International

CONFERENCE ON

COMPUTING & COMMUNICATION

(IC3-2022)

3rd & 4th June 2022

Jointly organized by :

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Gandhi Institute for Education and Technology

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Proceedings
of
International Conference
on
Computing and Communication
(IC3-2022)

3rd - 4th June 2022

Edited and compiled by

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ABOUT GANDHI INSTITUTE FOR EDUCATION AND TECHNOLOGY, BANIATANGI

Gandhi Institute for Education and Technology was established at Baniatangi, Bajpur, Khurda by the SPBM foundation, Bhubaneswar in May, 2009 affiliated to Biju Patnaik University of Technology, Rourkela, Odisha. The Postgraduate Centre of Gandhi Institute for Education and Technology is functioning from the year 2013.

In Gandhi Institute for Education and Technology, every effort is harnessed to realize the dream of making this educational institution as temple of learning. It is the aim of GIET to participate in the task of inculcating necessary Knowledge, Skills and Creative Attitudes and Values among the youth of the country to contribute more effectively towards establishing an equitable social and economic and secular ideal of our nation. GIET is well known for its dedicated faculty, staff and the state-of-the art infrastructure conductive to a healthy academic environment. The Institute is constantly striving to achieve higher levels of technical excellence. Evolving a socially relevant and yet internationally acceptable curriculum, implementing innovative and effective teaching methodologies and focusing on the wholesome development of the students are our concerns. The Institute currently has seven academic departments including PG departments in four disciplines of engineering, with nearly more than 50 laboratories organized in a unique pattern of functioning, Central Library with state-of-the art facilities, Auditorium, Student Activity Centre, Computer Centre, Indoor Games facilities, basketball & Athletic stadium, Seminar Halls with required infrastructure etc. Faculty of repute, brilliant student community, excellent technical and supporting staff and an effective administration have all contributed to the pre-eminent status of Gandhi Institute for Education and Technology.

It is almost a residential institute housed with nearly 1800 students. has 06 hostels out of which 04 hostels for boys and 02 hostels for girls. Lovely gardens, student amenities, shopping complex, water fountain, playground facilities etc. in the campus are of immense interest for students. The placement service at the institute is one of the best of its kind for its 1st batch of students. The alumni of the institute hold responsible and enviable positions all over and are in constant touch with the institute. Every new entrant into the portals of this institution is poised for partaking a rich heritage and tradition that is unique to GIET.

Each year, we do conduct Cricket, Football tournaments, besides the annual athletic meet. The students of the Institute also participate in various sports and games competitions elsewhere to represent the Institute. The students run many hobby clubs like Photography club, Music club, Science club, Debate club and Fine Arts club. The competitions on debate, music etc. are organized department wise, hostel wise and Institute as a whole. The Institute organizes its annual cultural festival 'SPARKLE' every year. There are many facilities for the students to engage themselves in extra-curricular activities. Sports and cultural activities have become part and parcel of the campus life.

The institute brings out an Institute Newsletter. "The Campus Focus" every quarter which publishes literary and technical articles, faculty and students' achievements, publications, various activities carried out inside the campus and etc. To motivate the students in social services, the Institute has a unit of CSR team. The students of this unit render social services in the nearby rural areas.

The Institute is well connected by road, rail and air to all national as well as international destinations. The Institute has been awarded as best Technical Institute by leading Organizations for last three years.

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Message Board

MESSAGE

Dr. Satya Prakash Panda
HON'BLE CHAIRMAN
Gandhi Institute for Education and Technology
Baniatangi, Khordha, Odisha

I am pleased to welcome you all to the International conference on computing and communication (IC3-2022) to be held on 3rd & 4th June 2022 at Gandhi Institute for Education & Technology, Baniatangi in association with Department of Computer Application, Sikkim Manipal Institute of Technology, Sikkim, India.

The successful outcome of the IC3-2021 held last year, generated an overwhelming response from speakers, delegates and participants resulting in a unanimous request for the continuation of the conference on computing and communication

The intent of the International conference IC3-22 is not only to discuss lively and emerging issues of a particular domain but also dissemination of the awareness among other learned folks. Over the years dramatic improvements have been made in the field of computing and communication technologies but I believe IC3-22 will be dedicated to bring out latest trends in computer engineering and technologies. In order to provide outstanding technical sessions, distinguished experts, eminent professors are invited to participate in the conference. I hope IC3-22 will make you aware of state-of-art and provide a platform to discuss various issues, challenges and their feasible solutions.

I would like to express my appreciation to the organizing committee of IC3-22 for their dedication, efforts and timely support.

I wish all the very best and a grand success of IC3-22

MESSAGE

Shri Girish Chandra Singh

HON'BLE REGISTRAR
Biju Patnaik University of Technology
Govt. of Odisha, Rourkela, Odisha

When talent and hard work meet together that results in success. I congratulate and applaud the team for their efforts in organizing the conference successfully on emerging technologies in computer science. These emerging technologies have the indeterminate power to strengthen lives, transform the global economic scenarios and make this world a better place for the upcoming and future generations. A Nation that believes to lead in Global Eco space and competes with Developed Countries must be equipped with a highly educated and skilled workforce. It is indeed a great pleasure to come across International Conference on Computing & Communication (IC3) on 3rd and 4th June 2022 organized by Gandhi Institute for Education and Technology in association with Department of Computer Application, Sikkim Manipal Institute of Technology, Sikkim, India.

I am sure that the conference of this type will inculcate the much-needed research culture among the students and teachers and trigger interactions among researchers to exchange the ideas of recent advances in the areas of "Computing and Communication".

I wish the conference a grand success.

MESSAGE

Prof. Jyoti Prakash Mishra

HON'BLE VICE CHAIRMAN
Gandhi Institute for Education and Technology,
Baniatangi, Khordha, Odisha

I am delighted to welcome you to be a constituent of this International Conference on Computing & Communication (IC3) on 3rd & 4th of June 2022. Being a highly inter disciplinary research area it is a perfect topic for a conference, giving opportunity for researchers to meet and exchange information and collaborate. I am very happy to state that this conference will provide a platform for such exchange of information on advancements of computing and communication technologies.

This Conference IC3 2022 in association with Department of Computer Application, Sikkim Manipal Institute of Technology, Sikkim, India is being attended by eminent researchers, setting stage for an intense discussion on the topic and successful exchange of ideas. Cross fertilization of ideas provides a fillip for the progress of research. The papers being presented have been selected based on blind reviews and are of very high standards. An opportunity has been provided for research scholars to discuss their problems and an achievement with senior researchers is a welcome gesture. I am sure the conference has all the ingredients researchers look for in a conference and this conference will provide a new perspective to the researchers. A conference has served its purpose when the delegates get good opportunity to network for further research.

The various technical and non-technical committees have put in admirable effort in making the conference a memorable one to all the delegates. I take this opportunity to congratulate all the delegates for their participation and contribution.

I wish this Conference IC3 2022 a grand success.

MESSAGE

Dr. Jibanananda Jena
HON'BLE PRINCIPAL
Gandhi Institute for Education and Technology,
Baniatangi, Khordha, Odisha

On behalf of Gandhi Institute for Education and Technology, I extend a very warm welcome to all the delegates, participants and students to the International Conference on Computing and Communication (IC3) to be held on 3rd and 4th June 2022. The conference aims to bring together national and international researchers, industrial experts and academicians to present papers and to discuss on current research and development in state-of-the-art technologies in computing and communication, Environment friendly computing, Reconfigurable computing and it will provide a forum for sharing insights, experiences and interaction on various aspects on Computer Science and Information Technology.

I would like to express my deep gratitude to the department of CSE, EACE and MCA for their great effort to organize the International Conference IC3-22 **in association with** Department of Computer Application, Sikkim Manipal Institute of Technology, Sikkim, India.

I wish all the very best and the IC3 to be a grand success.

MESSAGE

Dr. Zdzislaw Polkowski

Department of Business Intelligence in Management,
Wroclaw University of Economics and Business, Poland

It gives me immense pleasure that the Gandhi Institute for Education and Technology, Baniatangi is organizing International Conference on IC3- 2022 on 3rd and 4th June 2022. Information technology has served as a big change agent in different aspect of business and society.Advancement and application of information technology are ever changing and It has proven game changer in resolving economic and social issues.

The happening of such type of conference has been always a very unique event. Sometimes, the organizer may not be sure whether it is either a sole event or the outset of a success story with a multitude of conference editions. I wish the Conference (IC3-2022) will follow the latter of my described scenarios and become a reputable, annual event in the scientific landscape of Odisha. As the Keynote Speaker of the Conference, IC3-2022, I know how hard and uncertain, it may be to acquire a sufficient number of highly respectable submissions in order to meet the requirements of the publisher.

