring system that will meet a practical need, it is also important to take into account the hardware's use and the circuit's architecture. Monitoring tasks are frequently carried out offline at this time. The development and innovation of technology, particularly in the fields of electronics and software, is the foundation for many remote surveillance systems. For electricity monitoring, such as that shown in [14]-[16], wireless technology is used all over the world as an alternative to wired technology. Bluetooth technology is one of many wireless technologies that is widely used, particularly in portable devices.

In this study, a monitoring device for single-phase voltage and current signals on power lines was created. The goal of this system is to be used as a practical monitoring system that represents signals with accurate statistics. The device uses a microcontroller to handle data acquisition, calculations, and wireless data transmission. Development of the system's hardware, software for the microcontroller, and monitoring software for mobile devices were all part

of the creation process. To support the created system, an asynchronous interrupt driven sampling method was created. Some main advantages are anticipated from this system, i.e.

− The system enables portable devices to watch both the waveform of the acquired signals as well as important signal-related parameters like RMS values, maximum values, minimum values, and harmonic contents.

− Since many modern portable devices include a Bluetooth interface, the monitoring procedures can be completed with ease using widely accessible portable devices like hand phones.

Self-starting, single phase, good performance, low-cost induction motor drive

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Abstract: The goal of the current article is to develop a self-starting single phase induction motor (SPIM) drive system that is low-cost and high-performing. The starting and running capacitors are replaced by phase-shifted pulse width modulation (PWM) trains supplying the motor. High performance sensorless SPIM drive is achieved by combining adaptive sliding mode control with model reference adaptive control (MRAC). The findings show that the proposed system can start and quickly monitor the reference speed with almost no percentage overshoot and no steady-state error. Additionally, the suggested SPIM drive system is unaffected by changes in system parameters and resistant to exterior load torque disturbances. To verify the viability of the suggested method, numerous simulations have been run.

Introduction

Single-phase induction motors are frequently used in domestic and commercial uses, including fans, refrigerators, washing machines, dishwashers, dryers, and clothes compressors [1]–[4]. This is because they have advantages over low rating DC motors, such as rigidity, affordability, high reliability, minimal upkeep requirements, and the absence of excitation. Due to their pulsating and stationary air-gap magnetic field, single phase induction motors (SPIMs) are not self-starting motors [5], [6], so a mechanism for beginning an SPIM is essential. The two-capacitor SPIM, which combines the qualities of high starting torque and excellent running performance, is one of the SPIMs that are categorized according to their starting methods.Many researchers are interested in enhancing SPIM efficiency during startup and operation. An electronically controlled capacitor was used in the study [7, 8] to enhance SPIM performance. To increase the starting torque of an SPIM, Liu [9] used an electronic switch to change the actual capacitance value of the capacitor. To increase an SPIM torque and its effectiveness, Liu et al. [10] have suggested a straightforward hardware circuit that consists of a digital signal processor DSP chip and one power electronic device. The power electronic device's switching sequence is managed by the digital signal processor (DSP), and as a result, the necessary capacitance values are attained for beginning and running operation. According to the authors of [6], a triode for alternating current (TRIAC) device and capacitor would be used to connect the primary and auxiliary windings. By using the correct TRIAC switching sequences, this arrangement allows for high starting torque.

Many researchers are very concerned about sensorless speed estimation of electric drives, and several methods have been documented in the literature. In [11], [12], a Kalman filter application for three-phase induction motor speed estimation is shown. Fuzzy logic observers were used by the authors of publications [13] through [15] to determine the speed of three-phase induction motor drive. In [16], [17], the use of a sliding mode observer for speed

determination has been discussed. Numerous researchers have been interested in using model reference adaptive system (MRAS) for motor drive speed estimation because of how easy it is to use and develop [18]. The application of MRAS for three phase induction motor speed determination is described in [19], [20]. For the purpose of estimating the speed of a direct controlled switched reluctance motor, Khan and Verma [21] have applied MRAS. In order to provide an observer for determining the speed of a three phase induction motor, Merrassi et al. [22] combined MRAS and neural network.

Using a voltage source converter transfer device, high voltage direct current model predictive control

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Abstract: Model predictive control (MPC) has recently been ranked as one of the best modern techniques of control for high voltage direct current (HVDC) transmission systems based on voltage source converter (VSC) transmission systems because it is an easy-to-understand, simple-to-implement controller with a dynamic and quick response. For the conventional double closed loop PI controller, it is difficult to calculate the couplings, Kp, Ki, and Kd parameters. Additionally, it is less resilient to complicated or systems with slow dynamics. This paper describes the model predictive control for a two-level converter. Based on model prediction, an AC current control method is recommended for the inverter side along with direct power control for the rectifier side. The controller makes predictions about how the output voltage will act in each switching state at each sampling frequency using the recognized model. At the following sampling period, the best switching state is used, with the cost function acting as a benchmark. The accuracy of the MPC technique was verified using the tools of the MATLAB/Simulink software. The simulation's results attest to the feasibility and effectiveness of the suggested control strategy.

Introduction

After ASEA constructed the first link using high-voltage direct-current (HVDC) lines, long-distance electricity transmission using direct current (DC) started. The background of the DC, however, goes back earlier. In the 1890s, it became obvious that alternating current AC was more effective at transmitting electricity over long distances, and Thomas Edison was unable to compete with it. On the other hand, the DC is nesting again between the branches, providing a new spot, as a result of the rise in global electricity usage [1]. Power circuits are now employed for the conversion and management of electrical energy. New standards for assessing energy quality and efficiency have been developed as a result of the rising electrical energy usage [2], [3]. A completely new breed of control diagrams has been traced in response to the novelty of semiconductors [4]. the 1990s, the expansion of A completely new breed of control diagrams has been traced in response to the novelty of semiconductors [4]. Voltage source converters began to use semiconductors like insulated-gate bipolar transistors and gate turn-off thyristor in the 1990s because of their advancement. (VSC). On the island of Gotland, the very first VSC-based HVDC transmission line with a 50 MW underground cable went into service in 1999. These transmission cables are also known as HVDC plus, VSC-HVDC, and HVDC light [5]-[7]. Because the HVDC system has a number of benefits, including a decoupled and quick control of the power flow, the improvement of the power quality indicator, and the supply of

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isolated loads [8]-[13], it necessitates the development of rigorous control methods for both active and reactive power flows.

Recent studies have discovered some very intriguing MPC predictive control findings. The paper [18] compiles a table of some differences between the model predictive controller and the proportional-integral regulator and uses theory and experimental calculations to show the robustness of the predictive control. The mathematical modelling and design of the MPC control technique are provided by Zhang et al. [27]. The MPC control of the VSC-HVDC that powers passive networks is described in Zhao et al.'s [28] study. The discrete mathematical modelling of the two sides of the VC-HVDC system was where this essay began.

Reactive power correction using an advanced LVRT-controlled DSCC-STATCOM

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Abstract:

The control of STATCOM for enhancing reactive power compensation during grid faults and unbalanced load is the main topic of this paper. Analyzed and its operational limitations are examined is the issue with convectional voltage source converter based STATCOM for reactive power management and capacitor voltage balancing during grid faults. An adaptive low voltage ride through control technique-based modular double star cascaded converter (DSCC) STATCOM is suggested to address the aforementioned issues. In this dynamic control, a zero (Vo) sequence voltage is inserted for the management of active power, and the positive reactive currents and negative reactive currents are independently controlled for the management of reactive power. By managing the equal distribution of active power between converter legs, this cutting-edge control technique successfully balances the sub module capacitor voltage within its permitted limits and offers dynamic reactive power management during grid faults. Using software-based simulations with MATLAB/Simulink under single line to ground fault and unbalanced load, the efficacy of the DSCC-STATCOM and proposed control method is confirmed.

Keywords: Capacitor voltage balancing, Low voltage ride through, Modular multilevel converter, Reactive power compensation, STATCOM

Introduction

Modern power systems are becoming extremely complicated due to the growing demand for better power supply and voltage stability. The power system is more susceptible to errors due to the rapid increase in demand for single-phase loads, intelligent energy-efficient devices, and induction motor drives. Additionally, as current green energy sources like wind and solar are integrated, there are more stability issues with the power system, which could be the root of frequent faults at the load end. Convectional STATCOMs based on voltage source converters (VSC) are used to support power systems by giving reactive support, but current STATCOM are insufficient to meet the demand for reactive support under grid faults. Recent modular multilevel converters are getting popularity as a solution to these issues [1] through [3]. The advantages of these modular STATCOM configurations over traditional VSC-based STATCOMs include high voltage configurations with low-rated semiconductor devices, ease of scaling to high voltages, lower switching losses, and lower weight and volume when compared to conventional converters [4], [5]. These modular STATCOM configurations also have high Mvar ratings. The system's dynamic reactive power management is significantly impacted by the compensation of reactive power during grid faults because it results in an uneven allocation of real power among the converter's legs and unbalanced capacitors in submodules. Numerous

studies have concentrated on enhancing the control mechanism for MMC STATCOM to compensate dynamically for reactive power during asymmetrical grid outages and unbalanced capacitor voltages. By balancing the capacitor voltages, various methods for dynamic reactive power management are addressed. Huber and Korn's [7] sub-module selection-based method is used, and the most appropriate module is chosen based on polarity. However, using this approach results in higher frequency and internal converter inefficiencies. When working with smaller submodules, this technique is successful in maintaining the capacitor voltages but results in output voltage distortion.

The thyristor energy router's impact on harmonics

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Abstract:

The essential component of the energy internet that controls both the voltage level of an electric network and bidirectional power transfers is known as an energy router (ER). The paper introduces the thyristor-powered ER (TER) for a medium voltage distribution electric network that is similar to the Internet (6, 10, 20 kV). At the ER connection point, the devised device scheme applies longitudinal and transverse voltage regulation and enables changing the network's power flow and voltage level. The paper focuses on the analysis of the harmonic voltage components that the semiconductor TER components bring into the electrical network. The development of an electric network segment with a TER and a mathematical and computer model. The research done using the developed models has demonstrated that the device does not substantially distort sinusoidally. Over the full scope of an effective regulation, the harmonic components factor of the output voltage has acceptable values.
Keywords: Computer model, Energy internet, Harmonic components, Mathematical model, Prototype, Thyristor energy router

Introduction

The energy internet (EI) was suggested as an evolution of the energy system to improve the efficiency of energy production, transmission, and consumption [1]. It is regarded as the second iteration of the smart grid. The energy internet is a solution to energy issues in the Internet-style through bidirectional integration of information and energy flows, in contrast to the smart grid, which focuses on the informatization and intellectualization of the current energy system. By ensuring free power flows in a medium voltage (MV) distribution electric network, the building of internet-style power networks will enable the expansion of interaction between energy producers and consumers (DEN). It is simple for new network participants to join the infrastructure at any time, and exchanging energy is just as simple as sending data over the internet. A smart power flow management device, which is an energy analogue of an Internet router, can be used to build a power system similar to the Internet. This device, known as an energy router (ER), is the fundamental component of the energy internet that enables communication among the unified groups of energy market players [3]. The majority of the pieces in the publications on EI are reviews, according to a study. The works cover a variety of topics, including EI characteristics [4], [5], EI design [1], [5], EI applications of

information and communication technologies (ICT) [1, [6], [7], EI's primary hardware [4], [8], EI Blockchain technologies and applications [9], and other topics. Conceptually, the major issues with the architecture, control system, and power equipment of an electrical network similar to the internet are considered. Although no specific solutions are offered, the fundamental strategies are established. Additionally, the ER, the most crucial component of the internet-style electrical network, connects and manages bidirectional power and data flow between different EI components to build a network structure between them. There are many ER concepts discussed. Energy routers for MV electric networks are being developed by teams all over the globe. For instance, the investigation of the functional design architecture and properties of energy routers [10] by a team from the United States is described in the paper [10].

DVR with a hybrid control method for reducing voltage sag and swell in a solar-powered IEEE 33 bus system

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Abstract:

Sag/swell raises power quality concerns because it impairs the grid-connected system's general performance. The hybrid control mechanism based on a dynamic voltage restorer (DVR) is described in this research as a means of reducing sag and swell problems in the solar PV-based IEEE 33 bus system. The hybrid controller enhances the DVR system's general efficiency and dynamic performance. The planned work is also used to address the distribution system's voltage quality problems while utilizing solar energy efficiently and with the least amount of energy from the utility grid. Grid-side sag and swell are added, and load-side compensation is accomplished by injecting DVR voltage. The hybrid control system for DVR is built using the proportional-integral (PI) controller and fuzzy logic controller (FLC). For performance realization, the solar PV system with DVR system in this study is connected to the IEEE 33 bus system's 29th location. At sag and swell circumstances for load voltage, the hybrid control mechanism-based DVR offers 1.06% and 1.05% total harmonic distortion (THD). The suggested work satisfies the THD calculation requirements of IEEE 519. The proposed design exhibits better THD reduction for load voltages when compared to earlier studies.

Keywords: DVR, IEEE 33 bus, PV panel, Sag, Swell

Introduction

Baran and Wu developed the well-known IEEE 33 bus distribution system in 1989 to examine the impacts of distribution system changes on load balancing and power loss reduction [1]. The majority of issues with traditional delivery systems are commonly studied using the IEEE 33 bus system. One of the effective renewable energy sources used in the majority of utility sectors is solar photovoltaic (PV). Due to its intrinsic qualities, lack of pollution, and availability in all sizes, the solar PV system draws a lot of users. With these characteristics, the creation of micro-grid PV systems is possible, and it provides the electrical power from PV systems as a nearby renewable energy source. Because of the high gigawatt penetration of the PV system, the operation procedure is too complicated. The PV array screen contains electrical components and is wired to the grid system to convert voltage profiles. The performance and quality of the electric power are negatively impacted, which is unacceptable, and there are major power quality issues on the grid side as a result. To increase the dependability of the solar PV-based grid system, it is essential to look into any problems or disturbances with the desired power quality that are brought on by the solar PV system. Voltage sag, swell, disruption of the harmonics, and impulsive transients are the main

causes of power quality problems. While running the procedure, these problems cause damage to the machinery. Power quality problems are reduced using a variety of techniques, including power system monitoring (PSM), universal power quality conditioner (UPQC), dynamic voltage regulator (DVR), an energy storage system (ESS), inverter method, and static synchronous compensator (STATCOM) [2], [3].In order to meet the new challenges with the best possible solutions, the enhanced IEEE 33 bus system is frequently used in the majority of intelligent power systems. It integrates distributed systems, renewable energy sources, and advanced operation techniques. The back/forward sweep method is used in the radial distribution system with distribution generation (DG) to analyse the power flow calculation. To understand how the IEEE 33 bus system will affect the voltage profile, DGs are incorporated into the system.