The Conference will focus on practical application and data analytics in Engineering and Management. The two days Conference will definitely provide an excellent platform for the research scholars, academicians, students to spread knowledge on Scientific research in interdisciplinary areas.

I wish the Conference a grand success.

MESSAGE

Dr Samarjeet Borah

Professor & Head at the Department of Computer Applications at SMIT, Sikkim, India

New trends arise within computer science industry every year, and it becomes important for professionals to be familiar with these different trends and all that they entail. No matter what profession one is working in, being familiar with these can improve your professional standing and can help one understand what the potential upgrades are for the industry that you are already working in.

I would like to express my thanks to Gandhi Institute for Education and Technology **in association with Department of Computer Application, Sikkim Manipal Institute of Technology, Sikkim, India** for making this conference an example for others. Each and every one in the team is an invaluable asset, and I cannot enough appreciate you for this.

I wish the Conference a grand success.

MESSAGE

Dr. Smruti Rekha Das

GIET, BBSR, Odisha, India

Technology today is evolving at a rapid pace, enabling faster change and progress, causing an acceleration of the rate of change. However, it is not only technology trends and emerging technologies that are evolving; a lot more has changed due to the outbreak of COVID-19 making IT professionals realize that their role will not stay the same in the contactless world tomorrow. And IT professionals will constantly be learning, unlearning, and relearning.

I am looking onward to an exhilarating two days of insightful presentations, discussions, and sharing of technical ideas with researchers from so many different demographic locations.

I wish the conference a grand success.

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EXPERIMENTAL STUDY OF LOCATION SPOOFING AND IDENTITY SPOOFING ATTACK IN IOT NETWORK

Satya Krishna. V, P.Karunakar Reddy
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract

The IoT Network comprises of a billion intelligent devices. They have capability of processing, networking, sensing and actuating. IoT is introduced in various domains like medical, agriculture, industry, manufacturing, defence into the society. These tiny devices are generally deployed into the open and uncontrolled environment. So, they are easy targets for an attacker to launch various cyber-attacks. Location Spoofing is an attack in which an attacker can modify a device's genuine physical location related information and can prepare a clone of the device. Location related context information plays vital role in the decision-making process for IoT applications. If an Intruder manipulates Location related context information, then false data will be accumulated and processed by the base command center. Because of that wrong decision will be triggered by command centre because of faulty analysis of wrong data. It can lead towards serious issues such as accident or traffic jam problem in the smart traffic management application, machine malfunctioning in the industry related application. Identity Spoofing is an attack in which an attacker captures the original identity of a genuine device and then misuse this captured information to launch an attack like Masquerade and MITM attack. Presence of such attacks in the network can affect the efficiency and performance of the system. There is no significance work which focus on Context parameter for providing an authentication service, various research scholars have suggested a work in the domain of Identity based Authentication, Token based Authentication, Key based authentication. Pitfalls in such approaches are that they do not provide effective & efficient authentication security service as they do not consider the context parameter at the time of providing decision regarding device is genuine or not. We have provided a fundamental base to show the impact of modification of context parameter in IoT network. We have simulated Location Spoofing & Identity Spoofing attacks in the Cooja simulator. Our experimental results states that though device identity is legal but if we modify device location related context information, there will be adverse effect on network performance- Delay, Throughput and Power consumption. Main reason behind this result is that intruder intentionally introduced malicious activities into the network by modifying context data. So, in future there is a need to develop an authentication or security approach by integrating context & identity parameters for offering tight security solution.

Keywords: Location Spoofing attack, IP Spoofing, Context Validation, COAP, RPL

OPEN RESEARCH PROBLEM FOR EFFECTIVE IOT AUTHENTICATION

Sidhanta Kumar Balabantray, Sambit Kumar Mishra
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Abstract

IoT is collection of different "things" which are associated with open web. As all the things are connected to the Internet, it offers convenience to end users for accessing the resources from "Any Where, Any Time" throughout the globe. At the same time, open nature of IoT provides a fertile ground to an intruder for launching different security related threats. If we can no apply proper security safeguards to the IoT System, then it will be not useful to society. Authentication, Encryption, Trust Management and Secure Routing are different domains to offer security in IoT system. Among them, Authentication is very much important security service as it validates device identity before granting access to system services/ resources. Existing IoT Authentication algorithms are fail to verify device identity in unambiguous way. Existing authentication methods are based on Identity, Key, Password or token attribute for validating device identity. They are vulnerable to different security threats such as Key Stolen threat, MITM threat and Location Spoofing threat. These kinds of approaches are not suitable in the applications related to target tracking, smart city or defense. They provide device identification in ambiguous way and because of that intruder can perform malicious activities in a system, which can decrease system performance. So, it is a demand of time to design an efficient and secure Multi-factor Context aware Multi Key based IoT algorithm which can offer better security from well- known security threats and validate device identity in unambiguous way.

Keywords: IOT, Multi-factor Authentication, Context based Authentication, Location Spoofing attack

A NOVEL TECHNIQUE ENABLING TEXT TO SPEECH SIGNAL CONVERTING SYSTEM USING RASPBERRY PI

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Abstract

Rasperry is the technological advancements are increasing at a faster pace. But the utilization of technologies in various sectors are very low. It is known that most of the people find it difficult to detect the text from the paper and books. So we propose a system where the text images can be extracted by the system and given to the Pi. The Pi processes the text images and reads out the content using speaker.This enables the use of text to speech conversion.

Keywords : Interactive voice response, Optical Character Recognition, Texttospeech, Voice

SELF LEARNING AI SMART BOT WITH NLP AND SPEECH RECOGNITION

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Abstract

Chatbots are used to reduce tedious human work and these bots provide quite qccurate information than getting information from the physical information provider. But the problem with the existing Chatbots are not mutable and any updation cannot be done without editing the source code or by editing the knowledgebase.This bot purely uses dynamic knowledge base. This Smartbot was made to rectify the problems faced by the regular bots. The Smartbot that we developed are made up of python language and uses speech recognition for getting voice input from the user and giving the response to the user in the text format. This Smartbot scrapes the information from the given website and uses it as a knowledge base. Before using the knowledge base this Smartbot preprocesses the scraped data. Hence this Smartbot uses python tools for Natural Language Processing and Speech recognition.The user input is searched against the knowledge base for the similar word. It calculates the similarity using cosine similarity function. Since this chatbot can learn from the website, it can be self updated. Hence the uttermost advantage of this Smartbot is, this bot can update itself when the website gets updated and the additional speech recognition feature provides easier user access.

Index Terms—Natural Language processing (NLP), Speech Recognition, Tokenization.

A SURVEY ON DIFFERENT INTRUSION DETECTION TECHNIQUES USING MACHINE LEARNING

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Abstract

Intrusion Detection System, abbreviated as IDS, examines and detects suspicious activity in a network. Hence, IDS is significant to secure network as there is a rapid share of confidential data over the internet by many organizations and people. This study aims to review various Machine Learning (ML) techniques available for Intrusion Detection (ID). Various feature selection and classification algorithms have been explored in the context of ML for ID. A comparative analysis is also presented with various merits and demerits of the ML algorithms considered for the study. Various drawbacks of ML techniques for ID are discussed. Various ML techniques that are considered in this analysis include Naïve Bayes (NB), Random Forest (RF), K-Nearest Neighbour (K-NN), Support Vector Machine (SVM), Logistic Regression (LR), Multi-Layer Perceptron (MLP), Classification and Regression Trees (CART), Extra Tree Classifier (ETC), Information Gain Ratio (IGR), Correlation based Feature Selection (CFS), Principal Component Analysis (PCA), minimum redundancy and maximum relevance feature selection methods and few more. All the ML algorithms taken in this review have their advantages and disadvantages. From the analysis, it is found that most of the ML algorithms show acceptable accuracy for ID classification. However, these studies have to be improved to detect the zero-day attack due to technological development. These studies have also provided suggestions for improving the system further. The common and important specificities to be considered are optimized and listed so that this will help the network security expert to design an effective IDSystem in an effective and efficient way.

Keywords – Intrusion Detection System, Security, Machine Learning Techniques, feature selection, redundancy, relevance.

EXPERIMENTAL EVALUATION OF EXPECTATION-MAXIMIZATION ALGORITHM FOR BANGLA-ODIA MACHINE TRANSLATION

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Abstract

The role of Expectation-Maximization (EM) algorithm for Bangla-Odia machine translation system has a good practicality to be implemented with high accuracy result. The entire mathematical calculation is worked out and shown here by taking some Bangla-Odia sentences as a set of text called corpus. This EM algorithm helps to find out the maximum likelihood probability value with the collaboration of the 'argmax function' that follows the mapping between two or more words of source and target language sentences called as one-to-one, oneto-many and many-to-many mappings. The lexical relationship among the words of the parallel sentences is calculated by mathematical formula and those values indicate which word of the target language is aligned with which word of the source language. As the EM algorithm is a looping process, the word relationship between source and target language is easily found out by calculating some probability values in terms of maximum likelihood estimation (MLE) in an iterative way. To find the MLE or maximum aposterior (MAP) of parameters in the probabilities model, it is really a challenging task as machine translation being one of the core areas of NLP research work nowadays with some implementation problems and issues. Keeping all these types of issues in mind, the nature of lexical problems those arise at the time of analyzing bilingual translated texts between Bangla (as source language) and Odia (as the target language), is attempted in this paper. One of the major factors of MT system is, handling the problem of 'word divergence' or 'lexical divergence' by EM algorithm with MLE technique. Though it is solved by EM algorithm, adding MLE technique is used partially to enhance the probability values to give more accuracy. A bilingual dictionary called as a lexical database that is experimentally examined and tested mathematically is in use here, as common problems of word divergence or lexical divergence are normally addressed at the phrase level using bilingual dictionaries or lexical databases.The basic challenge lies in the identification of single word units of the source text which are converted into multiword units in the target text.The experimental results are based on the bilingual Bangla-Odia corpus developed with EM algorithm applied to it, which finds a good combination for solving lexical divergence problem with high accuracy.

Keywords: Expectation, Maximization, Probability, Alignment, Corpus, Odia, Bangla.

PROPOSED MODELS FOR DATA COMPRESSION FOR ACHIEVING COST EFFICIENT AND SECURE DATA STORAGE OVER PUBLIC CLOUD

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Abstract

Every day millions of digital images are generated and stored over the cloud. Millions of users are turning towards cloud to store their sensitive data over cloud rather than their local devices in order to save the space also enabling themselves to access that data from anywhere from any devices, but the security and privacy of the sensitive data can only presume upon the reliability of cloud service provider. Most of the public cloud service providers does not assure data security and privacy. In order to guarantee data privacy and security one has to move to private cloud. Also higher data storage cost, access restriction and data privacy are the major concern in cloud platforms. Work in this regard has been achieved but with minimalistic approach. This paper studies technical challenges comes while constructing cloud based image processing system. We have explored various image processing tasks such as compression which helps to minimize storage cost, fragmentation which helps to store image in chunks and provide extra security layer. We have conducted extensive experiments to evaluate the effectiveness of the system.

Keywords— Storage Cost, Cloud Security, Data Privacy, Data Fragmentation, Data Compression

ACCESSIBILITY OF DATA LINKED TO LARGE SCALED HETEROGENEOUS DATABASES USING GENERALIZED APPROACH: A CASE STUDY

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Abstract

In broad sense, optimizing queries in general can be a fundamental aspect linked to large scaled heterogeneous databases. Particularly, while replicating as well as performing storing options in databases associated with several disjoint locations, it is really required to focus on the suitability of sites during query execution. Likely, the process of choosing the most efficient query evaluation plans from the prescribed strategies should be feasible towards processing certain queries, particularly in complex situations. Assume that a large scaled database system is being provisioned with finite number of resources in a way that computational capabilities of various resources can be shared by the users. Also the users complete the execution by the desired heterogeneous system. The assigned tasks are linked with provisioned parallel tasks. In such situation, it is really difficult to decompose the independent relationship and further to allocate in the host sites. Considering the data dependency within the parallel tasks into account, the total execution time associated with the queries depends on the maximum execution time of the parallel tasks. Accordingly, the particle swarm optimization algorithm can be implemented prioritizing the fitness parameters accounting the required memory while executing the queries. The time required to execute the queries along with the cost can be well taken towards measuring the performance of queries particularly in the allocated locations. The algorithm can act on the basis of swarm of early responses. In fact, it can act like the evolutionary computing mechanisms to obtain the optimized response by moving the early responses in successive repetitions.

Keywords: Large scaled database, Heterogeneity, Query plans, Containerization, Data accessibility

A NOVEL DIAGNOSIS SYSTEM FOR PARKINSON DISEASE BASED ON ENSEMBLE RANDOM FOREST

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Abstract

One of the most important concerns in healthcare and machine learning research is diagnosing Parkinson's disease (PD). Researchers have demonstrated the usefulness of artificial intelligence and machine-learning models in a variety of practical classification issues. The proposed study aims to develop a PD prediction model. This paper proposes an ensemble random forest (ERF) model, which employs a variety of classification approaches to achieve this goal. The proposed ERF classifier is evaluated on the PD dataset from the machine learning repository at the University of California at Irvine (UCI).

The suggested classifier is also compared to various state-of-the-art machine-learning classifiers, such as random forest, naive bayes, support vector machine with radial basis function kernel, and decision tree. To assess the effectiveness of the suggested ERF classifier, several performance indicators such as accuracy, detection rate, sensitivity, specificity, F-Measure, receiver operating characteristic, area under the curve, and statistical tests such as the kappa statistics were used. To assess the reliability of the classification models in handling imbalanced data, this study used several splits of training and testing data, including 50–50 %, 66–34 %, 80–20 %, and 20-fold cross-validation. Finally, the suggested ERF model revealed its potential in the classification results, with a 96 % accuracy rate. The output findings were also compared to those of previous studies on the same dataset, and the proposed classifiers were determined to be the top in every performance metric.

Keywords: Parkinson Disease, Ensemble, Random Forest, Machine Learning Classifiers

APPLICATION OF MULTILAYER PERCEPTRON IN SPEECH EMOTION RECOGNITION

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Abstract:

Emotion is the state of mind based on which we express ourselves. Emotion recognition is a part of speech recognition which is witnessing a great leap in Artificial Intelligence. It can be used in various technologies like voice assistant (Google Assistant, Alexa, Siri and Cortana), monitoring suspicious behaviour and fraud detection. Although there are multiple models to recognize emotions using machine learning and deep learning, this project aims to use the Multilayer Perceptron Model to identify the speaker's emotions using audio files as input and discovering the multilevel representation of the signal.

Keywords: speech recognition, artificial intelligence, multilayer perceptron model.

SUICIDAL TENDENCY DETECTION USING NLP

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Abstract

Depression is a common mental illness that can interfere with daily activities and productivity. Suicidal thoughts or attempts may result as a result. In today's society, suicide is a major issue. Suicide attempts should be detected and prevented early on in order to preserve people's lives. Natural Language Processing (NLP) and machine learning techniques were used to construct the platform, which was designed to interpret conversations. The proposed two-stage platform would evaluate conversation and categorize associated sentiments into four categories: “happy”, “neutral”, “depressive”, and “suicidal”. The first step of intent recognition would examine conversations and categorize associated sentiments into two categories: "YES" and "NO". We show how social media data and suicide notes can be used to identify people who are in danger of committing suicide. Suicide notes are usually written in letters and posted on websites, and they're also captured in audio and video. Suicide notes can be used as study material in NLP. This article comprehensively introduces and explores methods and algorithms from a variety of disciplines. We also look at the ethical considerations of using such technology and the ramifications for privacy. For knowledge-aware suicide risk assessment, current research incorporated external knowledge utilizing knowledge bases and suicide ontology. Currently, this technology is only used for intervention for those who have "opted in" for the analysis and intervention, but it allows for scalable suicide risk screening, potentially identifying many people who are at risk before they engage with the health care system. Finally, we review the current work's shortcomings and offer some recommendations for further research.

Keywords—NLP, SVM, TF-IDF, Logistic Regression, Random Forest, Stochastic Gradient Descent, BoW

DESIGN AND IMPLEMENTATION OF AN IOT BASED SOLAR CHARGE CONTROLLER

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Abstract

This Paper presents the concept of a Maximum Power Point Tracking (MPPT) based Solar Charge Controllers (SCC) for charging a battery in stand-alone Solar Photo-voltaic (SPV) systems. A SCC is a battery charge regulator which is connected in between the SPV panel and the battery, the primary purpose of the SCC is to regulate the charging of the battery so that it charges correctly. PWM based SCCs may get the job done but they have very low efficiency as compared to MPPT based ones and thus waste a lot of SPV power. This fact has been analyzed in our article by executing the simulations for both the charge controller types and the efficiency of PWM was found to be only 65% whereas that of the MPPT based is 94%. Another useful feature in modern day SCCs and in our prototype is the facility to monitor the device parameters remotely on a wireless network which provides major flexibility to controllers. In this prototype model we have implemented MPPT based SCC along with one Wi-Fi module for monitoring the battery voltage, current, PWM pulses and battery status on smartphones. The user also gets notified about the battery status, whether the battery is charging or it is over charging. If the SPV voltage is more than 12V the relay disconnects the battery from the SPV cell and a notification regarding this is given to the user.