Using PMU and UPQC integration to the grid during fault circumstances, analyze bad data

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Abstract:

This study analyses bad data in an IEEE 14 bus system using phasor measuring units (PMU) devices. The data obtained from the PMU in the bus system under normal working conditions and the data obtained when the bus system experienced faults are compared. In this article, a principal component analysis (PCA) method is suggested for differentiating between data transmission under normal and fault conditions. The PCA method determines the noise brought on by the disturbances as well as the dynamical magnitudes of the measurements that were obtained. Unified Power Quality Conditioner (UPQC) updates the grid system by modifying system settings to mitigate the fault. The PMU devices use the PCA technique to compare the measured components and analyze the system performance under various operating circumstances. These components are simulated in the Simulink environment of the MATLAB software with time-related PCA.

Keywords: Bad data detection, MATLAB, Phasor measuring units, Principal component analysis, unified power quality conditioner

Introduction

Real-time measurements must be used in modern power systems in order to improve system administration and control. We are even able to safeguard the system's connected devices under fault circumstances thanks to the real-time measurements [1]. Faster measurement readings from the system can be used to generate a quick reaction, preventing many fatal conditions. Phasor measuring units (PMU) devices [2] linked at various points of the power system can accomplish this. These devices can be positioned however best suits the needs of delicate devices. PMUs have many uses, including assessing the stability and security of the power system and enhancing grid defence. The PMUs in these communication devices have a problem when they interface with outside signals because it causes mistakes in the measured signals and introduces disturbance. When a fault on the transmission lines causes the grid system to malfunction, these measured signs are also disrupted [3].

An IEEE 14 bus system with faults inserted at various points along the bus system is taken into consideration for the analysis of various data measured by PMU measuring devices [4]. The signals from the PMU devices are compared to the bad data produced when a fault is introduced in the bus system with the nominal working circumstances. The IEEE 14 bus system is depicted in Figure 1 as a single-line diagram with numerous

sources and loads linked at various points. As can be seen, the bus system [4] consists of various modules linked to various buses. The majority of the vehicles are powered by three generators to handle their loads. In order to improve the voltage profile of the buses, two synchronous condensers are also incorporated into the system. Static condensers, which are capacitive VAR devices compensating reactive power, can take the position of these synchronous condensers [5]. The transmission line data and static condenser data used in the modelling of the 14 bus system are displayed in Tables 1 through Table 4. Data loading and generator grade are both below.

Modified Newton-Raphson SHEPWM in three-phase voltage source inverters

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Abstract:

In order to maximize the switching angles of a three-phase inverter in a photovoltaic system, a novel method is presented in this paper. It offers unconventional answers to the issue of selective harmonic elimination (SHE) in drives for induction motors fed by three-phase inverters (VSI). Using modified Newton-Raphson algorithms and hybrid genetic algorithms (HGAs), the aforementioned issue was separately resolved. Even when the first iteration is random, GAs can still come up with the right answer. The answer then quickly converges. The modified Newton-Raphson method, a unique method that generates all possible solutions without assuming the starting angles, is used by the SHE pulses width modulation (SHEPWM) technique to solve transcendental equations. This simplified modified method ensures rapid convergence to the solution. A real-time experimental proof of the SHEPWM technique was conducted in the OP5600 RT-Lab simulator. The outcomes show that the suggested SHEPWM algorithm effectively reduces the desired harmonics while regulating the fundamental voltage, and that the signal quality increases over time in line with the modulation index. The SHE-PWM, which has a current THD of 5% for a switching frequency of 1150 Hz, produces the best results for M=1.1.

Keywords: Hybrid genetic algorithms, Modified Newton–Raphson method, Selective harmonic elimination, SHEPWM, Three-phase inverter

Introduction

Selective harmonic elimination pulse width modulation (SHEPWM) was first documented in papers in 1964 [1], [2]. This extremely efficient modulation technique is used to regulate two-level inverters to improve the output voltage quality. In this method, a series of holes of different widths are used to produce the inverter output wave. What sets this wave apart is the number of spaces or pulses per alternation [3], [4]. The most troublesome harmonics, which are detrimental to the operation of loads like electric motors, are eliminated by the switching angles [5]. The calculation of power switch switching periods involves simultaneously solving a number of nonlinear equations. The solution of the aforementioned equation set is the primary barrier to the SHEPWM method. The SHEPWM technique formulae are shown in [6] and [7]. Over the past 20 years, SHE techniques have been the focus of extensive study. Only a few SHE methods have been adopted by the industry due to their difficult implementation [8], [9]. Due to the complicated implementation and high computational load required by SHE techniques, challenges are encountered when attempting to answer the SHE issue using analytical methods. As a result, non-traditional optimisation techniques, especially those drawn from natural biology, are receiving more attention in research aimed at solving the SHE problem. Particle swarm optimisation (PSO), ant colony optimization (ACO),

and genetic algorithms (GAs) have all been successfully used to address the SHE problem. The switching angles have been generated in real time using the artificial neural network algorithms [12, [13], colonial rivalry algorithm [14], and bee algorithm [15]. Hybrid GAs (HGAs), which combine GA and local search (LS) algorithms, can be used to effectively and efficiently enhance the search algorithm [16, [17]. When the GA is used to establish the initial value of the solution, the Newton-Raphson technique performs noticeably better [18]. For three-phase pulse width modulation (PWM) inverters, the PSO algorithm is effectively used to find the best switching angles [19]–[21]. Al-Hitmi et al.'s [22] "any initial random assumption" technique was used to arrive at an analytical solution for Newton-Raphson-based SHE equations.

An Overview of Alternate Antenna Design Techniques for Biomedical Applications Based on Implantable Antennas

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Abstract: Implantable biomedical devices are receiving a lot of attention for helping to solve difficult medical problems. The design of implantable biomedical devices faces numerous obstacles, one of which is creating and implanting antennas in a hostile environment because of the human body's surrounding tissues. Antennas that are implanted must be small, effective, and safe, and they must be able to work well within the appropriate medical frequency bands. An overview of the major design considerations and difficulties associated with body-implanted antennas is provided in this paper. The applications, design strategies, difficulties, simulation tools, as well as the testing and production of implantable biomedical antennas are all examined in the review.

Keywords: implantable antennas, Vitro and Vivo measurements, biomedical telemetry

Introduction

Those medical devices that can wirelessly communicate with another device are considered implantable. Utilizing electromagnetic waves, radio frequency has been produced for medical purposes since the turn of the century. In the field of biomedical applications, the use of implanted devices is increasing. Biomedical communication makes extensive use of inductive and RF linkages. A short-range communication channel with data rates ranging from 1 to 30 kbps [1] and a transmission range of less than 10 cm [2], the inductive link makes use of coil antennas. Research is currently focusing on RF-linked implantable medical devices because of their greater range and faster communication rates to address these issues. Several spectral properties are currently being used. In 1998, the Medical Implant Communications Services (MICS) band was suggested by ITU-R Recommendation SA.1346 [3]. The Industrial, Scientific, and Medical (ISM) bands—608 to 614 MHz, 868 to 868.6 MHz, 902.8 to 928 MHz, 1395 to 1400 MHz, 1427 to 1432 MHz, and 2.4 GHz to 2.5 GHz—are additional recommended frequency bands for biomedical applications (WMTS). A wide range of medical procedures now call for the use of implanted biomedical devices, including endoscopy, blood pressure measurements, continuous real-time pressure measurements, sugar level checks, pacemaker connection, insulin push-out, radiometer/heating, dental antenna for remote health care applications, and intracranial pressure monitoring. In point of fact, they play a crucial part in the medical diagnosis, treatment, and prevention of humans. There are numerous applications for implanted antennas in diagnosis,

including magnetic resonance imaging (MRI). In MRI, the antenna sends electromagnetic vibrations to the body and receives feedback in the form of nuclear magnetic resonant frequency signals from the body's nuclei. [4].

Deep-in-body biomedical wireless applications using a miniaturized circular antenna for wireless information and energy transmission

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Abstract: A novel implantable, miniaturized circular PIFA antenna is described in this paper. It upholds both remote data correspondence and remote energy transmission at the Clinical Gadget Radio communication band (Med Radio 402-405MHz) and the Modern, Logical and Clinical groups (ISM 902.8-928 MHz). The antenna is circular to avoid sharp edges, and the patch is made smaller by adding two circular slots. The main scenario involves embedding into the muscle layer of a three-layer cylindrical human arm model, for which several parameters (resonance, radiation pattern, and Special Absorption rate, or SAR) are analyzed. Additionally, the effectiveness of power transmission and interaction distance limits to guarantee connection is evaluated.

Keywords: PIFA antenna, SAR, Circular polarization

Introduction

Health care has recently received a growing amount of attention in society as a result of the rapid aging of the population. Because of their enormous potential to be light, small, and used in a variety of practical applications, implantable medical devices, or IMD, have received a lot of attention and have been widely studied. But researchers still need to figure out how to make an effective system for IMDs that can transmit both power and data. IMDs are a highly common patient safety device today and are growing in popularity. IMDs devices have a number of benefits, including temperature monitoring and diagnostics [1]. This device is implanted within the human body by surgery [2]. In the field of biotelemetry, the biomedical sensor has made incredible contributions. Because to the presence of interstitial, these sensors combat functional limitations and produce flawless results [3]. Both medically implanted devices and a range of frequency bands are permitted. The ISM band is used in this work due to its bigger bandwidth and shorter wavelength compared to the MICS (401–406MHz) band, where the majority of medical applications are found. [4]. The industrial scientific and medical (ISM) band (2.4-2.4835GHz) is used for PIFA.

Antennas can be circular, square, or any other shape [4]. A low-profile antenna is required for wireless communication systems that support multiband and wideband communications. A planar inverted -F antenna with minor inverted radiation and a quarter-wavelength patch is one such antenna [6]. Several other miniaturization techniques rely on implantable patch antenna designs. The effective current flow path on the antenna can be increased by using the meandering or spiraling technique [7]. Vertically stacking multiple radiating can also be used to extend the current flow path without changing the physical size of the antenna [7].

Design of the optimal reporting cells for the location management problem using the binary differential evolution algorithm

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Abstract: This study describes optimal reporting cell planning (RCP) based on binary differential evolution for location management in wireless cellular networks. Due to bandwidth limitations and the rapid growth of mobile users, mobile location management (MLM) has become more important in wireless communication. The overall cost of location management includes the signaling costs of location registration and location search. A trade-off between these two results in the lowest possible cost of location management. By utilizing the proposed twofold differential development (BDE) strategy, the optical reporting cell planning configuration is determined. The simulation results clearly show that the suggested approach offers cost-effectiveness and convergence for the reference networks.

Keywords: Binary Differential Evolution (BDE), location registration, reporting cell planning (RCP).

Introduction

Mobile location management has become absolutely crucial in wireless communication as a result of the rapid growth in mobile users and the constrictions of bandwidth availability. While constructing the infrastructure of a cellular wireless communication network to support more subscribers, mobility management is a crucial component. With the aim of tracking users' present locations so that a call or message can be forwarded to the mobile user within the constraints of limited resources, the field of mobility management in wireless communication is a sophisticated and intricate challenge. [1]. The bandwidth is used for mobile user registration as well as searching for users in a network. There is, however, a trade-off between location and cost.For the RCP problem, a comparison of three artificial intelligence techniques, namely Genetic Algorithm (GA), Ant Colony Optimization (ACO), and Tabu Search (TS), was conducted [4]. Location management in mobile networks is handled efficiently by evolving cellular automata [10]. The performance of the Binary Particle Swarm Optimization (BPSO) algorithm for optimal RCP configuration design was recently reported.

Improvement of Adaptive Noise Canceller for EEG/ERP Signal Noise Cancellation using Grey Wolf Optimizer

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Abstract: The main goal of this study is to optimize the adaptive noise canceller with Electroencephalography/Event-Related Potentials (EEG/ERP) as the input signal. Adaptive noise cancelers are implemented in this research using gradient-based, swarm-based, and a natural-inspired approach called Grey Wolf Optimization (GWO). An optimal weight value is calculated and GWO is utilized to update the optimal weight value in order to enhance the ANC's performance. White Gaussian Noise (WGN) has been taken into account when testing an adaptive filter on sample input EEG signals at various SNR levels. The mean value, the Signal Noise Ratio (SNR) in decibels (dB), and correlation are used to assess the GWO algorithm's performance. The proposed GWO method outperforms gradient-based methods like RLS, LMS, and swarm-based methods like Particle Swarm Optimization (PSO), according to a comparative analysis. The fact that first-time GWO is applied to denoising EEG signals from contaminated EEG signals demonstrates that the proposed GWO method is more effective at extracting the desired EEG component, indicating the approach's novelty.