Keywords: Maximum Power Point (MPPT), Solar Charge Controller (SCC), Solar Photovoltaic (SPV), Pulse Width Modulation (PWM), IOT.

EFFECTIVE ALGORITHMS AND THEIR ANALYSIS ON BREAST CANCER CELLS DATA CLASSIFICATION USING DATA MINING IN RSTUDIO

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Abstract

Breast cancer is a disease which has high morbidity and mortality. Breast cancer starts in the breast cells. Cancer starts when the old and damaged cells begin to grow out of control. In women, after skin cancer, breast cancer is the second most common cancer. Analysis of the data set of cancer patients can give us a more personalized and early approach for the treatment. Data mining techniques using the Machine learning and Artificial Intelligence algorithms help us to classify, analyze and also visualize this kind of data. This research is done in order to predict if the data mining techniques can be used to classify and analyze dataset for categories like breast cancer cells data. The accuracy and the error of the applied algorithms i.e., ANN and KNN are also found. RStudio is the environment on which these algorithms are run using the R programming language. Two algorithms Artificial Neural Network (ANN) and K nearest neighbor (KNN) are applied giving an accuracy of 94.59%, error of 6.4% and 52% for KNN.

Keywords- Breast cancer, Data mining, Artificial intelligence algorithms., R programming language, RStudio, ANN, KNN

REAL-TIME VIDEO PROCESSING FOR SHIP DETECTION USING TRANSFER LEARNING

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Abstract

Automatic ship classification and detection is an interesting research field concerning maritime security. It has been an active research field for decades and in the recent times it is gaining interest and focus of researchers. Automatic ship detection systems are important for maritime security and surveillance. These systems can be used to monitor marine traffic, illegal fishing and illegal activities which deals with the prospects of maritime security. This research is gained interest because of many ships that are sailing on the ocean or sea does not installing transponders which are used for tracking the ships. It will be a serious threat to nation, mankind, and sea-life if we do not keep an eye on these kinds of ships. Therefore, in this we presented a novel Deep Learning method that will be used to detect ships by using satellite Images. This approach uses TensorFlow object detection API to detect objects in the images as we are concerned with object detection. The dataset used for this purpose is MASATI-v2 dataset which consists of various satellite images that are captured under different weather and dynamic conditions. As the real-time satellite monitoring is kind of video thing, we proposed an approach to perform video processing to detect ships by using the model that is trained using MASATI-v2 dataset. For training the model we are using a Transfer Learning technique by utilizing SSD MobileNetV2. This algorithm is different from normal convolution neural networks, and it uses depth wise and pointwise separable filters to perform the task.

Keywords—Ship Detection, Object Detection, Transfer Learning, SSD MobileNet-v2;

REAL TIME-BASED HEART PATIENT MONITORING SYSTEM: AN APPLICATION OF HEALTH CARE IOT

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Abstract

Currently, India is having the highest CVD (cardiovascular diseases) patients in the world. According to the year 2016 data, 54.5 million heart patients [1] are in India with a mortality rate of 1:4. According to WHO, India is accountable for one-fifth of this non-communicable diseases death [2]. Aside from medicinal treatment, the tracking of heart patients is very much necessary for the early management of the patient. Referring to the above information about CVD, here an IoT application is proposed especially for tracking heart patients. This work is designed with Arduino Uno and a heartbeat sensor (AMPED) along with GSM and GPS module. The proposed system enables the patient concerned person with all details like heart rate information and current position of the heart patient through a smartphone so that the medical aid can be supplied immediately.

Keywords: Arduino, Heart beat sensor, GSM900A, I2C based LCD, GP

A COMPREHENSIVE SURVEY ON RECENT ISSUES, GRAPHS, DESIGN PROCESS AND MAPPING TECHNIQUES BASED ON EVOLUTIONARY ALGORITHM FOR NETWORK ON CHIP ARCHITECTURE

Smrutirekha Das, Sumit Kar
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Abstract

Continuous demand for high performance embedded systems driving the System on Chip (SoC) market in an uphill trend. High performance requires more processing power and capacity. To achieve more processing power from a single chip, SoC designers are putting more Processing Elements (PE) onto a single silicon substrate. Putting a greater number of PEs on a single substrate requires very high-speed bus and deadlock-free scheduling which are getting more and more complicated day by day. To address this situation, Network on a Chip architecture is adopted in recent years. Network on Chip (NoC) in contrast with SoC utilizes an on-chip interconnection network. On-chip interconnection networks facilitate the connection of a greater number of PEs. The On-chip network routing facilitates deadlock-free scheduling and parallel processing. One of the important aspects of NoC is Optimal Mapping. Optimally mapping the participating cores means low bandwidth requirement, low latency hence greater throughput. Optimization of communication bandwidth cost for On-Chip Networks" or "Bandwidth cost optimization for Network on Chip is the prime factor for consideration In this regard, this review article discusses in detail the advantages of NoC over SoC technology, recent issues in NoC, types of graphs, mapping of NoC through numerous evolutionary algorithm, NoC design process and NoC platform. An attempt has been made to comprehensively discuss every aspect of NoC regarding various optimization techniques for the process of mapping.

Keywords: Network on Chip (NoC), System on Chip (SoC), Mapping, Optimization, Processing Elements (PE), Scheduling.

SENTIMENT AND DEPRESSION ANALYSIS USING MACHINE LEARNING

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Abstract

Depression and anxiety is the most health hazard nowadays for modern life style which may leads to suicide. This can be prevented by proper treatment if it is detected well before. The prediction of such things is possible now with advent of data science. In this work, the corpus of blog posts in social media is collected to identify the depressed people. Here, the various text encoding scheme like NLTK, BOW, TFIDF are implemented to extract the features and applied to Numpy, Panda like classifiers to differentiate between clinical and control subjects to specify the handler mind set.

Keywords: Depression, Social Media, Neural Network, NLTK, Machine learning.

DESIGN OF AN EFFICIENT MEMRISTOR-BASED DYNAMIC EXCLUSIVE-OR GATE

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Abstract

In this paper, an efficient memristor-based dynamic logic design for an Exclusive-OR gate is proposed. The proposed realization reduces the number of cascaded stages and component count thereby providing an overall performance improvement. The performance of the proposed design is compared with the most recent existing design through LTspice software simulations at 90 nm technology node in terms of total power consumption, average propagation delay, and number of components used in the implementation. The results show that the proposed design consumes 57 % reduced power and provides faster operation with 5.09 % improvement in propagation delay in comparison to its existing counterpart. Further, the robustness of the proposed design is verified by performing technology and capacitance variation. The results show the impeccable performance of proposed design across different load capacitance and technology nodes.

Keywords— memristor, domino logic, dynamic logic, dynamic circuits, domino logic gates, Exclusive-OR.

INVESTIGATION OF SWIPT NOMA SCHEME OVER RAYLEIGH FADING CHANNEL CONDITION

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Abstract

In new-age portable organizations, nonorthogonal multiple access (NOMA) innovation gives a viable response to gigantic access with a high information rate need. To amplify the aggregate rate in the downlink framework, the review utilizes NOMA and synchronous remote data and power move (SWIPT) hand-off. With that in mind, knowing how to successfully pick clients' entrance frameworks and power assignment for the entrance client is essential. Because standard optimization approaches have trouble tackling nonlinear and non-convex issues, this research offers a user selection furthermore unique power designation (USDPA) plot in the NOMA-SWIPT transfer framework in light of neural organizations. A profound neural organization (DNN) is utilized to make a client choice organization, and profound support learning is utilized to recommend a power designation organization. The simulation findings show that the suggested method outperforms existing relevant schemes, particularly when high quality of service criteria are required. We present a merged client choice and dynamic power allotment (USDPA) strategy that picks the best clients for admittance to the framework while likewise deciding the ideal power assignment to streamline the aggregate rate.

Keywords: SWIPT, NOMA, MA, MIMO, TS, PS, AF, DF, BS, PPP.