Keywords: Adaptive noise canceller, EEG/ERP signal, GWO, LMS, RLS, Optimization, SNR

Introduction

Event-related potentials (ERPs) are the electrical impulses in brain waveforms that can be seen. ERPs can be produced by moving the eye, hand, auditory system, or motor system [1–4]. When joined with EEG, ERPs are extremely weak signs with an exceptionally low sign-to-commotion proportion (SNR). A few averaging-based direct methodologies can be utilized to improve and remove ERPs that have been joined with EEG [5]. Because ERP signals are biological signals with potential biomedical applications, they are now an essential part of brain research. It likewise assumes a pivotal part in the origination and progression of cerebrum PC interface (BCI) research [6]. Since the group of neurons generates EEG, it is non-stationary and extremely noisy. It is essential to have EEG signals with a high SNR value in order to demonstrate the usefulness of the study of ERPs analysis. As

referenced before additionally as a result of eye squinting, eyeball development, hand development, and heart flags, these EEG signals got defiled. As a result, it has become crucial to develop methods for removing noise from EEG signals. [7].

Design of an adaptive error-normalized LMS filter for an EEG signal with PLI and eye blink noises

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Abstract: The presence of artifacts makes it difficult to analyze the electroencephalogram (EEG) signal's spectral behavior. The low-amplitude signals produced by the human body's unconscious ocular activity and muscle activity constitute these artifacts. In our examination, we basically considered Eye flicker ancient rarities and Electrical cable Obstruction for denoising. Least Mean Square (LMS) Adaptive filtering has been extensively utilized for filtering due to the fact that the source and noise in received signals are derived from distinct sources. The results demonstrate that clean EEG signals still contain significant artifact components despite filtering. For further signal filtering, we propose the Error Normalized LMS (ENLMS) algorithm as an alternative to the overhead computation associated with LMS in this paper. In addition, we developed Error Normalized Sign LMS (ENSLMS) and Error Normalized Sign Regressor LMS (ENSRLMS) by incorporating signum into the proposed algorithm. It can be deduced from this that the proposed adaptive filter reduces the Eye Blink and PLI artifacts in EEG signals without erasing any significant information.

Keywords: Adaptive filtering; EEG; Error Normalized LMS; Eye blink artifacts; Power line Interference

Introduction

The body's control center is the brain. It is a component of the nervous system, which also consists of the spinal cord and a vast network of nerves and neurons. Mind problems incorporate any circumstances or handicaps that influence our cerebrum. Brain injuries (hematomas, blood clots, contusions or bruising of brain tissue, cerebral edema or swelling inside the skull, concussions, strokes), brain tumors (malignant or benign), neurodegenerative diseases (Alzheimer's disease, dementia), and mental disorders are all examples of different kinds of brain disorders. During acquisition, the EEG signal encounters a variety of artifacts in the clinical setting. Eye blink artifacts (EB), respiration artifacts (RA), electrocardiogram artifacts (ECG), and power line interference (PLI) are the most frequently observed artifacts. These artifacts have a significant impact on signal quality, which is critical for clinical monitoring, diagnosis, and effective cancellation. As a result, obtaining high-resolution EEG signals from recordings tainted by background noise is a significant area of research. In order to present an EEG that makes it easier and more accurate to interpret, the objective of EEG signal enhancement through filtering is to distinguish the legitimate

components of the signal from the undesirable artifacts. Fixed coefficient filters are ineffective when there is no prior information available or when the signal, noise, or both are non-stationary. However, adaptive filters are naturally capable of adjusting their own parameters in response to the incoming signal in those instances. In the past, a lot of work was done to create a system that would be ideal for dealing with real-world constraints. A method for removing eye movement and ECG artifacts from the non-cephalic reference EEG was proposed by Fortgens [1]. Carlos Guerrero and others [2] presented a method based on Independent Component Analysis (ICA) and Recursive Least Squares (RLS) to get rid of eye movement artifacts. The proposed algorithm combines adaptive filtering's online interference cancellation with the effective ICA capability of separating brain wave artifacts. To extract a reference signal, they utilized distinct electrodes close to the eyes (Fp1, Fp2, F7, and F8) that register both vertical and horizontal eye movements. In the literature, both fixed and adaptive filters are used in a variety of ways to improve the quality of EEG signals [3–5].

Advanced Speech Recognition Using Convolutional-Recurring Neural Networks

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Abstract: For the purpose of improving speech, we suggest an end-to-end model built on convolutional and recurrent neural networks. We make no assumptions regarding the nature or stationarity of the noise in our model; it is entirely data-driven. We use both convolutional and recurrent neural network architectures, in contrast to existing approaches that use multilayer perceptions (MLPs). We can thus take use of local structures in both the frequency and temporal domains according to our method. We create a model that is more data-efficient and achieves greater generalization on both observed and unseen noise by adding prior knowledge of speech signals into the building of model components, we build a model that is more data-efficient and achieves better generalization on both seen and unseen noise. Based on experiments with synthetic data, we demonstrate that our model outperforms existing methods, improving PESQ by up to 0.6 on seen noise and 0.64 on unseen noise.

Keywords: MLP, Neural Networks, ASR, improving PESQ

Introduction

One of the mainstays of creating solid programmed discourse acknowledgment (ASR) and correspondence frameworks is voice expansion [1, 2]. The problem is especially pressing right now because modern systems are frequently built using data-driven approaches based on substantial deep neural networks [3,4]. Discourse improvement calculations capability as a preprocessing module that assists with diminishing the clamor in discourse signals before they are taken care of into these frameworks in this situation, where the bungle between clean information used to prepare the framework and the loud information experienced while conveying the framework will habitually debase the acknowledgment precision practically speaking. For many years, the classic problem of speech augmentation has received a lot of research attention in the field. The spectrum subtraction method [5], the lowest mean-square error log-spectral method [6], and other statistical analysis methods can frequently provide analytical noise suppression solutions by making assumptions about the underlying noise's nature. However, due to these irrational assumptions, the majority of these statistical-based systems frequently fail to construct. The task was

completed while HZ was an intern at Microsoft Research. estimators that are able to accurately approximate complicated real-world conditions. As a result, the recovered signals frequently contain more noisy artifacts [7].

Breast Cancer Histology Image Analysis Using Deep Convolutional neural networks

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Abstract: One of the leading causes of cancer-related death worldwide is breast cancer. Although the process of early diagnosis is time-consuming and frequently results in disagreement between pathologists, correct treatment and survival increase significantly. The accuracy of diagnostics can be improved by computer-aided diagnosis systems. The computational method for breast cancer histology image classification that is based on deep convolution neural networks is developed in this work. As part of the ICIAR 2018 Grand Challenge on Breast Cancer Histology Images, a dataset of hematoxylin and eosin-stained breast histology microscopy images is made available. A gradient-boosted trees classifier and a number of different architectures of deep neural networks are used in our strategy. Our accuracy rate for the 4-class classification task is 87.2%. At the high-sensitivity operating point, we report an accuracy of 93.8 percent, an AUC of 97.3 percent, and a sensitivity/specificity of 96.5/88.0 percent for the 2-class classification task to detect carcinomas. When it comes to automated histopathological image classification, we know of no other method that performs as well as this one.

Keywords: Image recognition, Gradient-boosted trees classifier, Deep learning

Introduction

A lot of attention has been paid to how image processing techniques can be used to analyze medical images ever since digital medical imaging equipment was introduced. Automated diagnosis systems, which have been the subject of diligent multidisciplinary research for decades [1], are one of the most active areas of research. Two purposes are served by a computer-aided medical image analysis tool: diagnostics and segmentation The general Semantic Segmentation problem divides an image into a set of non-overlapping regions to group together identical pixels [2]. However, when it comes to clinical images, the focus is typically on locating a select few intriguing parts, such as growth zones [3], organs [4], and so on. Consequently, only a small percentage of multimodal medical images can be interpreted by doctors [5]. Furthermore, sectioned pictures are habitually used for the calculation of many highlights that can be used in the conclusion [6]. Therefore, the significance of image segmentation and its application in biomedical engineering cannot be overstated. Tissue and cell morphology is controlled by intricate biological mechanisms connected to cell development and pathology [13]. A pathologist used to perform morphological assessments by observing the specimen. This procedure is time-consuming and subjective, leading to variations between observers even among senior pathologists [6,16]. Computer-aided diagnosis (CAD) is used to

increase inter-observer agreement and reproducibility, reduce human error, and improve diagnosis accuracy due to the subjectivity of morphological criteria in visual classification [20].

Rule-based and machine learning-based techniques abound in the field of digital pathology image analysis [20]. In many image analysis tasks, deep learning-based approaches outperform conventional machine learning methods, automating processing from beginning to end [4,10,12]. Convolutional neural networks (CNN) have been utilized successfully in the field of medical imaging for a variety of issues, including diabetic retinopathy screening [19], the prediction of bone disease [26], age assessment [11], and other issues [4,22]. Histological microscopic image analysis applications based on deep learning have been shown to be useful for diagnosing breast cancer [1,2,20,24].

A Study on Brain Tumour Detection Methods Using Image Processing

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Abstract: Biomedical Image Processing is a growing and demanding field. It comprises many different types of imaging methods like CT scans, X-Ray, and MRIs. These techniques allow us to identify even the smallest abnormalities in the human body. The primary goal of medical imaging is to extract meaningful and accurate information from these images with the least error possible. Out of the various types of medical imaging processes available to us, MRI is the most reliable and safe. It does not involve exposing the body to any sort of harmful radiation. This MRI can then be adopted and the tumor can be segmented. The whole process of detecting brain tumors from an MRI can be classified into four different categories like Segmentation, Optimization, and Feature Extraction. This survey involves reviewing the research by other professionals and compiling it into one paper.

Keywords: Feature Extraction, Segmentation, Filtering Techniques

Introduction

An abnormal growth of cells in the brain is known as an intracranial neoplasm or brain tumor. The mind is the most important factor of our body. A tumor may cause migraines and headaches frequently. It may even result in vision loss over time. As of now, science is scant about the starting points and factors prompting this strange development. Benign is the name given to the tumor's noncancerous form. These are easy to identify and have a slow rate of growth. Malignant tumors are cancerous. Due to their difficult detection and as these are extremely aggressive they may pose a threat to life. Doctors can choose between an X-ray or an MRI to find a tumor. When all other tests fail to provide sufficient information, MRIs are appropriate. An X-ray check utilizes the properties of attraction and radio waves to deliver exact pictures. MRIs are usually prescribed by neurosurgeons because they give them enough information to find even the smallest abnormalities. However, due to the use of magnetic waves, MRI is not appropriate for patients who have pacemakers or metal implants. Now that we have the scanned image of the brain, it is essential to precisely locate the tumor, its size, and where it is. The neurosurgeon needs all of this information to complete his diagnosis. Computerized Image Processing can be of assistance in this regard. We are able to precisely detect the tumor by utilizing various feature extraction and segmentation techniques.

Convolutional Network-based automatic lung segmentation based on Thoracic CT Images

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Abstract: The most dangerous type of cancer is lung cancer. The chance of survival can increase if the disease is caught early. Radiologists are able to accurately and quickly diagnose lung nodules due to automation. Lung cancer computer-aided diagnosis (CADx) systems are difficult to create. Lung segmentation is one of the most significant parts of CADx, which is made up of several parts. Lung segmentation is a necessary prerequisite for effective nodule detection and classification. The process of separating the lung region from the other tissues on the CT image is called lung segmentation. Traditional strategies for lung division don't precisely fragment typical and strange lungs. In tasks related to computer vision and image processing, deep learning has outperformed other approaches. The segmentation of biomedical images is the sole purpose for which the architecture based on convolutional network has been proposed and implemented. Lung segmentation was carried out using the lungs dataset using Conv-Net on CT images and their corresponding segmentation map analyzed. The achieved loss and accuracy are 0.0871 and 0.9678, respectively. Therefore, Conv-Net can be well adopted for CT scan lung segmentation to save millions of lives around the world. .

Keywords: Convolutional Networks (Conv-Net), Deep Learning, Lung Cancer, Automatic Lung Segmentation.

Introduction

The majority of cancer-related deaths around the world are caused by lung cancer. 1.69 million people died from lung cancer in 2015 [1]. Early detection of lung cancer is possible, but it is like trying to find a needle in a haystack. Small, round, or oval abnormal growths in the lung may be the first sign of lung cancer. It is difficult to locate these nodules due to the intricate structure of the lungs. CT, an important diagnostic tool, can identify lung nodules. The automated detection and diagnosis of lung nodules benefits both patients and radiologists. Lung nodules can be effectively treated and saved lives if they are detected early and accurately. Numerous computer-aided diagnosis (CAD) systems that have been developed over time aid in the diagnosis of lung cancer. The CAD system includes

lung segmentation, nodule detection, false nodule reduction and nodule classification. Segmentation is necessary for the automated analysis of lung nodules and it allows for the determination of lung volumes and the identification and measurement of pulmonary anomalies. The meaning of lung division from chest CT filters has been explained. If the lungs were not segmented correctly, results could be missed or may analyze areas other than the lungs. [3]. Here a crude lung segmentation method was applied to sixty scans, and 17% of nodules were missed. Using a new lung segmentation algorithm that improved the results, only 5%. Based on threshold [5], region [6], boundary [7], shape [8], edge[9], and machine learning techniques [10], the current methods for segmenting can of different kind. In image recognition and classification tasks, Convolutional Neural Networks (CNNs) or Conv-Nets have demonstrated remarkable results. The size of the dataset has a significant impact on the performance of Conv-Nets. When Conv-Nets are trained on a large amount of data, its output is more accurate. There is a finite amount of biomedical data available. The convolutional network is well suited for biomedical image analysis. Utilizing a combination of Conv-Net and data augmentation methods to increase the quantity of medical data quality result have been demonstrated.

Deep structured learning-based Chest X-Ray Segmentation and Augmentation of TB

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Abstract: A subfield of machine learning known as deep structured learning, deep structured models, or deep architectures, employs neural networks with multiple layers to learn hierarchical data representations. The results of using deep learning in computer-aided diagnosis (CADx) to make statistically accurate predictions about tuberculosis from 2D chest X-ray (CXR) images are presented in this paper. They show that a deep convolutional neural network (CNN) applied to a small and unbalanced dataset can effectively segment lungs for CADx of tuberculosis. In contrast to the original dataset that was not segmented, CNN shows that it can train despite over fitting. When compared to the original and other pre-processed datasets after lossy data augmentation, lossless data augmentation of the segmented dataset results in the lowest validation loss (without over fitting) and nearly the same accuracy (within the limits of standard deviation). Lower validation loss, but lower validation accuracy, are the results of the additional limited lossy data augmentation. In conclusion, in addition to larger datasets and more complex deep CNNs, improved segmentation, data augmentation, dataset stratification, and the removal of non-evident outliers result in improved CADx progress for smaller, less balanced datasets.

Keywords: Pneumonia COVID-19 Tuberculosis, Deep learning, Transfer learning, Multichannel Stacking Chest X-ray

Introduction

Because of its generally modest cost and simple openness chest X-beam (CXR) imaging is utilized broadly for well-being observing and determination of numerous lung sicknesses (pneumonia, tuberculosis, malignant growth, and so

on.). Expert radiologists use CXR to manually analyze and detect these diseases' marks, which is a lengthy and complicated process. However, today's advancements in general-purpose graphic processing card (GPU) hardware [1] and software for medical image analysis [2] particularly deep learning techniques [3] enable scientists to automatically detect a variety of lung diseases from CXR images at a level that is higher than that of licensed radiologists [4]. Experts strongly believe that because of the smaller datasets, deep learning techniques become efficient for very big datasets (>104 images), making diagnosis successful.

Leveraging Layered Object Representation to Assess Remote Sensing Visual Images for Partial Visible Aircraft

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Abstract: The remote sensing community frequently uses partial visibility in airplane detection tasks, but it is rarely taken into account. The mode particularly utilized for identification for object in ground shooting pictures and has shown its mind-boggling ability to deal with structure distortion and appearance variety. However, as the visibility rate decreases, its performance will significantly decline. In this paper, we propose a layered object representation for partially visible airplane detection. First and foremost a section setup layer, is intended to demonstrate the impediment to guarantee that specific part setup will be completely apparent. Our model will simultaneously infer the location of each individual part configuration, ensuring stable detection of partially visible airplanes. In contrast to conventional DPM, the method consists of two layers, with each layer modeling have distinct object coverage levels. On a remote sensing image dataset, we test our method and obtain encouraging results.

Keywords: partially visible detection; local context; remote sensing images; deformable part model; part configuration

Introduction

In the remote sensing community, object detection has been the subject of extensive research for years. Due to the limited spatial resolution of remote sensing images, researchers focused primarily on large geospatial objects like airports and harbors in the early stages. Large amounts of high-quality remote sensing data are becoming easier to obtain than ever before thanks to the rapid development of satellite sensors and remote sensing technologies. As a result, numerous remote sensing applications are flourishing. On one hand, the developing goal has worked with the cycle of article discovery since more precise spatial and otherworldly objects can be noticed and a more compact item model can be gotten. However, this resolution also creates a cluttered background for the identified objects.

High-Goal Remote Detecting pictures in genuine applications are probably going to contain cloud, In addition, the detection of airplanes with a half-body in the hangar or out of view is very common. Impediment has been thought about in PC vision, for example, identification [1, 2] and division [3]. Likewise, much work has been finished for impediments dealing with remote detecting pictures, for instance, grouping [4], and street extraction [5]. Satellite remote sensing image detection of partially visible airplanes is the subject of very little research. We concentrate on this issue in this paper. The Deformable Part Model (DPM) was first proposed [6] and has demonstrated that it is highly capable of modeling both rigid and non-rigid deformation of objects as well as object appearance and scale variations. It has received a lot of attention for images taken in natural settings. However, the objects in these images maintain in-plane rotation while those in the earlier scenes are upright, making them distinct from the images obtained from remote sensing sensors. It has been shown that DPM's presentation will diminish by a fifth when the imperceptibility pace of the item gets to 40% [7]. This is primarily due to the fact that the model can only handle objects when they are severely partially visible, the scores for individual parts will be significantly impacted, and as a result, the object's overall score will significantly decrease. In addition, the model's remaining components are unable to independently infer the object as a whole. Regarding the detection of hierarchical or layered objects, [8] sparse representations has been suggested to identify parts and voting for objects using object offsets in Hough space. A coarse-to-fine airport detection model [9] that infers airports using a CRF model in the fine layer and uses a saliency model to identify candidates in the coarse layer giving satisfactory result.

Metaheuristic-Based Multilevel Adaptive Thresholding for Image Segmentation

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Abstract: Multilevel picture thresholding is a useful technique for effectively segmenting a variety of images. This chapter provides an overview of meta heuristic-based multilayer thresholding for the purpose of segmenting gray-level images. Investigations shows how well staggered thresholding division has been performed.: The cuckoo search, the bat algorithm, the artificial bee colony, the particle swarm optimization, the firefly optimization, the social spider optimization, the whale optimization, the moth-flame optimization, and the grey wolf optimization are all examples of optimization algorithms. The objective function, the applied thresholds used in the research, the number of images, and performance data are all mentioned. The review comes to the with multilevel thresholding segmentation with top quality performance.

Keywords: Multilevel thresholding, Otsu thresholding, Maximum entropy thresholding, Bees algorithm

Introduction

Due to the rising demand for computer vision systems over the past ten years, image thresholding continues to pique the interest of researchers from various fields. Nowadays, digital cameras are everywhere and for applications like surveillance, medical diagnosis, industrial implementations, etc., a variety of electronic devices with cameras require specialized software for image processing and understanding. Segmentation is the first stage of this type of system in this situation [1]. Thresholding (TH) is a specific kind of division that separates pixels into a few gatherings in light of their degree of power as per at least one limit value [2]. Thresholding is not only straightforward but also dependable, and it is able to deal with noisy images. There are two categories that can be applied to the TH process: 1) bi-level and 2) multilevel, depending on the number of thresholds that the image requires. The bi-level procedure characterizes the excess pixels as the foundation and the pixels with a force esteem higher than the limit as a thing. In contrast, the multilayer TH (MTH) employs a number of thresholds to distinguish the pixels that represent the

objects in various regions of the image. The process of dividing an image into multiple regions or segments based on certain criteria like color, texture, intensity, and so forth is known as segmentation. Thresholding is a usually involved strategy in picture division, where pixels are separated into bunches in light of their power levels compared with edge esteem. One group is given to the pixels with intensities below the threshold, while another group is given to the pixels with intensities above the threshol[5]. Binarization is the process of dividing pixels into groups. The resulting binary image has only two values, typically black and white. Otsu's thresholding, global thresholding, and adaptive thresholding are all examples of thresholding techniques. The characteristics of the image being processed and the desired outcome determine the thresholding method to use [6]. Selecting a single threshold value for the entire image is the basis of global thresholding. This strategy accepts that the forefront and foundation of the picture have particular power values. Otsu's thresholding is a variant of global thresholding that uses the image histogram to automatically determine the best threshold value. It is suitable for images with uneven illumination because it maximizes the variance of the foreground and background pixels between classes [7]. In contrast, adaptive thresholding adjusts the threshold value locally based on the pixel values in the vicinity. Images with varying contrast or lighting conditions can benefit from this method.

Sine Cosine Algorithm and Differential Evolution Used in Hybrid for Feature Selection

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Abstract: By bringing down the elements of the dataset and bringing down the existence intricacy, highlight choice is a vital stage in working on the presentation of the classifier. Swarm methods utilize an assortment of component determination methodologies to pick the best subset of highlights. One of the later multitude methodologies, the sine cosine calculation (SCA), is used to address the element determination issue by means of worldwide streamlining; by the by, it is powerless to be trapped in neighborhood optima. In order to overcome this obstacle, the SCA is assisted in skipping the focal point by making use of the differential evolution operators as a local search strategy. The proposed strategy is contrasted with the other three calculations with select the subset of elements utilized in eight UCI datasets. In terms of performance measures and statistical tests, the experiment's results demonstrated that the proposed method outperformed other approaches.

Keywords: Feature selection (FS) · Sine Cosine Algorithm (SCA) · Differential evolution (DE) · Metaheuristic (MH)

Introduction

In computational processing, important considerations include the kind of problem, the purpose of the processing, the size of the problem, and how long it will take to solve. The computational time and accuracy of the results are directly impacted by the issue's size. As a consequence of this, numerous researchers attempt to resolve these issues by making the data smaller and more consistent. The best way to reduce the size of the problem is to choose the features that are most important and get rid of those that are redundant or irrelevant [1]. During the process of dimensional reduction, a variety of methods are utilized; However, using optimization techniques like swarm intelligence (SI) or evolutionary computation approaches to help escape from getting trapped in local optima is the most effective one. Particle swarm optimization (PSO) [2], differential evolution (DE) [3], artificial bee colony (ABC) [4], social spider optimization (SSO) [5], gray wolf optimization (GWO) [7], ant colony optimization (ACO) [6], and sine cosine algorithm (SCA) [8] are a few examples of optimization methods that draw inspiration from

natural social behavior. The majority of these methods are used to solve problems involving dimensionality reduction. For instance, the ABC calculation had been utilized in [1] to choose the main highlights and assessed more than ten datasets. Its outcomes had been contrasted and those consequences of the Hereditary Calculation (GA) as well as PSO and showed high order exactness. Some datasets were also reduced using bare bones PSO, and the results showed that this method was more accurate than using all features. [9] developed a binary ALO method for selecting the most crucial feature. This method's classification accuracy was superior to that of the bat algorithm, PSO, and GA. [10] also used SCA to reduce the problem attributes in order to achieve high classification accuracy. It outperformed PSO and GA across ten datasets in terms of classification accuracy and computational time for most of these datasets. In a number of studies, DE was used to reduce dimensionality. For instance, DE was successfully used in [11] to cut down on training time and improve classification accuracy. Yang and others 12] utilized wavelet and statistical features derived from tool wear in DE to select the most crucial features in the real-time process. The exploratory aftereffects of DE beat every one of the thought about approaches. In contrast, [13] used DE for face recognition feature selection tasks to improve accuracy. Ten images were used to test the algorithm, which performed better than GA. DE is additionally utilized generally in [14,15].

K-means Clustering-Based Multi-Spectral Image Segmentation

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Abstract: Agriculture is one of the oldest economic aspects of human civilization, and it is still undergoing a dynamic makeover in the course of the application of IT innovative mechanisms in farming methodology. Remote sensing has vied a significant role in crop classification, crop health, and yield assessment. Multispectral remote sensing plays a vital role in providing enhancement of more detailed analysis of crop segmentation. In this article, pixel-based clustering of 12 channels is carried out using the satellite image from remote sensing satellite via k-means clustering. A k-means clustering algorithm is usually a better method of classifying high-resolution satellite imagery. The extracted regions are classified using a minimum distance decision rule

Keywords: Interval type-2 fuzzy sets, Fuzzy C-Means, Type-2 fuzzy clustering, Satellite image analysis, Land cover classification Change detection

Introduction

Particularly where IT plays crucial and major roles in their economic growth, agriculture serves as the fundamental tool for improved economic conditions in developing nations. For the crop classification using digital remote sensing, information has taken a variety of forms supported by the application of supervised and unsupervised classification techniques. To map geographic distributions of crops various factors like geographical region, crop diversity, field size, crop phenology, and soil condition come into play. In a decision-oriented application, Image Segmentation is one of the most useful methods for correctly classifying an image's pixels. Image segmentation is extremely useful in fields like health care, image processing, traffic image, pattern recognition, and so on. The pixels that make up an image are the focus of image segmentation, which is the process of extracting useful information

from them. It is possible to obtain thematic maps containing data such as registry information, soil, crop, and vegetation types through the classification of satellite imaging.

Optimizing 32 nm VLSI connectivity through the design for ultra-low-power, high-speed transceivers

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Abstract: The downsizing of integrated circuits causes a performance issue in very large-scale integration interconnects, which is addressed in this paper. The conventional copper interconnect is contrasted with the carbon nanotube (CNT)-designed interconnect. By using smart buffers as repeaters within the interconnect wires, the propagation delay of very long interconnect wires can be reduced. For the purpose of comparison, various combinations of MOS repeater interconnect and CNT repeater, CNT interconnect is used in existing buffer designs. Propound buffer using power gating techniques and an automated toggling approach is used to reduce delay. Propound Design saves 99.94% of dynamic power and 93 percent of leakage power when compared to a conventional buffer, but there is a delayed penalty. Other Propound Design offers a delay reduction of 52% and dynamic power savings of 99.86% and 88%, respectively. Next Propound Design1reduces propagation delay by 64% and saves 98% of dynamic power, leakage power consumption is increased. Using the Stanford SPICE model for CNT and BSIM4 PTM for MOS, a section of a long interconnect line is considered as the driver interconnect load system during the 32 nm simulation in HSPICE.

Introduction

Interconnects are slim wires of directing material that gives an electrical association between at least 2 hubs. At lower technology nodes, interconnect delays outnumber gate delays [1]. At higher frequencies, interconnects are more than just resistors; they also have parasitic capacitance and inductance attached to them. The speed, power dissipation, noise, and delay of circuits are all influenced by these material-dependent impedance parameters.

Previously, conductivity and SiO2 adhesion were used to select a material for interconnects. Copper interconnects have replaced aluminum interconnects, which are susceptible to electromigration due to an increase in current density [2]. Copper is still the industry standard for interconnects. Continuous scaling of semiconductor devices is the result of further technological advancement; As a consequence of this, Cu began to encounter the issue of an increase in resistivity brought on by gain boundary scattering and surface roughness. As a result, cutting-edge interconnect materials like carbon nanomaterial are required. However, repeater switching itself adds to total delay and causes power loss. Buffers can use power even when they are not switching. As a result, smart buffers or repeaters that help speed up interconnects without sacrificing dynamic or static power savings are essential. The primary objective is to optimize the power delay product (PDP) and energy-delay product (EDP) by investigating and collating the delay and power dissipation of the propeller repeaters. The propound repeaters additionally compare both CNT and MOS advancements. The modeling of buffers and interconnects is discussed in the following section. The approach taken by taking into account the architecture of the driver interconnect load (DIL) test bench is described. Finally the results of the simulation has been discussed and presented.