EMAIL SPAM DETECTION USING MACHINE LEARNING

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Abstract

Email Spam has become a major problem nowadays, with Rapid growth of internet users, Email spams is also increasing. Most of us consider spam emails as one which is annoying and repetitively used for purpose of advertisement and brand promotion. We keep on blocking such email-ids, but it is of no use as spam emails are still prevalent. Some major categories of spam emails that are causing great risk to security, such as fraudulent e-mails, identify theft, hacking, viruses, and malware. In order to deal with spam emails, we need to build a robust real-time email spam classifier that can efficiently and correctly flag the incoming mail spam, if it is a spam message or looks like a spam message. Google and other email services are providing utility for flagging email spam but are still in the infancy stage and need regular feedback from the end-user. There is a great scope in building email spam classifiers, as the private companies run their own email servers and want them to be more secure because of the confidential data, in such cases email spam classifier solutions can be provided to such companies with this proposed model the specified message can be stated as spam or not using Bayes' theorem and Naïve Bayes' Classifier.

Keywords: Email spam, Robust, Naïve bayes, Flagging, Infancy

PREDICTION OF DIABETES AT EARLY STAGES USING ANN & OUTLIER EXPOSURE

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Abstract

In the present scenario of medical field, Diabetes is a critical issue which do require a lot of attention and if predicted in early stages it can be cured easily. From past few decades many machine learning algorithms are being used for detection at early stages. In this research our principal attention is on prediction of diabetes for pregnant woman that can also be termed as Gestational Diabetes. This may also lead to affecting of Type 2 Diabetes. Several researchers worked hard to predict the results accurately. ANN has considerable edge over other classification algorithms. Machine Learning, Artificial Intelligence, Data Analytics, and other latest domains are being engaged in prediction of several categories of diseases in the health sector. ANNs (Artificial Neural Network) made a massive impact in medical department further egresses for various data driven applications in domain of health care. It starts with disease diagnosis, image processing of infected organs and finally predicting the disease accurately. Our primary focus is finding out the effect of parameters over dataset to forecast if a specific person is suffering from diabetes or not. PIMA dataset has been considered with 20 neurons for hidden layers and acquired accuracy of 86.2% when there are no outliers in dataset. This research depicts the accuracy & effectiveness of ANN model when compared to other classification algorithms.

Keywords— Machine Learning, Artificial Intelligence, Data Analytics, ANN, egresses

MASSIVE MIMO WITH ADVANCED MULTIUSER DETECTOR WITH IMPROVED SHARK SMELL OPTIMIZATION

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Abstract

Massive MIMO systems employ hundreds of antennas to service a number of wireless broadband terminals at the same time. Massive MIMO systems need for simplified, maybe linear techniques for efficient beamforming as well as decoding. To address the signaling overhead complexity, effective signal processing methods must be applied on both ends. When massive MIMO networks could be successfully deployed, there are several fundamental problems that must be resolved. This paper intends to introduce an advanced model for detecting the Gaussian channel matrix. Here, the major objective is to attain minimal Bit Error Rate (BER) between the transmitted and received bits, for which an optimization concept is integrated. Accordingly, the Gaussian channel matrix is optimally tuned, such that the BER among transmitted and received bits should be minimal. For optimization purpose, an Opposition Learning Insisted shark smell optimization (OLISSO) is implemented in this work. Finally, the outcomes of the presented scheme are evaluated over the other extant schemes with respect to varied measures. Moreover, error analysis was performed with respect to MAE, MSE and RMSE, respectively.

Keywords— Multiple-input-multiple-output; Gaussian channel matrix; Bit Error Rate; Multiuser Detector; Optimization.

IMPROVED ECC BASED SECURED DATA TRANSMISSION IN CRNS

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Abstract

Cognitive radio mechanism is demonstrates as a proficient method for sensing the spectrum and make use of the attained data to develop the overall performances of communiqué system. On the other hand, owing to the transmit character of this network; communiqués are subjected to varied attacks. This paper primarily intends to propose a new secured communication approach through the available predicted spectrum channels. Here, channel states are predicted via optimized LSTM. For secured communication, this work deploys improved "Elliptic-curve cryptography (ECC)" that guarantees the security level of data frames. Accordingly, the channel state is predicted by means of Levy Updated Aquila Optimizer (LU-AO). In the end, studies and analysis are done to show the efficacy of LU-AO model.

Keywords—CRN; Channel state; Improved ECC; optimized LSTM; LU-AO model

AI POWERED YOGA INSTRUCTOR

Sunita Barik, Bright Anand D
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Abstract

Human activity recognition is a well-known computer vision problem that has imposed several challenges over time. The health status of a person can be analyzed and predicted by monitoring and recognizing their activities. Yoga posture recognition is relatively a newer application. Yoga is becoming increasingly popular across the globe as a result of its physical, mental and spiritual benefits. For those people who perform yoga at their own convenience, at their house, without any physical instructor, usually perform yoga by watching videos, say on YouTube. Such a practice may lead to wrong yoga postures, which may harm the individual rather than benefiting them. So, in this paper we aim to build a free personal yoga instructor which also measures the accuracy of posture through real-time pose detection. We have used the Posenet model for achieving this aim. The application consists of specifically designed yoga tracks/playlists which are suited to the user's health issues, creating a more personalized experience. Using such an application will benefit the user to follow the correct and accurate yoga postures without the need of a physical instructor and at zero cost.

Keywords—posenet, tensorflow, pose recognition, pose estimation, computer vision, neural network

AN OVERVIEW OF CAREER DENDROGRAM EFFECTIVENESS

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Abstract

A national database of actual requirement of workforce, category-wise by both Government and Industry, the type of educational or skill qualification required, nature of job, eligibility criteria, salary and perks, career development /progression in every field / sector of employment is urgently required. In order to realise the goal of demographic divide, every citizen of the country needs to be educated for job, be it a scientist, a doctor, engineer or whatever to meet not only the needs of our society but also the other societies elsewhere in the world. Every student aspires to become a great person and self reliant, but their passion and likings are diverse. In order to cater to the aspirations of the students and facilitate them to aim it high, they are required to be informed about the number and type of jobs this country has in the future years, as also the number of business persons, entrepreneurs, workforce in all areas of employment.

Key words- workforce, dendogram

A WEB-BASED SOLUTION MODEL FOR DIVYANG PERSONS FOR ACCESSING SERVICES

Bijaya Nanda, Chinmaya Ranjan Pattnaik
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Abstract

Presently, we can get a lot of information on a map-based platform using a PC or a mobile app. Examples of such apps are Ola & Uber showing taxi locations, Zomato & Swiggy showing restaurant locations and Google maps showing restaurants, filling stations, hotels etc. But today a disabled person is unable to browse and identify nearby locations having accessibility features. Offices, restaurants, bus stops, railway platforms, schools, cinema halls etc. which are having accessibility provisions cannot be filtered and shown by any means today, which would be very helpful to persons with disabilities. There is no centralized web portal or app for storing of information on accessible Offices/ buildings/ departments/ public places. There is no platform where restaurant owners, film hall owners, hotel owners etc. can register and declare that their properties are now accessible.

Key words- Disable Person, Website & Android users, Voice Recognition

ALCOHOL PERCENTAGE DETECTION USING BLUETOOTH TECHNOLOGY

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Abstract

In this digital era, leading a luxuries life has created a trend and alcohol consumption added a spice to it. Due to the wide spread of consuming alcohol, slowly it become as a daily activity. As a result, health monitoring has decreased. So the further will not be as our fantasy world. The "BLUE TOUCH" will be a barricade as a sparkle solution. Through the blue touch access, this device display's the percentage of alcohol consumed. As it is a noninvasive biomedical sensor, a painless test will be done. And by the immediate result, we can analyze our situation. This “BLUETOUCH” is a specially designed mobile interface which will be used in detection of the alcohol percentage consumed by a person. This main functionality is Bluetooth. This application has been designed by the connection of interfaces. Each interface that is attached here will be working on its designed purpose to get the desired output. The result of the working interface will give access to the next interface to perform its action. As completing every interface, finally we will be getting the display screen of our expecting result.

Keywords- Alcohol, Bluetooth, Android, Alcohol sensor, Android studio.

CLOUD BASED SMART CITY TRANSPORT MANAGEMENT SYSTEM

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Abstract

Application Sensors have protected current technological cities. Sensors produce huge quantities of data from different tools, such as travel, revitalization, wastewater treatment, buildings enabled by IoT and IoT-enabled healthcare, etc. Today's requirement is to analyze massive volumes of information produced by the sensor of the emerging technologies use of various advanced analytical tools is a mandate. The emphasis of this study is on Big Data Analytics in Smart Cities activated by IoT. The work proposed is a smart city transportation management using cloud computing management over the big data. The proposed system deals with Landon Transportation System that stored runtime data on Transport for Landon (TfL) cloud server. Using Naïve Bayes supervised machine learning classification demonstrates, affected routes, station, number of buses etc. using modified Naïve Bayes classification algorithm. The effectiveness of proposed system is also analyzed.