Understanding and analysis of medical images using convolutional neural networks

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Abstract: For the diagnosis and treatment planning of the anomalies, it is necessary to understand and analyse the acquired images. However, the effectiveness of picture understanding done by qualified medical specialists is constrained by the limited availability of human experts as well as the weariness and rough estimate methods linked with them. For comprehending images, convolutional neural networks (CNNs) are useful tools. In a number of visual interpretation challenges, they have outperformed human specialists. Medical image Segmentation, abnormality detection, disease categorization, computer assisted diagnosis, and retrieval are a few examples of application areas that fall under this category. In this article, a thorough overview of the state-of-the-art deep convolutional network-based medical picture processing is offered. The overarching goal is to encourage experts to make substantial use of CNNs in their medical image understanding, analysis and diagnosis.

Introduction

Through the prompt diagnosis of medical anomalies and medical trauma associated with an injury or sickness can be lessened and even human lives can be saved Glaucoma, diabetic retinopathy, tumours, interstitial lung illnesses, cardiac conditions, and tuberculosis are examples of medical oddities. X-ray, magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET), single photon emission computed tomography, or ultrasound scanning is essential for both analysis and diagnosis. Understanding an image entails finding abnormalities, determining where they are, where they are going, how big they are, and how serious they are. The effectiveness of picture interpretation is constrained by the limited availability of human experts, their weariness, hefty consultation fees, and rough estimate techniques. Additionally, the forms, locations, and structures of the medical defects vary greatly. Even highly qualified doctors find the diagnosis challenging in this situation. Therefore, to facilitate accurate analysis of medical images, human professionals frequently feel a need for support

tools. Systems with intelligent image understanding are driven by this. Machine learning (ML)-based image interpretation systems have been developing quickly in recent years. Support vector machines (SVMs), clustering, k-means nearest neighbour (K-NN), restricted Boltzmann machines (RBMs), random forests (RFs), and decision tree learning are a few examples of machine learning (ML) approaches. But making intelligent machines that could self-learn the traits required for image interpretation and extract them was a reasonable first step towards overcoming the problem. The convolutional neural network (CNN) model, which automatically learns the necessary elements and extracts them for medical picture understanding, is one such clever and effective model. Convolutional filters that make up the CNN model's main component learn and extract the specific features required for effective medical picture comprehension. This survey's goal is to provide a thorough review of the methods and uses of CNNs and their variants in the field of medical image understanding and analysis. The state-of-the-art CNN models provide an encouragement for the researchers and practitioners for medical image understanding and analysis and to use CNNs extensively in their respective fields of study and diagnosis.

A Review on Deep Learning based Image Compression

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Abstract: Deep learning is a machine learning method used to analyse, classify, and compress images. It is used to apply the rule of deep learning to various neural networks to obtain better compression and minimize loss and superior visibility of the image. Deep learning is used in a justified manner with distinct analysis to obtain these things. Image compressions can be done through deep neural networks, artificial neural networks, recurrent neural networks, and convolution neural networks. To achieve better compression of image with high accuracy and minimum loss with superior visibility this review paper discuss in detail how to apply the rule of deep learning to various neural networks with distinct analysis for its application to different types of images in a justified manner.

Keywords: Deep neural networks, unsupervised learning

Introduction

An image can be compressed using a variety of techniques in the process known as image compression]. There are two different types of image compression techniques: lossy and lossless , where the lossy technique give higher compression but can eliminate any valuable information from the original image. Lossless, however, eliminates the possibility of losing the original image data. Early techniques, such as arithmetic coding, Huffman coding, and Golomb coding, compress images primarily by removing redundant data from the image matrix. By encoding spatial frequencies, the transform coding of image compression is done in late 1960s through Fourier transform and Hadamard transform. Ahmed et al. presented the discrete cosine transform in 1974 as an image coding method that might stack image energy and improve low-frequency domain compression.The quantization and prediction approaches are provided for entropy By recording spatial frequencies, the transforming coding of image compression, specifically the Fourier transform [7] and Hadamard transform, was proposed. Ahmed et al. on [10] presented the discrete cosine transform [9] in 1974 as an image coding method that might stack image energy and improve low-frequency frequency domain compression efficiency. Additionally, the quantization and prediction

approaches are provided for entropy data redundancy reduction as well as transform techniques for minimum spatial and visual redundancy. Subsequently the most extensively used or recognised method for lossy image compression is JPEG. Neural network research on picture coding was a hot area during the 1980s and 1990s. The ability to train complex models with more than 1000 layers has been made possible by the innovation of efficient processing systems, enormous data availability, and advanced algorithms. Since 2015, a subfield of computer learning called deep learning for image coding has undergone continual development relies on learning several representations that match to a hierarchical structure of characteristics, factors, or concepts. Deep structure models are well exemplified by pre-fed neural networks with numerous hidden layers, or DNNs. Back propagation (BP) is a well-known algorithm for learning the parameters of these networks that gained popularity in the 1980s. With learning networks that have numerous hidden layers, back propagation alone did not perform well, and the challenge grew as these networks' depth rose. The development of unsupervised learning processes may benefit from the use of deep learning techniques.

Deep learning based intelligent image compression

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Abstract: Image compression algorithms such as JPEG, JPEG2000, BPG, and WebP has been outperformed by Deep Learning-based (DL) image compression. Quality-performance indicators, namely: output image quality, compression complexity of high-resolution images have been assessed on real-time compression scenario. Along with structural benefits of a deep neural network including PReLU activation function, Bayes thresholding and sub-pixel convolution especially suitable for real time stringent image compression tasks. We analyse the performance of the proposed model by adopting patch-based and global processing. The result indicates that the proposed image compression system can meet the requirements with reasonable performance. The model extracts the salient recurrent patterns inside an image and still can adapt to the specific structure of the given dataset

Keywords: Deep Learning, Bayes thresholding, real time

Introduction

The exponential growth of digital information in recent years has posed significant challenges for storing and transmitting data. In this context, image compression plays a crucial role in representing data in a more compact manner. Image compression refers to a collection of algorithms aimed at reducing information within images by discarding redundant information. Various image compression standards such as JPEG, JPEG2000, BPG, and WebP, are currently at the forefront of academic and industrial image compression research. Deep Convolutional Neural Networks (DCNNs) have demonstrated exceptional accuracy in predicting tasks involving complicated unstructured input such as photographs. Deep Learning has also started contributing to the field of image compression, with Convolutional Auto encoders (CAEs) being one of the most widely used designs due to their ability to deliver higher quality output images at high compression levels. However, the research efforts in this area are not typically designed to address specific real-world challenges with multiple restrictions to meet. They are often

evaluated on thumbnail datasets with no consideration of performance (e.g., compression speed) and offer limited flexibility to extend or improve the system while meeting the performance requirements. In a recent study, the authors defined a real-world industrial task of real-time compression of high-resolution photographs, with particular project objectives to meet. They presented a model that combined breakthroughs in deep learning literature with image compression-specific features to meet these objectives. Specifically, the authors designed two variants, one using full-image processing of the content and the other conducting patch-based processing. They trained two variants are applied on a dataset of high-resolution images The similarity between the images, i.e., consecutive acquisitions of the railway track, supported the proposed approach's adequacy to match the task. The approach needed to preserve essential image details such as cracks while considering specific hardware and compression constraints. Finally, the two variations were compared with JPEG in terms of visual quality and compression performance to find the best solution with room for improvement. The paper's remaining sections are organized as follows. Section II provides a literature review on learned image compression. Section III describes the real-world scenario and presents the two variants.

Performance analysis of NOMA Uplink Systems for Power Minimization

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Abstract: The purpose of this letter is to look into multiple input, multiple output (MIMO) uplinks and the use of non-orthogonal multiple access (NOMA) and new transceiver designs. To reduce overall power usage while still adhering to individual rate constraints, a new NOMA implementation approach with group interference cancellation is presented. In this system, user precoders and equalisers for the same group of users are concurrently generated, and closed-form design processes are created for user precoders. According to the results of the simulation, the suggested NOMA scheme consumes less power overall than both orthogonal multiple access transmissions and the signal alignment NOMA technique.

Keywords: NOMA, precoding, uplink.

Introduction

A novel strategy known as NOMA makes use of power domain non-orthogonal multiple access to provide applications with ultrahigh connectivity. In terms of system throughput and user fairness, NOMA is always superior to conventional orthogonal multiple access (OMA) methods. The combination of NOMA and multiple-input multiple-output (MIMO) has received a lot of attention recently. Multiple beams are formed in the spatial domain at the base station (BS) in the downlink MIMO-NOMA system, and an interference rejection filter is utilized at each receiver to eliminate inter-beam interference. Uplink MIMO-NOMA, on the other hand, has a different order for successive interference cancelation (SIC) operations and a different policy for allocating transmit power. For the MIMO-NOMA uplink, a transmission method based on the idea of signal alignment (SA) is suggested. In this scheme, however, the precoding and detection are not optimized together, which reduces power efficiency. Based on their effective channel powers, the users of this letter are divided into several groups, such as near and far user

groups. The precoders and equalizers of the transmitters and receivers are optimally crafted to reduce co-channel interference and improve signal detection in the uplink. A novel MIMO-NOMA scheme is proposed, capable of supporting multiple data stream transmissions for each user and serving users in distinct groups in accordance with the NOMA principle. Furthermore, a new precoding technique is acquainted with limit complete power utilization while ensuring the reachable rate necessity per client. User precoders and a minimum mean square error (MMSE) equalizer collaborate in this approach to de-correlate user signals per group. By expressing user precoders in a general manner, closed-form precoding design algorithms are developed. In terms of overall power consumption, computer simulations demonstrate that the proposed scheme is superior to the SA-NOMA and OMA methods.

Efficient Scheduling for joint user Uplink NOMA wireless network

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Abstract: Due to the delay-sensitivity of many developing applications, wireless networks require efficient scheduling policies. In this work, we examine a joint user pairing and scheduling (UPaS) method for MC-NOMA-enabled wireless networks in order to lower the maximum completion time of serving uplink users. A shortest processing time (SPT)-based approach to solving the NOMA scheduling problem within a reasonable amount of time and complexity is introduced after it is demonstrated that the problem is NP-hard. The simulation results show that the suggested scheduling method is more effective than random NOMA pairing and orthogonal multiple access (OMA) in terms of the maximum completion time.

Keywords: Non-orthogonal multiple access (NOMA), maximum completion time, uplink scheduling.

Introduction

Due to successive interference cancellation (SIC), NOMA is a crucial technology for 5G and beyond because of its high data rates and spectrum efficiency. However, its capability of lowering latency has not been thoroughly investigated. By allowing multiple transmitters to communicate with the same receiver simultaneously in uplink NOMA, SIC shortens the total amount of time required to serve users in the uplink. In single-channel NOMA-assisted mobile edge computing (MEC) networks, some studies have looked into power control for a fixed user grouping to reduce delay, but few have looked into the best scheduling and pairing to speed up transmission. The maximum or total completion time is typically used to measure delay optimality; however, prior research only considered a single-frequency channel system, making it unsuitable for situations involving multiple channels. In order to take into account different delay constraints for various services and reduce the amount of time required to serve each user, this letter suggests the appropriate pairing and scheduling of uplink users in a multi-channel network. A NOMA-enabled scheduling scheme for a multi-channel system that minimizes the maximum completion

time is proposed in addition to the formulation of the optimization problem. In the evaluated simulation settings, the proposed scheme outperforms OMA by saving 60% of the time on average.

Ergodic rate Analysis for the downlink SWIPT based NOMA network

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Abstract: This letter examines a hybrid wireless system based on non-orthogonal multiple access (NOMA) in which users use energy from received downlink signals to transmit on the uplink. We argue that when users begin uplink NOMA transmissions, the use of energy harvesting aids in maintaining distinct power levels. We derive closed-form mathematical expressions of the system's average ergodic rate to assess the model's performance. The outcomes demonstrate that: 1) This scheme can establish NOMA-based uplink communication solely on the basis of harvested energy; 2) the power-splitting parameter has a positive correlation with the performance of the uplink rate, whereas the choice of the time-splitting parameter favours' either the uplink or the downlink data rate.

Keywords: Downlink, NOMA, simultaneous wireless information, power transfer (SWIPT).

Introduction

For 5G wireless networks, NOMA is a proposed technology that gives users different power levels so that they can transmit simultaneously with the same frequency and time resource. There has been a lot of research done on downlink NOMA, but uplink NOMA is harder because the base station can't tell the power levels of multiple user transmissions apart. Different methodologies have been proposed to determine this issue, including power ease off plans and partial power control. Notwithstanding, these methodologies cause extra handling above in relegating power levels to the clients that can be handily recognized at the base station. The authors of this letter propose a novel strategy based on power splitting (PS) called simultaneous wireless information and power transfer (SWIPT). In previous works, SWIPT has been optimized for UL NOMA, a well-explored concept. However, the system's potential throughput is constrained when an additional time slot is utilized. To enable UL NOMA communication, the authors employ the PS-based SWIPT protocol and extract energy from the base station signals. This method has

two advantages: It naturally produces a variation in the power levels of users transmitting in UL as a result of different harvested energy, resulting in the creation of a self-sustaining reverse channel. Analytical expressions of the SWIPT-aided hybrid NOMA system's DL and UL ergodic rates that are confirmed by the authors are obtained. The results demonstrate that increasing power to energy harvesting circuitry without sacrificing DL data rate improves the UL rate of NOMA users. Expanding DL transmission time permits more energy to be reaped, yet it doesn't correspondingly build UL information rate. In general, the proposed method is a novel approach to resolving the optimal power allocation issue in UL transmissions based on NOMA. There are two advantages to employing SWIPT in a system with UL and DL NOMA, as well as a fresh point of view for future research in this field.

Performance analysis for RIS aided Uplink NOMA System using Group SIC

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Abstract: This letter proposes a joint design of reconfigurable intelligent surfaces (RIS) and non-orthogonal multiple access (NOMA) for spectrum and energy efficiency in future communication networks. The aim is to minimize the total transmit power of an uplink multi-group RIS-aided NOMA system by designing the transceivers and phase shifts. The proposed framework employs a group-based successive interference cancellation (GSIC) to serve user groups associated with different RISs through NOMA and separate user signals belonging to different groups. The optimization problem is divided into two sub-problems, namely transceiver design and phase shift optimization, for ease of processing. The transceiver design utilizes a parallel iteration algorithm with the minimum mean square error receiver, while a sequential rotation scheme is proposed for the phase shifter design. Simulation results demonstrate that the proposed method outperforms various benchmarks in terms of total transmit power.

Keywords: RIS, NOMA, phase shift, GSIC, uplink.

Introduction

Due to its capacity to enhance spectrum and energy efficiency in a cost-effective manner, reconfigurable intelligent surface (RIS) technology has been identified as a potential candidate for 6G. Non-orthogonal multiple access (NOMA) has also been shown to be a useful approach for applications with a lot of connectivity. Research has shifted to the creation of RIS-enabled NOMA systems as it has been demonstrated that combining RIS and NOMA further enhances efficiency. Phase shift and power allocation optimization for single-input, single-output systems have been the focus of previous investigations. However, research into transmission policies for multi-antenna NOMA systems aided by RIS is still in its infancy. There are two main categories for the current schemes: strategies based on clusters and beam formers. For downlink RIS-aided multiple-input-single-output (MISO) NOMA systems, passive and active beam former-based methods have been proposed to reduce power consumption. Meanwhile, both

cluster-based and beam former-based policies make use of successive interference cancellation (SIC). A novel transmission strategy is proposed in this letter for RIS-aided multi-group, multi-antenna NOMA uplinks, in which the base station (BS) simultaneously schedules multiple user groups associated with various RISs via NOMA. For the first time, inter-group interference in RIS-empowered NOMA uplinks can be eliminated using group-based SIC (GSIC). By jointly designing the transmit power, equalizers, and phase shifts, a power minimization problem is investigated. An iterative alternating method for obtaining the transceivers and phase shifts is developed to address the formulated problem. When the BS is equipped with the minimum mean square error (MMSE) equalizer, a parallel iteration scheme is developed to decompose the initial problem into two sub problems and determine the optimal transmit power. Each phase shifter can be optimized with a novel sequential rotation algorithm. When compared to a number of baselines, the proposed scheme significantly reduces the total transmit power.

A survey of difficulties and arrangements in the plan and execution of profound chart brain organization

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Abstract

The study of graph neural networks has shown that they can open up new applications in a wide range of fields by employing a fundamental method that is beyond the scope of other deep learning designs. In order to fully utilize the power of graph data, researchers are working to overcome a number of limitations that limit their expressiveness. There are a number of publications that look into the limitations and bottlenecks of graph neural networks (GNNs), but one thing they all have in common is that they can all be traced back to message passing, which is the main method we use to train our graph models. In this study, we describe the general GNN design pipeline, discuss solutions to the over smoothing problem, classify those solutions, and identify research challenges.

Keywords:

Introduction

Machine Learning and Deep Learning's image classification algorithms gain experience by learning the relationship between image pixels and the data classes being addressed. While performing order, there are issues like distorted images, loud images, obstructions, light, and so on. The game plan accuracy is directly influenced on the grounds that of presence of recently referenced issues in input picture. Using a superior learning strategy and legitimate list of capabilities, exactness issues in image order can be addressed. The components of pictures are the properties or qualities of the pixel values considering which the social affair of pixels are dispensed to various described classes. Model: Consider the clinical determination model, in which various obsessive examination data—such as blood pressure, glucose, and body mass index—are highlighted.

MODELS OF IT-PROJECT MANAGEMENT

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Abstract

Information system project management, also known as IT-project management, is a complicated, iterative procedure. Records of the development lifecycle (LC) play a crucial role in the development of complex IT projects. An evaluation of the efficiency of IT-related projects based on two altered life cycle models is presented in this article: spiral and cascade Simulation was used to conduct an analysis of how well the IT project's management worked. On the basis of the development of a geoinformation system (GIS) as an example, the modeling was carried out using Any Ljgic tools. It is demonstrated that using a modified spiral LC and splitting the flow of requirements at the input when designing a GIS is recommended. The proposed study is unique in that it takes into account the requirements of various kinds of communicative interactions. All of the interactions between the subjects of the process of creating an IT-project are understood under the communicative interactions category: verbal and non-verbal, implemented using CASE-means.

Keywords:

Introduction

Prerequisites for data and geo data frameworks (IS and GIS) as the execution of the IT - project are developing, as the areas of utilization of these frameworks are turning out to be more complex. In the execution of the IT-project assumes a significant part in the improvement of ways to deal with evaluating the adequacy of these frameworks. The intricacy of the frameworks adds to the intricacy of the cycles of configuration, demonstrating, plan and different deals withtheir creation. Communicative processes, exemplified by the verbal and software (interface) level information exchange, accompany each type of activity.

EFFECTIVE AUTHENTICATION RISK EVALUATION

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Abstract

Deployed software is currently constantly under attack. Aggressors have been taking advantage of weaknesses for a really long time and appear to be expanding their assaults. Antivirus software, intrusion detection systems, and firewalls can't completely resolve this issue. Attackers can only be stopped and users can feel safe from being exploited if the software development community works together to build safer software. It has been observed that the appropriate security assurance mechanism and countermeasures ought to be included in each phase of the SDLC. Security measures must be incorporated throughout the SDLC phases, starting with requirements and continuing through design, implementation, testing, and deployment. One of the widely accepted measures of protection mechanisms is authentication. Fitting degree of confirmation might be well uphold security highlights and subsequently guarantee security. The risk assessment to incorporate security assurance steps from the beginning of the development lifecycle is followed by the identification of various attributes of the "Authentication" Policy and their weighting.

Introduction

Online services still use passwords as their primary form of authentication [23]. Be that as it may, dangers to secret phrase based confirmation are expanding, e.g, by huge scope secret word data set holes and qualification stuffing [26].

As a result, in order to adequately safeguard their users, website owners are required to provide additional or different authentication mechanisms. One such measure is known as two-factor authentication (also known as 2FA), but users have found it to be unpopular [19]. Because it necessitates specialized hardware and user participation, biometric authentication is deemed unsuitable for large-scale online services [9].

IT- MODELS OF PROJECT MANAGEMENT

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Abstract

Information system project management (IT - project) is a complex iterative process. An important role for the development of complex IT projects plays records of the development lifecycle (LC). The article presents an analysis of the effectiveness of the work on the creation of IT - projects based on two modified models of the life cycle: cascade and spiral. Analysis of the effectiveness of the management of the IT project was implemented on the basis of simulation. The modeling was carried out on the basis of Any Ljgic tools on the example of development of geoinformation system (GIS). It is shown that it is advisable to design GIS on the basis of a modified spiral LC with splitting of the flow of requirements at the input. The peculiarity of the proposed study is to take into account the requirements in the form of communicative interactions of different types. Under the communicative interactions are understood all the interactions between the subjects of the process of creating an IT-project: verbal and non - verbal, carried out on the basis of CASE-means.

Introduction

The achievement of these goals necessitates meticulous planning and execution. With this impact, use of information, ability, apparatuses and procedures in the venture climate, alludes to project the board. Project the executives lately has multiplied, coming to new levels of refinement. To meet the challenges of the new economic environment, the process of globalization, rapid technological advancement, and quality concerns of stakeholders, it has emerged as a distinct area of management practices.

DEVELOPING A FRAMEWORK FOR ONLINE PRACTICE EXAMINATION AND AUTOMATED SCORE GENERATION

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Abstract

Examination is the process by which the ability and the quality of the examinees can be measured. It is necessary to ensure the quality of the examinees. Online examination system is the process by which the participants can appear at the examination irrespective of their locations by connecting to examination site via Internet using desktop computers, laptops or smart phones. Although, there are many existing online examination systems, the main drawback of these systems is that they cannot compute automated score accurately, especially from the text-based answers. Moreover, most of them are unilingual in nature. As a result, examinees can appear at the examination in a particular language. Considering this fact, in this paper, we present a framework that can take Multiple Choice Questions (MCQ) examinations and written examinations in two different languages English and Bangla. We develop a database where the questions and answers are stored. The questions from the database are displayed in the web page with answering options for the MCQ questions and text boxes for the written questions. For generating the scores of the written questions, we performed several types of analysis of the answers of the written questions. However, for generating the scores of the MCQ questions, we simply compared between the database answers and the user's answers. We conducted several experiments to check the accuracy of score generation by our

system and found that our system can generate 100% accurate scores for MCQ questions and more than 90% accurate scores from text based questions.

 KEYWORDS: multiple choice questions, automated scoring, answer analysis, experimental analysis.

Introduction

The process of creating a program (test script) in any programming or scripting language that simulates the manual test case steps is known as automation of software testing [1], [2], and [3] [4] It is the interaction of robotizing the manual testing steps. Testing engineers need to execute and run a program to test the Programming Under Test (SUT) [5]. To put it another way, it is creating toolkits to test the source code that has already been implemented [6]. It points at fostering the testing stages to be robotized [7]. Both the application itself and the test scripts that will be used to test the application are development tasks. The first involves developing the application itself. The second involves developing the test scripts.

ARCHITECTURAL ASPE CT-AWARE DE SIGN FOR IOT APPLICATIONS: CONCE PTUAL PROPOSAL

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Abstract

Aspect-Oriented Programming (AOP) provides new constructs and concepts to handle secondary requirements in applications. Secondary requirements, i.e. crosscutting concerns, of the Internet of things (IoT) applications is inherited from the nature of the complexity of interactions, and implementation crosscutting concerns over core IoT architecture. Realizing the full potential of the IoT application requires a new abstraction design technique. This paper proposes an abstract class element toward a design approach to providing better means better separation of concerns. The proposed approach is accompanied by gathering relevant contextual properties pertaining to the environment of IoT interactions. A new architectural aspect-aware definition is proposed for tracking the logic of interaction characteristics on the IoT components being designed.

KEY WORDS : Aspect-Oriented Programming, Aspect Orientation, Modularization, Behavior-Interaction-Priority Model, BIP Components, Internet of things, IoT, crosscutting concerns, Aspects

Introduction

The rapid expansion of technology over the past ten years is undeniable. Today, a wide range of devices, including smart devices with sensor capabilities and all kinds of wearables, connect to the Internet to power newly connected applications and solutions. On the one hand, technology has become significantly less expensive, making it possible for everyone to collect data. In contrast, we must access the Internet everywhere, which provides a wealth of real-time information. In addition, some environments are solely online, such as social media, where all information is stored in the Cloud. Big Data [1,2], Cloud Computing [3,] and Internet of Things (IoT) [4,5,6] are just a few examples of new terms and expressions that have emerged as a result.

Multi-Task Learning, Clustering, and Prediction for Multiple Functional Data Using Multi-Task Gaussian Processes

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Abstract

A model that uses GPs to handle multitask learning, clustering, and prediction simultaneously. This method is a learning step for future predictions for new tasks and a model-based clustering method for functional data. The model is implemented as a mix of GPs with common mean processes and multiple tasks. For the optimization of hyper-parameters and the estimation of latent processes and variables by hyper-posteriors, a variational EM algorithm is developed. To account for uncertainty in both the mean processes and the latent clustering variables, we formulate explicit formulas for integrating them into a predictive distribution. When working with group-structured data, this distribution, which is defined as a mixture of cluster-specific GP predictions, improves performance. The model supports a variety of hypotheses regarding the covariance structure in order to facilitate the sharing of additional information among tasks and can deal with irregular observation grids. Various simulated scenarios and real data sets are used to evaluate performance on clustering and prediction tasks. MagmaClust, the overall algorithm, is freely available as an R package.

Introduction

Generation systems for trajectory tracking are a large class of dynamical physical models, and they are a common control and robotics problem. Numerous control schemes have been studied and modeled over the past few decades, and the majority of them can be categorized as a subset of computed torque control laws [1]. In general, one must be familiar with the system model, such as the kinematic, observation, and motion models, in order to track trajectories [2]. Be that as it may, in numerous commonsense applications, one normally can't get the model data/information, or the framework model is dynamical and is hard to portray. It is challenging to accurately model the system model due to its high degree of dependency, nonlinearity, and uncertainty. Thusly, customary displaying techniques are as of now not reasonable for the genuine dynamical climate [3]

Application of sampling random graph homomorphisms to network data analysis

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Abstract

A graph homomorphism is a map that preserves adjacency relations between two graphs. The issue of randomly sampling a graph homomorphism into a large network is the subject of our investigation. For sampling random graph homomorphism's, we propose two complementary MCMC algorithms and set limits on the mixing times and concentration of their time averages. We propose a novel framework for network data analysis based on our sampling algorithms that avoids some of the drawbacks of independent and neighborhood sampling methods. Computable observables like homomorphism density and average clustering coefficient, as well as their generalizations, are provided by various MCMC trajectory time averages. In addition, we demonstrate the stability of these network observables in relation to a suitable renormalized cut distance between networks. Through the use of artificial networks, we demonstrate our framework with a number of examples and simulations. In addition, we demonstrate how well our framework performs on Word Adjacency Networks of a collection of classic novels and the tasks of network clustering and subgraph classification on the Facebook100 dataset.