Keywords: Transport systems; Machine learning; Naïve Bayes; classification; IoT; Big Data; Smart citiy; Cloud Computing

ENDOSCOPIC IMAGES ANALYSIS USING CNN : A REVIEW

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Abstract:

Deep learning is a very significant tool as it can handle large amount of data. It is considered the most efficient technique for pattern recognition. The best deep neural network is considered as convolution neural network (CNN). This technique is most used in analysis of endoscopic images/videos. Earlier it was way more difficult to train dataset as there was low computation power and less dataset available. But today algorithm like CNN has become popular as it gives big data processing capability and saves computing power by parallel processing. This artificial intelligence technique is used in medical field in endoscopic analysis of images. We already have a great amount of dataset from previous patients of there GI tract diseases, so dataset models are trained to recognize disease like polyps, ulcer, esophagitis etc. This helps in diagnosis of disease faster and helps in saving valuable time of patient.

Keywords: Endoscopy, CNN, Artificial Intelligence

SPECTRUM ALLOCATION IN COGNITIVE RADIO NETWORK: REVIEW

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Abstract

Cognitive Radio Network (CRN) is an emerging paradigm developed based on the motivation of e radio spectrum. Idle radio channels are utilized by Cognitive Radio (CR) users without interfering with Primary Users (PU). The CRs have potential of sensing the communication environment, analyze and reconfigure to adapt with present condition. The su technology lies in detecting idle portions of a particular spectrum band and opportunistically utilizing the limited resources. Therefore, resource allocation for CR users is a significant from design consideration. The sensing accuracy is a key for determining the performance. It will differ depending on the method of sensing. This paper presents a comparative survey spectrum sensing and allocation issues in CRN. feature-based sensing is well accepted for its robustness in the random noisy environment. The cyclostationary features of different modulated signals are simulated to analyze its uniqueness.

Keywords—Cognitive Radio Network,Cyclostationary, R allocation, Spectrum sensing

SYSTEMATIC INVESTIGATION ON CLOUD ASSISTED IOT DEVICES, CHALLENGES AND APPLICATIONS

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Abstract

Over the past few years, technology has progressed and developed rapidly, where ad hoc networks have contributed a significant part to innovative development. There are four varieties of ad hoc networks such as mobile (MANET), vehicular (VANET), flying (FANET), and sea (SANET). Due to the variation of specifications, these four ad hoc networks have to turn into an alternative for providing connectivity in areas where infrastructure-based networks cannot be deployed. Therefore, this paper sets out a review of these four ad hoc networks, particularly focusing on the characteristics such as routing, density, and mobility. In addition, the variances between the four ad hoc networks are discussed with related works. This paper also outlines the challenges to be addressed in the deployments of these ad hoc networks.

Key words: WSN.IOT Cloud, FANETS, MANETS

A COMPARATIVE ANALYSIS ON SUPPORT VECTOR MACHINE, KNEAREST NEIGHBORS, NAIVE BAYES AND DECISION TREE CLASSIFIERS APPLIED FOR HUMAN FACE RECOGNITION

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Abstract

Image Processing is one of the most significant areas of Computer Science. Every day we have to deal with face recognition for various purposes such as security authentication systems, identification, matching images, etc. This research paper proposed a system model for recognizing human face using the combination of PCA, k-NN and SVM. Principal Component Analysis (PCA) used to process data and extracting useful features from images including reduction of dimensionality, increasing interpretability and diminishing information loss of given image. This model provided a comparative analysis based on the results of recognition accuracy achieved by Support Vector Machine (SVM) and k-Nearest Neighbors (k-NN), Naive Bayes (NB) and Decision Tree (DT) classifier. The aim of this paper is to provide the most efficient and accurate method to recognize human face including data preprocessing. The experimental result of this method reveals that the way we processed our data, SVM technique displays robust performance and increases the efficiency of human face recognition technique with the utmost level of accuracy than others three.

Keywords: Comparative Study, Face Recognition, PCA, SVM, k-NN

E-LEARNING AS A TRAINING CONCEPT FOR STAFF

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Abstract

In this article the E-learning training in occupational health is being analyzed along with safety on a selected group of employees directly employed by a logistics company and employment generated by temporary work agencies. In addition, attention has been focused on the way periodic and initial training was carried out and the impact of adaptation of knowledge of the course participants. The goal of this article is to find out the opinions of the participants of e-learning courses, as well as to identify the benefits that affect the acquisition of knowledge in business. The research indicates positive opinion of participants of OHS(Occupational Safety and Health) training in logistics company in 88% by showing interest in E-learning training in various forms. However, the least desirable method is the individual meeting with the trainer 2% and group training stationary with the trainer indicated 10% of respondents. Research has shown a number of benefits of such a form of training. The main advantages of the form of E-learning training include, the high involvement of the trainer specializing in occupational safety and health, who showed initiative in the best way to provide key information on occupational safety and health. Characterized opinions have been mostly positive and oriented to the acceptance of such a form of training. Among the opinions there were also barriers, in 68% there was a fear of low knowledge of information technology, but 15% of participants indicated no barriers, so this can be the high percentage of people who want to develop through new training models. Another important aspect of online training is the possibility of self-learning at any time and any place without much pressure from the trainer. The study also took into account the results from the knowledge tests, which showed a pass rate of 100% of the trainees. The study also showed an interest in stationary training at the level of 12% of the respondents. This method is also still respected by employers because of the individual contact with other people.

Keywords: training, remote learning, e-learning, applications, occupational health and safety

BRAIN TUMOUR DETECTION USING DEEP CONVOLUTION NEURAL NETWORKS

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Abstract

A brain tumour may be a growth of abnormal cells in our brain. Tumors are often classified as benign and malignant tumors. Early recognition and characterization of brain tumor is a significant exploration space in the area of clinical imaging and as necessary aids in picking the majority of invaluable therapy way to save patients life. Our objective in this paper is to create multi-characterization of brain tumours for the early conclusion aspiration utilizing deep Convolutional Neural Networks (CNNs). Our contributions in this paper are: (i) Identification of brain tumour from input MRI pictures i.e. having tumour or its normal and (ii) Outline about brain tumour type i.e. glioma, meningioma and the (iii) classification of the brain tumour grades as Grade-2, Grade-3 and Grade-4. Our experimentation results show that using CNNs we achieved about 90% accuracy in prediction and classification of tumours.

Keywords: Deep neural networks, brain tumour, machine learning, prediction and classification

WHATSAPP CHAT ANALYSIS USING NLP TECHNIQUES

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Abstract

The recent eruption of the Internet has made communication easier for individuals all over the world. Social Media provides humongous data to carry out different analysis techniques. WhatsApp is taken into consideration to be the most popular utility because of its massive customer base. This project uses NLP to analyze WhatsApp Chats, by importing the Chats from WhatsApp to Notebook and performing "DATA ANALYSIS" over the text posted by different users and finding the most interactive insights and hidden patterns from chats. Performing Sentiment Analysis to find the Polarities of messages, Dividing the message into 1 of 15 classes using NPS_CHAT corpus from NLTK using different classifier models, and applying Text Analysis methods like Word Cloud, Lexical Diversity, POS_Tagging etc., are the three main motives of the undertaking project. By visualizing the WhatsApp chats using different graphs we can extract and offer the most information that is furnished like most active day, favorite emojis, Frequent chats/Dialogues used individual info, etc. The results of this project focus on finding the difference between the team leader and other teammates, finding who is the most interactive in the team, and many more interesting insights that help the person in self-analysis or can be used by the faculty to analyze their students.

Keywords—NLP, WhatsApp, Data Analysis, Sentiment Analysis, Emojis, Classification, Word Cloud, Lexical Diversity, POS_Tagging, Frequency of Messages

PERFORMANCE COMPARISON OF SOME OBSTACLE AND MOBILITY AWARE PROTOCOLS OF MANET

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Abstract

One of the major reasons of performance degradation of MANET is the presence of obstacles in the terrain area. This causes link break and route failure hence performance of MANET severely diminishes. Different authors have suggested several algorithms to improve the performance of MANET in presence of obstacles. This paper compares some of the obstacle aware protocols with presence of fixed obstacles in the terrain area. To represent real terrain obstacles like mountain, building and tower etc., different shape and size polygonal obstacles are considered. In this work, we have compared some of the previously proposed obstacle and mobility aware protocols with varying number of polygonal fixed obstacles in terrain area.