Keywords: Subgraph classification, hierarchical clustering, sampling, graph homomorphism, MCMC, graphics, stability inequalities, and networks

Introduction

All through this paper, we consider just undirected and marked diagrams which contain no different edges. Make G a straightforward graph. For the vertex $v \in V(G)$

, let $N(v) = \{u | uv \in E(G)\}$

Further more, the degree $d(v)$

of v be the size of $N(v)$

. If all of the vertices have the same degree, the graph G is regular; G is d-regular if this degree is d. A subset of the vertices of G is called a free set on the off chance that it prompts a subgraph of G containing no edges. It is also believed that the empty set is a separate set from G.

Saudi Arabia's Cloud Computing Model for E-Commerce

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Abstract

Several sectors, including e-learning, healthcare, and education, are affected by cloud computing. With high productivity and low expense, it provides customer service lives that have a high economic value. In developing nations like Saudi Arabia, cloud computing is still relatively new compared to its widespread adoption in industrialized nations (SA). In essence, a variety of variables that could influence the Saudi Arabian government's choice for doing so will determine if a modern approach to the cloud is implemented. Hence, in order to enable the application of cloud knowledge, it is crucial to understand why certain businesses are better prepared than others to make the switch to cloud computing. Accordingly, this article aims to present a cloud computing model for E-commerce in SA that integrates the E-commerce as a service business and cloud computing. The proposed model also offers several internal services, including security services, Platform as a Service (PaaS), Infrastructure as a Service (IaaS), Hardware as a Service (HaaS), Software as a Service (SaaS) and Data as a Service (DaaS). Throughout this, it is anticipated that the suggested model will work with reliable management, server and business modules in addition to sources of hardware and software.

Keywords: PaaS,HaaS,DaaS Cloud Computing

Introduction

Information technology has spread to every facet of society, the economy, education, government administration, and everyday life. Cloud computing is one of the most recent innovations, and a large number of public and private institutions use it. The National Institute of Standards and Technology (NIST) has defined cloud computing as "a model for enabling convenient, on demand network access to a shared pool of configurable computing resources that can be quickly provisioned and released with minimal management effort or interaction with service providers." The institutions may gain some advantages from cloud computing; it can help the activity of their business. Be that as it may, various sorts of foundations, may have specific reservations in utilizing distributed computing, particularly the Little and Medium endeavors (Sme's).

Business IT Key Arrangement on Corporate Execution

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Abstract

The Effect of Strategic IT Alignment in Business on Corporate Performance The function of information technology is essential to the advancement of a company's business management. In the fierce competition, particularly among distributors of electrical appliances, businesses must employ strategies to differentiate themselves and cut costs. By streamlining IT/IS, the implementation of cost reduction reduces business processes. However, information systems like stock data collection and transaction problem reporting have not yet been implemented in business processes. As a result, businesses must devise the appropriate technology strategy in order to adapt dynamically to technological shifts. In light of the issues that emerge, this exploration is simply restricted to vital preparation of data frameworks and application portfolios utilizing the Ward and Peppard approach since it centers around planning the organization's interior outside factors with respect to business and innovation. Within five years, this study hypothesizes that the determination of the strategy can result in the successful implementation of the application in an electrical appliance distributor company. The exploration stage starts with gathering information from the writing, meets, and direct perception. Utilizing the Ward and Peppard method, conduct a subsequent investigation of both the internal and external environments. The mapping of the Critical Success Factors (CSF) that must be evaluated using the IT Balanced Scorecard is based on the findings of the

environmental analysis. An application portfolio represents the proposed strategy for business, management, and IT systems that emerged from this investigation.

Keywords: Strategic Planning, Ward and Peppard, CSF,IT Balanced Scorecard

Introduction

The process of developing an IT strategy, previously known as Strategic Information System Planning (SISP), is undergoing a significant rebirth. It has an impact on the strategy-making process as well as its content [1]. This is because of two distinct factors: the consolidation of the "Strategy as Practice" school from a research perspective [3,4] and the convergence of business and IT strategies in what has been referred to as "Digital Transformation" [2]. While "the realities of strategy formation" [5] (p. 372) has drawn attention to incremental planning, program implementation, and organizational learning, strategy is now seen as an ongoing social process. However, IS strategy implementation in and of itself, as well as the evaluation of the implementation process and outcomes, have received little attention during this evolution [6,7].

Covering Approximations Way to deal with Span Requested Data Frameworks

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Abstract

It is been demonstrated that the hypothesis of unpleasant set is exceptionally advantageous in working with struggle issues actuated by the data charm The first thought of the harsh set isn't exact, in any case, when inclination orders of attributes spaces (standard) are to be thought of. A novel mathematical method for establishing a control-based rough set approach seeks the issue of covering approximation in relation to a control relation in interval-ordered information systems. Our method produces results that are more accurate than those produced by conventional methods like Pawlak's. With a single value, topologies replicate various types of information systems. We made the Pawlak approximation space into a covering approximation space by defining a control relation for interval information systems. After that, we use this method to work with interval-ordered information systems. The proposed method's results allowed for the creation of two distinct rough approximations, the j-lower and j-upper approximations. We employ the covering approximation in the rough set approach because there are numerous improved methods for investing generalized approximation relative to a control relation in interval information systems in this study. The Pawlak strategy applied to interval information systems has been extended to include this. By developing new algorithms that make the calculations easier, this strategy paves the way for additional generalizations.

Additionally, we can incorporate additional topological concepts to assist in real-world decision-making.

Key word: Topological Spaces, Rough Sets, Rough Approximations, Accuracy Measures, Data Classifications

Introduction

Web services that are user-facing and latency-sensitive, like those at Netflix [68], Google [77], and Amazon [89], are increasingly being constructed as micro services that run on shared/multi-tenant computer resources, either as virtual machines (VMs) or as containers (with containers recently gaining substantial popularity).These micro services must effectively multiplex shared resources while handling varied load characteristics in order to maintain service-level goals (SLOs) including end-to-end latency. When one or more "critical" micro service instances (specified in section 2) face load spikes (caused by cyclical or unpredictable work load patterns) or shared resource contention, both of which cause longer than anticipated timeframes to process requests, SLO violations occur.

IoT Security Using a Random Forest Algorithm

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Abstract

New channels for the detection of such attacks have emerged as a result of recent advancements in programmable networks, particularly the programmability of data planes in switches and routers. This paper suggests using Random Forests, a machine learning technique, to quickly and reliably identify DoS attacks in a programmable switch, taking advantage of this newly discovered capability. Random forests employ a large number of procedurally generated classification trees, each of which independently classifies an input into one of a number of classes. After that, a network flow will be categorized by each decision tree as either a legal user flow or a potentially dangerous one, such as a component of a Denial of Service (DoS) attack. Despite the fact that multiple classification trees are utilized to improve accuracy, random forests are extremely light due to the fact that only a small number of straightforward calculations are

required for each classification tree. Due to the simplicity of the operations performed in each tree, programmable switches are an excellent choice for employing this strategy because of their limited resources and need for rapid processing to function at line rate.

Introduction

The Internet of Things (IoT) is a significant and cutting-edge form of communication in the twenty-first century, according to Atzori, Iera, and Morabito (2010). Through some fundamental network infrastructure in the IoT environment, it permits perception and control of physical objects, facilitating integration between the computer system and the real world. In recent years, mobile devices, sensors, and actuators have become a larger and more common part of our daily life [Shi, Li, Zhu, et al. (2018)]. The Internet of Things has taken over every area of our life due to its potent communications and computational capabilities [Lin, Yu, Zhang et al. (2017); Alvear, Calafate, Cano et al. (2018); Stankovic (2014); Al-Fuqaha, Guizani, Mohammadi et al. (2015)].

A Review of Deep Learning-Based Methods for Predicting Molecular Property

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Abstract

At the moment, deep learning is widely used in a variety of fields due to its precise performance. The current state of research on deep learning in molecular property prediction applications is thoroughly examined in this review from three perspectives: compares the advantages and disadvantages of supervised learning, semi-supervised learning, and unsupervised learning. The most extensive research to date focuses on supervised learning-based molecular property prediction. Nonetheless, the examination pattern has advanced toward semi-regulated learning and unaided learning.

Introduction

In domains as diverse as quantum mechanics, physical chemistry, biophysics, or physiology1, machine learning (ML) has played and continues to play a significant role at various levels. In chemo informatics, machine learning (ML) has been widely used in the development of quantitative structure-activity relationship (QSAR) models2, 3 that are intended to predict particular qualities such bioactivity4, toxicity5, or small molecule-protein binding affinity6. Because there are public datasets available, these models allow for the screening of molecules for particular properties.

A Review of an IoT-Based Health Monitoring System Using a Raspberry Pi

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Abstract

Health is one of the most pressing issues facing humanity today. Lung failures, heart-related diseases, and cardiac illnesses are all on the rise. The health of elderly patients or hospital patients must be monitored, but practitioners and doctors must be on constant watch in order to do so. The Web of Things (IoT) and the use of data innovation hugely affect how medical care is given. As part of the IoT health monitoring system that is being proposed, a portable device with sensors that can detect a variety of physiological parameters, such as the patient's body temperature, blood pressure, electrical heartbeats as seen on an electrocardiogram (ECG), blood oxygen saturation, heart rate, body fall detection, traumatic brain injury, and activity monitoring, would be made. After that, the information would be sent via the Internet to a medical server. With this, doctors can better diagnose patients and monitor their health remotely. The device also

has an emergency alert feature that notifies the patient and doctors when sensor values exceed specified thresholds. Utilizing the Internet of Things (IoT) for remote monitoring and data collection, patients can avoid life-threatening situations and receive prompt, cost-effective medical care. Users can also check their health indicators on a regular basis and seek treatment for any irregularities early with a portable health monitoring device.

Keywords: System on a chip (SoC), MQTT (Message Queuing Telemetry Transport), Internet of Things (IoT), remote health

Introduction

The Internet of Things (IoT) is currently a well-researched technology standard. Currently, sensors are used in almost every industry, from industrial monitoring systems to everyday products. IoT and sensor-based intensive healthcare systems are becoming more widely used [1]. IoT makes life easier, more effective, and more intelligent. The prototype device [2] offers simple-to-use alarm and voice recognition features by using a smartphone as the data computing platform.

AI-Driven Car Parking Automation

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Abstract

In today's urban areas, where parking facilities are scarce, car parking has become a major problem. In most big cities, finding a parking spot is hard and frustrating, especially during rush hour. The proposed application makes it simple to reserve parking spots, thereby resolving this issue. Users of this application can see a variety of parking lots and consider whether or not there is a space available. You can reserve the booking space for a specific time slot if it is available. Likewise, this framework gives an extra element where, for security purposes, the vehicle personality is checked by means of its enlistment number at the passage/leave region.

Introduction

AI and ML approaches offer practicable and effective methods for classifying the segmented objects in the photos [8]. Global automakers have been putting money into computer vision and artificial intelligence technologies to create completely autonomous vehicles. Self-driving car sales peaked at $24.1 billion USD in 2019 and are expected to reach $60 billion USD by 2030, assuming the previously mentioned AI techniques can be effectively and safely incorporated into the vehicles [9]. Fig. 1 displays the costs incurred in 2019 by several businesses for the creation of completely autonomous vehicles [10]. Automating the speed of self-driving cars might be difficult, especially when it comes to AMP that are driven on city streets. Every street that the AMP is anticipated to travel on varies in density. Typically, there will be fewer people living along the roads found on the outskirts of cities, and as a result, fewer moving vehicles. City streets with heavy traffic will have more cars and fewer trees. The speed of self-driving cars is crucial to their growth since too much speed can be disastrous, while too little speed can result in under-using the technology.

An Investigation of the Present Data Aggregation Method for Wireless Sensor Networks

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Abstract

The wireless sensor network plays a significant role in a variety of applications of the upcoming advanced wireless technology for efficient communication, including smart homes, the commercial sector, the defense industry, and modern agriculture. Throughout the communication process, there are numerous issues and difficulties. The most difficult and fascinating topic among researchers is energy conservation. This is because in a wireless sensor network, there are n sensor nodes that can recognize and send data to the base station or sink either directly or through an intermediate node. Before sending the best data to the sink or another device, the sensor node must discard any unnecessary data it receives from nearby nodes in order to reduce energy consumption. Numerous sensors can identify a specific target when it is located in a particular sector. This paper presents the Data Agglomeration Technique, which is one of the persuasive methods for ignoring unnecessary data, increases WSN lifespan, and improves energy efficiency to address this issue. The effective data aggregation paradigm can also reduce network

traffic. The various data agglomeration techniques for maximizing energy efficiency in WSN were discussed in this paper.

Keywords: Data agglomeration, clustering, energy-saving routing.

Introduction

A wireless sensor network is a network without cables that connects routers, base stations, sensors, and other devices. Among these sensors, humidity, temperature, health monitoring, target tracking, surveillance, wind direction and speed, power-line voltage, vibration intensity, pressure, sound, motion, pollutants, and seismic events, among other things, play a significant role in this field (1-4). Remote sensor network contains n number of assortments of remote sensor hubs. The energy that these groups of wireless sensor nodes need to collect, analyze, and send their data to a sink or base station over the network is limited. A transducer is one of four components that each sensor node uses to generate electric signals from sensed data. Second, the sensor's output is processed and saved by microcomputers. Thirdly, the transceiver transmits data to the computer after receiving it from the server. Last but not least, the battery's energy source is the most important factor (5). If a sensor node stops working because it doesn't have enough energy, there will be a big problem and the protocol will fail badly (6). The battery cannot be recharged while the nodes are deployed in a belligerent environment.