Keywords: MANET, MOAR, OMAR, Polygonal Obstacle, NOARA, EEOARA

A DEEP ARCHITECTURE SURVEY ON AUTOMATIC MODULATION CLASSIFICATION

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Abstract

Automatic Modulation Classification (AMC) plays a vital role in intelligent wireless communications receiver. After signal detection and before demodulation this technique is used. This technique not only improves the signal power but also increase the spectrum efficiency. Considering to Deep learning (DL) techniques, this is applied in various field in Signal processing operation. Various training model is used for performance improvement of existing traditional approaches. Under various channel impairments, deep learning method learns variety of characteristics of radio signal for improvement the performance of method of modulation classification. Here the authors represent the basics concept of various architectures of deep learning techniques. This article briefly explains the concept of deep learning for Automatic Modulation Classification in communication system. In this paper the basic challenges of modulation classification also explained in the field of Deep Learning.

Index terms: Neural network, recurrent neural network, Convolutional Neural network, Automatic Modulation Classification and Deep Learning.

SMART HEALTH CARE APPROACH USING MACHINE LEARNING FOR BREAST CANCER DIAGNOSIS AND PREDICTION

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Abstract

Smart health care is the demand of today's world that helps in may health related issues to cure timely, in development of new medical procedures, for handling large and complex medical data, fast disease analysis and reduce fault for prediction and accuracy testing. Smart health care system is very crucial when a patient need timely treatment for unpredictable disease i.e Breast Cancer. Machine Learning, as great field of Artificial Intelligence play a parental role to develop Smart Health Care Systems. Machine need to learn from input that play a vital role, because by crunching large volume of data it help medical professional to provide medical solution to patient based customized individual characteristics. Here in this study we find how Breast Cancer disease prediction done for diagnosis with large dataset. In this study supervised classifier SVM is used for classification on dataset for breast cancer prediction and diagnosis. Machine Learning models can flow with different processing of python and learning methods to prepare neural network. In this research study Wisconsin dataset for diagnosis prediction and original dataset is used for classification with different well known supervised algorithm i.e. LR, SVM, k-NN, NB and DT. These classifiers are implemented to generate a comparative study of accuracies acquired in classification. The study provides the result that SVM gives higher result of accuracy with all dataset. This study concluded to have better result with SVM to approx.99% that is improved accuracy of previous research accuracies. The performance measures for all classifiers are compared with confusion matrix by calculating accuracy, sensitivity, specificity and precision.

Keywords: Breast Cancer, SVM, Smart Health Care, Wisconsin dataset

ACCURATE STOCK PREDICTIONS THROUGH LSTM NEURAL NETWORK

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Abstract

The stock market is incredibly volatile and dynamic on a daily basis. Many concealed causes and intricate interactions impact it, resulting in a high degree of nonlinearity. The stock market's high level of unpredictability, as well as its effectiveness, can lower investors' profits. Stock market trend forecasting is extremely important in enhancing and optimizing an investor's earnings. Therefore, this research article has been utilized to achieve effective prediction of stock market trends through the use of machine learning approaches. For achieving this goal, the stock market dataset has been provided as an input to the proposed methodology. The presented approach initially preprocesses and labels the data which is then subjected to K Nearest Neighbors, Long Short-Term Memory and Decision making. This leads to an effective realization of the stock market prediction that can significantly improve the investors return over a long term. The approach has been subjected to extensive experimentation that has been useful in measurement of the predictive error achieved which is within the prescribed limits.

Keywords—Stock market prediction, Pearson Correlation, LSTM Neural Network

PLANT LEAVES DISEASE DETECTION USING DEEP LEARNING

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Abstract

Plant diseases are important factors in determining plant yield and quality. Plant disease identification can be accomplished through digital image processing. Deep learning has made significant advances in digital image processing in recent years, far outperforming traditional methods. One of the primary factors determining crop yield loss in crop production and agriculture is the identification and detection of plant diseases. Plant disease research is the study of any visible points in any part of the plant that aids in the differentiation of two plants, technically any spots or colour shades. It is extremely difficult to correctly identify plant diseases. Identification of the disease necessitates a lot of work and expertise, as well as a lot of knowledge in the field of plants and disease detection studies. As a result, image processing is used to detect plant diseases. Disease detection employs image acquisition, image extraction, image segmentation, and image pre-processing techniques.

Keywords: CNN, Pooling Layer, ReLU, ConvNet

EXPLOITING GA BASED OPTIMAL FEATURES FOR ONLINE SEQUENTIAL EXTREME LEARNING MACHINE

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Abstract

The key objective of feature selection algorithms is to select optimal (optimal) features which are relevant and non-redundant. Reducing the number of features by keeping classification accuracy same is one of the critical challenges in Machine Learning. High dimensional data contains thousand of features with the presence of the irrelevant and redundant features which negatively affect the generalization capability of machine learning algorithms. In this paper, the genetic based feature selection (GA) for Online Sequential - Extreme Learning Machine classifier (GA-OSELM) algorithm is designed with additive or radial basis function (RBF). OS-ELM algorithm has been developed for sequential input in which data is read one by one or chunk by chunk mode. Experimental results are calculated for ELM, OS-ELM, GA-ELM and GA-OSELM. With the result, it is inferred that GA-OSELM maintains the classification accuracy by minimizing 58.50% features. The proposed algorithm is compared with the other popular existing sequential learning algorithms as the benchmark problem.

Index Terms—Pattern Classification, Extreme Learning Machine, Feature Subset Selection, Genetic Algorithm, Sequential Input

DESIGN AND IMPLEMENTATION OF HIGH SPEED,LOW POWER MAC UNIT WITH PROPOSED MIXED ADDER FOR THE DSP APPLICATIONS

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Abstract

Multiplier accumulator unit is an important part of many digital signal processing applications involves multiplication and accumulation. This module is so versatile that it is use in most of the processor that are available now a day. MAC unit calculates the product of the two number and store that data into the register. By lessen the lagging time of the multiplier and adder, the gross delay of the multiplier accumulator unit can be reduced. In this paper we try to Enhance the pace of the multiplier and accumulator unit and lessen the lagging time. This paper shows the different executions of mac units and show the comparison between these implementations on the basis of power and delay. The multipliers used here are Wallace tree and Vedic multiplier and the adders are normal adder and proposed mixed adder (Kogge stone and carry look ahead adder). In this paper, Enhance the speed of the MAC unit is shown by merging two adders mentioned above i.e., proposed mixed adder, and implement with Vedic multiplier and Wallace tree multiplier and compare the results. In which it has achieved a 45% reduction in delay and 22% reduction in total power consumption .The effectiveness of MAC unit is noticed with the reduction in delay and enhancement in the speed . Synthesis and simulation are done by Xilinx ISE and Modelism.

keywords: Vedic multiplier, MAC unit, Wallace tree multiplier, Kogge stone adder(KSA), carry lookahead adder(CLA)

TOUCHLESS USER INTERFACE FOR SKETCHING USING HAND GESTURE RECOGNITION

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Abstract

Artificial intelligence (AI) technologies have a significant impact on developments in research and creative processes. With the rapid advancement of computer vision, the demand for humanmachine interaction is growing. Hand gesture recognition is frequently employed in robot control, intelligent furniture, and other aspects because hand gestures can represent enhanced information. With current development in computing, the traditional writing and teaching methods are insufficient because it still uses mouse, keyboard and touch pens. This paper proposes a solution by creating a Touchless User Interface (TUI). TUI uses hand gestures to sketch on the air without using the keyboard or mouse which is captured and reflected on the screen. The app developed for the same consists of tools such as circles, rectangles, lines, freehand drawing and eraser which can be selected and drawn in the air, the system captures the respective shape or structure and reflects it on the screen. Human hand may be split from a complex background and identified in real time which is done using convolutional neural network. Thus, touchless user interface is developed with experimental accuracy of 98.48%.

Keywords- Artificial Intelligence, Computer Vision, Touchless User Interface, Hand gesture recognition

MACHINE LEARNING BASED INTELLIGENCE SYSTEM FOR LOAN PREDICTION

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Abstract

As the technologies are advancing, there are such a big amount of advancements within the banking sector. Because the population increasing the amount of applications are increasing each day for loan approval. There are some bank criteria's that they need to test while selecting an applicant for loan approval. And Based on some parameters, the bank has got to decide which one is acceptable for loan approval. It's tough and time consuming to test out manually every person's details and then recommended for loan approval. In this system, we use a machine learning technique like random forest which will predict the one that is reliable for a loan, supported on the previous record of the person whom the loan amount is sanctioned before. This systems basic objective is to predict whether the loan approval to a selected individual is safe or not.