IoT clustering protocols for agricultural precision

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Abstract

The Internet of Things (IoT) has made it easier to use Wireless Sensor Network (WSN) technologies in new applications. IoT can play a significant role in enhancing production, quality, and output yield in agricultural monitoring. Many agricultural activities will see significant improvements as a result of the use of WSN and data mining methods. The management of the amount of water in planted fields is one such activity. Additionally, WSN has evolved into a more dynamic area of precision farming in recent years. The use of energy and increasing the life of the nodes are the most significant issues in the development of WSN. The clustering protocols based on soft computing that are utilized in the agricultural sector to extend the lifespan of WSNs are the subject of a systematic analysis in this paper. Different soft

computing methods are used for classification: genetic algorithm, fuzzy logic, swarm intelligence, and neural networks The survey will then present a comparison of soft computing techniques, focusing on their objectives and advantages and disadvantages. The findings of this survey enable the researchers to select the appropriate soft computing method for WSN-based precision agriculture clustering protocols.

Introduction

Wireless sensor network (WSN) technology has been effectively applied to enhance network performance in a number of different fields [1,2,3]. Different sensors are used in the environmental field primarily because of their manageable and simple configuration setup [4,5,6,7]. Additionally, the sensor nodes operate independently and build the network infrastructure on the fly. Nodes in such infrastructure lack a stable network topology and can connect the neighboring node that is more suited to transmit data based on a number of variables. The sensor nodes collect the observational data and transmit it to the base station (BS) with the aid of a few gateways and cluster heads. These cluster heads' job is to gather the data packets that have been received and relay them to the backend server. The cluster heads successfully build a single-hop.

Predicting Cardiovascular Disease Using Machine Learning Algorithms

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Abstract

The provision of healthcare is an essential human task. The term "cardiovascular disease" refers to a wide range of infections that affect the heart and veins. The initial methods for estimating cardiovascular diseases aided in making decisions regarding the progressions that occurred in high-risk patients to reduce their risks. Methods: In the proposed research, we have looked at informational collection from haggling, which does not require information pre-handling systems like removing noise data, removing missing data, filling default values if necessary, or classifying attributes for different levels of prediction and decision making. Methods like classification, accuracy, sensitivity, and specificity analysis are used to determine the diagnosis model's performance. A prediction model for determining whether a

person has cardiovascular disease and providing an awareness or diagnosis is presented in this paper. In order to present an accurate model for predicting cardiovascular disease, the accuracy of applying rules to the individual results of Support Vector Machine, Random Forest, Naive Bayes classifier, and logistic regression on a region-specific dataset is compared. Results: The study's machine learning algorithms had an accuracy range of 58.71 percent to 77.06% when predicting cardiovascular disease in patients. Conclusions: When compared to various machine-learning algorithms, Logistic Regression was found to have a higher accuracy (77.06 percent) than the others.

Keywords: Cardiovascular disease, Machine Learning Algorithms, Performance Evaluators, toxins.

Introduction

Prediction utilizing machine learning techniques is the main subject. In many modern business applications, including e-commerce and many others, machine learning is widely used. One application for machine learning is prediction; our topic is the prediction of heart disease using patient datasets and patient data for whom we need to estimate the likelihood that heart disease would develop. The most popular programming language, Python, has a number of libraries that are utilized in this project with a machine learning model. Deep learning neural networks and complicated algorithms are used in the subset model of artificial intelligence called machine learning. The human body is made up of several different organs, each of which serves a specific purpose.

Fuzzy C-Means Clustering-Based Energy-Efficient Algorithm for Wireless Sensor Network

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Abstract

Energy efficiency is an essential consideration in wireless sensor networks. An energy-efficient routing algorithm has been proposed in this paper to extend the network's lifespan. The optimal number of static clusters has been created using fuzzy C-Means clustering in this study. To avoid excessive energy loss, redundant data generation and transmission are eliminated using the coherence concept. The purpose of gateways, both intra- and inter-cluster, is to prevent nodes from transmitting data over significant distances. For direct data transmissions, a novel strategy

has been proposed to select sturdy nodes close to the sink. Based on lifetime, average energy consumption, and throughput, the proposed algorithm is compared to LEACH, MR-LEACH, MH-LEACH, and OCM-FCM. The findings confirm that the proposed algorithm performs significantly better than other algorithms and is better suited for use in wireless sensor networks.

Keywords—WSN; clustering; sleep-awake; virtual grids; multi hop; routing

Introduction

Wireless sensor networks (WSNs) are enabling a proliferation of technologies in a variety of applications, which is quickly changing how information is gathered and shared across nodes. In order to sense several crucial factors for environment-based systems, such as humidity, pressure, temperature, light, sound, and vibrations, the WSN is made up of a large number of tiny sensor nodes (SNs) that range in number from hundreds to thousands. Battery-powered sensors called SNs collect data and transmit it to the destination node, which will then act right away. These nodes are capable of three things, including detecting, processing, and communicating. Four elements make up most SNs. These parts include a radio transceiver, an external memory, a power source, and a microcontroller.

Energy-Efficient Cluster-Based Fuzzy Enhanced Multicast Protocol for Increasing Network Lifetime

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Abstract

The sensor node in a wireless sensor network (CWSN) is mobile and can roam both within and outside the network. The best routes for forwarding packets are what present existing models have found to be difficult. It may result in a decrease in the lifetime of the network if the balancing of packet arrivals and energy conservation is not achieved. Fuzzy enhanced Cluster based Energy Efficient Multicast Protocol (FCEEMP) is developed on the basis of three aspects in our research work. The first is multicast routing, which is based on the best route metric and average reliability metric. Second, the cluster is formed by the stability of nodes and their ability to take routes. The cluster network model uses three sets of nodes to estimate energy consumption: the sensor node, the cluster member, and the Cluster Head (CH). Thirdly, an improvement to the fuzzy model is made to get the best energy and the value of the lifetime of

the network. Based on the simulation analysis, the proposed protocol outperforms the other schemes.

Keywords: CWSN, Energy consumption, Multicast routing, Fuzzy model

Introduction

The sensor node in a wireless sensor network (CWSN) is mobile and can roam both within and outside the network. The best routes for forwarding packets are what present existing models have found to be difficult. It may result in a decrease in the lifetime of the network if the balancing of packet arrivals and energy conservation is not achieved. Fuzzy enhanced Cluster based Energy Efficient Multicast Protocol (FCEEMP) is developed on the basis of three aspects in our research work. The first is multicast routing, which is based on the best route metric and average reliability metric. Second, the cluster is formed by the stability of nodes and their ability to take routes. The cluster network model uses three sets of nodes to estimate energy consumption: the sensor node, the cluster member, and the Cluster Head (CH). Thirdly, an improvement to the fuzzy model is made to get the best energy and the value of the lifetime of the network. Based on the simulation analysis, the proposed protocol outperforms the other schemes.

Optimized and Secure Data Aggregation Protocol for Wireless Sensor Network

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Abstract

It is a challenge for the community of researchers .Additionally, data transmission security is a significant constraint that makes WSN research increasingly appealing. One method for conserving energy is data aggregation, which reduces computing overhead by eliminating redundant data. However, some security breaches cause the data aggregation readings to be false, rendering the outcomes inaccurate. Additionally, there is a tradeoff between WSN energy consumption and security. Higher levels of security also result in an increase in energy consumption (more encryption and decryption use more energy), and attempting to conserve energy means compromising security in some way. An energy-efficient and secure data aggregation protocol that does not compromise security is proposed in this paper. Encoding the information just at leaf hubs, utilization of protection homomorphism method and cutting the

information guarantees secure and exact information collection. Our protocol is more secure and energy efficient than the EESSDA protocol, as demonstrated by our theoretical analysis and simulation.

Keywords: Security, Secure Data Aggregation Protocol, WSN, OSDAP, EESSDA

Introduction

As soon as a node dies, other problems in a wireless sensor network are meaningless, making energy consumption one of the key problems. To reduce the energy consumption of nodes after they are installed, numerous studies have been conducted by various researchers. Because the sensor nodes in a WSN are so close to one another, nearby nodes sense and transmit similar data, wasting bandwidth and energy. Experiments in [1] demonstrate that the energy used to transmit a single bit is equivalent to the energy used to compute 800 instructions. Data aggregation is the most reliable solution, despite the fact that many have been suggested by various writers. By combining the data before being used, a process known as data aggregation [2–6] allows for the removal of redundant data from networks.

Using a Rough Set Method, Mathematical Modeling for Predicting and Classifying Neonatal Infections

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Abstract

The majority of human contagious diseases affect newborns. Our goal is to provide a prediction for these diseases, which are responsible for millions of deaths. Rough set technique was used to analyze the symptoms of these diseases with the fewest attributes, and a time series model was used to predict which diseases are contagious.

Keywords: AI-Artificial Intelligence, RST-Rough Set Theory, CS-Congestive Science, ML-Machine Learning, KD-Knowledge Discovery, A-Data Analysis, Data Mining and Time series

Introduction

Since its inception as a field of study more than a century ago1,2, infectious disease epidemiology has placed a strong emphasis on the mathematical representation and analysis of infectious diseases. The development of more advanced computing, electronic data management, the capacity to share and deposit data over the internet, as well as quick diagnostic tests and genetic sequence analysis, has led to a rise in the use of detailed electronic monitoring of infectious diseases in recent years. The use of mathematical models in the creation and testing of fundamental scientific ideas as well as the design of workable disease prevention measures has expanded as a result of these continuous discoveries. In many nations' public health programmes, mathematical analysis and models have been crucial in satisfactorily explaining previously perplexing observations 3,4.

A Kernel-Based Node Localization in an Anisotropic WSN

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Abstract

The primary issue with wireless sensor networks (WSNs) is still the localization of sensors. Low accuracy is the fatal flaw of range-free node localization in WSN, which is unfortunate. The problem of anisotropic WSN node localization is transformed into the problem of kernel regression when we apply kernel regression to it in this paper. Classical DV-Hop is contrasted with the proposed radial basis kernel-based G-LSVR and polynomial kernel-based P-LSVR in isotropic and anisotropic WSNs with varying proportions of beacons, network scales, and communication range disturbances. G-LSVR presents the best limitation exactness and dependability from the reenactment results.

Introduction

The biggest issue with wireless sensor networks (WSN) right now is still localization of the wireless sensors. The range-based measurement method and the range-free measurement method can be used to categories the localization methods of WSN. While the latter receives low accuracy in the absence of range information, the former can obtain high accuracy with the use of range information [1-4]. Machine learning is added to the localization of WSN in order to increase the range-free node localization's accuracy [5]. A precise artificial neural network (ANN) was utilized in range-free localization methods, and when compared to other conventional algorithms, its accuracy and performance were considerably enhanced [6–12]. Additionally, Phoemphon et al. [13, 14] used fuzzy logic to localize objects without a range in WSNs.

Forecast of Coronary illness Utilizing Mixture Straight Relapse

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Abstract

Dynamic Coronary illness (HD) is perhaps of the most well-known infection, and early determination of this sickness is an indispensable movement for some medical services suppliers to stay away from and save lives for their patients. Coronary illness records to be the main source of death across the globe. By using machine learning techniques, hidden information in the health sector can help make early decisions by predicting existing diseases like coronary heart disease. The two-phase implementation of the proposed Hybrid Linear Regression Model (HLRM). The first step is to preprocess the data; KNN and simple mean imputation are used to imput missing values, and then Principal Component Analysis is used to find the most important attributes that contribute to the disease's cause. Second, the linear regression technique known as stochastic gradient descent is utilized to record the probability values of the dependent variables

in order to ascertain the connection that exists between the independent and dependent variables. The proposed model has been observed to have an overall prediction accuracy of 89.13 percent. The study's findings will serve as a reference for medical professionals and as a platform for academic research.

Keywords: Machine learning; heart disease, association, Linear Regression Model, principal component analysis, Decision tree

Introduction

Medical disease data are classified using classifier selection, and a clustering-based classifier selection method is suggested. The technique chooses a large number of clusters for an ensemble process. The classifier with the best average performance is then picked to categorise the provided data after calculating the standard presentation of each classifier on a subset of clusters. The weighted average method is employed in the computation of a normal act. The distances between the given data and each chosen cluster are used to determine weight values. Multiple classifier selection and multiple classifier fusion are the two main types of multiple classifier combinations. The selection of several classifiers presumes that each classifier possesses competence in a few small regions of the feature space and seeks the classifier with the highest local accuracy.

PRECISION AGRICULTURE: AN ANALYSIS OF MANY FUNCTION IN A WIRELESS SENSOR NETWORK

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Abstract

The concept of instantaneous observation of environmental and field parameters like soil moisture, humidity, temperature, and PH, among others, is known as precision agriculture. What's more, move of the upsides of those boundaries to the distant focal server, which based on these qualities, takes suitable activity to control the utilization of various assets like pesticides, water, manure and so forth. in a way that works best to get the best quality and quantity of crop yield. Utilizing the Wireless Sensor Network (WSN) technology and a wide variety of sensors, farmers in Precision Agriculture monitor and analyze the values of the field parameters in real time. The sensor-based data collection, monitoring, and control system is the subject of this survey paper, which looks at various existing techniques, communication technologies, and protocols. It likewise surveys the use of WSN in accuracy Horticulture climate and effectively brings up the future extent of the work in this space

Introduction

Agriculture's expansion and development are the primary indicators of India's economic development. In the coming years, traditional farming methods will not be able to meet the challenge of meeting the ever-increasing demands of an expanding population. In order to increase agricultural productivity, newer methods must be utilized [1]. It is too essential to create eco-accommodating innovations in a manageable way. When it comes to measuring plant growth conditions from a distance, such as temperature, humidity, atmospheric pressure, soil moisture, and water level, WSN technology can be extremely useful. The crop's quality and productivity can be improved by the wireless monitoring and controlling system [2, 3]. A novel idea known as precision agriculture (PA) is the result of technological advancements in the agricultural sector. The two kinds of methods known as "Map Based Precision Agriculture" and "Sensor Based Precision Agriculture" make up the majority of PA. Geographic Information System (GIS), Global Positioning System (GPS), Remote Server (RS) technology, soil sampling, and other methods are used in Map-Based Precision Agriculture and utilized for controlling and observing field parameters. GPS will be useful for observing and controlling WSN-based systems because it can pinpoint the field's exact location [4].