Keywords: Credit line, Risk, Automation, Machine Learning, Random Forest, NPA, CRAR

DESIGN OF REGULAR CLOCK-BASED QCA LOGIC CIRCUIT REDUCING WIRE CROSSING COMPLEXITY

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Abstract

The constant demand for speed leads the digital industry to increase device density. As a consequence, transistor-based technology is experiencing numerous practical challenges. Out of many, the emerging Quantum-dot cellular automata have evolved as a viable alternative to present CMOS technology. The clocking, in QCA, primarily supplies the necessary power and the underlying clocking circuitry drives the flow of information. However, proper use of the regular clocking circuit in QCA was neglected in most of the reported works, except few. On the flip side, the interconnection of wires and signal routing is a critical issue in cell layout and underlying clocking. A rule-based wire crossing technique in a coplanar manner is presented in this paper. The proposed methodology, on the whole, targets the signal bypass depending on the interconnecting cell only. The most investigated circuit in regular clocking, full adder, is considered for testing the viability. The simulated outcome verifies the desired output, ensuring the information flow via the crossing junction without any interference. QCADesigner is employed to check the functionality of modified design in existing clocking schemes.

Keywords: QCA · Wire Crossing · Regular Clocking · Full Adder · Rule-based Wire Crossing

COMPARATIVE ANALYSIS OF DEEP LEARNING TECHNIQUES FOR COVID-19 DETECTION

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Abstract

Coronavirus keeps mutating itself. The only way by which we can prevent it from wide spreading is early detection. Lungs are the most affected human body part by the coronavirus. In this study, we have used chest radiographs images to deduce whether person has COVID-19 or not. We compiled two publicly available datasets, which contain COVID positive, pneumonia, and standard CXR images, and used various transfer learning models like VGG-16, InceptionV3, ResNet50, and Xception in this study. The output of these classification models can be used for the next level for simplification and adjusted to improve performance. This paper offers a comparative analysis of various CNN models using chest X-Rays. Specifically, VGG-16, InceptionV3, ResNet50, and Xception achieved accuracies of 94%, 97%, 98%, and 92%, respectively.

Index Terms—Coronavirus, radiographs, CNN, transfer learning

ENABLING DOCUMENT CLUSTERING THROUGH DATA SCIENCE

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Abstract

Clustering data based on meaning is critical in the software development industry. Manual categorization of unstructured information is a difficult and time-consuming job which is usually performed in the journalism profession by journalists and editors to segregate emails and other content daily. As an alternative, automated semantic document clustering uses the entire content and context of the file as component characteristics to build extremely precise clusters. There are several strategies offered, such as K-means clustering, Semi-non negative matrix factorization, and K-EVD, however most of these strategies have effectiveness concerns when it comes to document clustering. As a consequence, this work focuses on addressing those challenges by offering a unique concept that varies from the ones outlined previously while combining several of their qualities to produce a straightforward yet reasonably accurate clustering strategy. The solution accepts input data of a folder containing files in.txt, .pdf, and .doc formats. This information is then pre-processed to retrieve features such as Title Sentence, Noun, Proper Noun, and Top Words. The feature scores will then be fed into the weighted matrix approach to generate semantic groupings for the texts resulting in an effectively classified and clustered documents which are then emailed to the Editor.

Keywords: Document Clustering, Weighted Cluster Matrix

ATTRIBUTE-BASED STORAGE SUPPORTING SECURE DEDUPLICATION OF ENCRYPTED DATA IN CLOUD

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Abstract

Personal and commercial file sharing apps that leverage cloud storage are becoming increasingly popular. End-to-end encryption is often a desired feature of these applications due to data security concerns. Many attempts to create cryptographic solutions fail owing to the absence of key features. SeGShare is a new architecture for end-to-end encrypted, group-based file sharing that uses trusted execution environments (TEE), such as Intel SGX. SeGShare is the main solution that protects the security and integrity of all data and management files, as well as imposing immediate permission and membership revocations, deduplication, and rollback assaults.

Keywords - SeGShare, Cloud, TEE, CECS, AES Algorithm

DETECTION OF LARYNGEAL CANCER USING DEEP LEARNING TECHNIQUE

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Abstract

Laryngeal cancer is one of most prevalent cancer in the world, it comes at around 14 in terms of severity, and it simply targets the larynx as a malignant tumour, an organ that is important for speaking, breathing, and swallowing. The most common type of laryngeal cancer is SCC(Squamous cell carcinoma), and its detection and diagnosis without delay are critical for lowering patient mortality and also functionality of vocal cord could also be maintained. Premature/before-time diagnosis is critical to reduce mortality and preserve vocal cord function, but with the help of computer-assisted machine learning algorithms in the field of computer vision applied to endoscopic videos of the larynx, which directly help to earlystage cancerous laryngeal tissue classification detection. Experts assessed the balanced dataset of the patches, and the dataset was extracted based on four laryngeal tissue classes. The findings will aid in the development of a clinical practise paradigm for accurate early-stage SCC treatment. Even with the difficulties in diagnosis mentioned in the clinical literature, computer-assisted diagnosis has received little attention. The findings point to a useful endoscope-integrated processing system that can help with premature diagnosis.

Keywords: SCC, CNN, Densenet, larynx

K-MEANS CLUSTERING DECISION APPROACH IN DATA HIDING SAMPLE SELECTION

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Abstract

Nowadays data science play an important role in decision making process. Data science application varies from organization to organization where it play a very important role in decision making process in multidimensional data. Author suggest an application of k means clustering data science algorithm in the sample selection process of carrier during data hiding behind carrier. Suggested approach helps to minimize the time complexity for sample selection and also cluster samples more accurately which helps to focus on specific cluster rather than entire samples in carrier. The experimental results are calculated are far better than any other clustering technique which discuss in the result section of this paper. The primary objective of author is to make data hiding process so simple and accurate to minimize quantization error. K-means clustering is an effective technique to group samples in to different classes called as cluster based on euclidean distance and MOI. An accuracy of cluster is depends on how tightly items in clusters are bounded. Results are compared with existing approach which are better and hence proved that k means clustering data science approach is best match for sample selection process during data hiding.

Index Terms— K-Means Clustering, Centroid, Moment of Inertia (MOI), Euclidean Distance (ED), Root Mean Square (RMS), Region of Interest (ROI).

K-NEAREST NEIGHBOR (KNN) MODEL FOR CARRIER DATA CLASSIFICATION IN SECURITY DOMAIN

Smrutirekha Das, Sambit Kumar Mishra
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Abstract

Data science have a huge scope in security domain. Data science is a key in decision making process for many of the e-commerce applications. K-Nearest Neighbor(KNN) algorithm is a data science approach that help to classify multidimensional data which helps in decision making process. In the process of data hiding, there is questions always come where to hide data ?, how to choose samples? Authors have suggested the classifications of multi-modal image data using KNN algorithm that it helps in sample selection process during a data hiding. The classification of samples with KNN helps to optimize carrier samples and also to minimize Qe. KNN is supervised learning approach where it classify the data based on the provided training data. Results obtained from KNN algorithm also applicable in multi dimensional data classification which is explain in the result sections of this paper.

Index Terms—K-Nearest Neighbour (KNN), Data Science, Euclidean Distance(ED), Root Mean Square (RMS) error, Classification, Unsupervised learning, Quantization Error Qe.

A BEST FIT STRATEGIC APPROACH FOR SAMPLE SELECTIONS OF A CARRIER TO MINIMIZING QUANTIZATION ERROR* VIRENDRA

Sunita Barik, Bright Anand D
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract

Today data security and its transmission over the wireless network need special attention. Intruder always has a watch on sensitive data transmitted over a wireless network. This work proposes an approach that minimizes the quantization error between the original and result carrier by selecting optimize samples during Data Hiding. Propose work find out best matching carrier components during the data hiding process. Results also imply that achieved results are far better than any other steganographic method.

Index Terms— Best fit strategy, steganography, quantization error, carrier object, transmission media, data Hiding, data extraction etc.

VIRTUAL ASSISTANT USING ARTIFICIAL INTELLIGENCE FRAMEWORK

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Abstract

In this modern era of technology, we are working on AI (Artificial Intelligence) based systems, there are already some AI based Voice assistants like Google, Siri, Alexa, Cortana etc., This project uses voice input and output to show text on the screen. Our voice assistance's major goal is to make people smarter by providing immediate and calculated outcomes. The voice help takes our vocal input through our microphone and translates it into computer comprehensible language, providing the user with the appropriate solutions and answers. This service uses the internet to offer findings that have been questioned by the user. The Natural Language Processing algorithm allows computers to speak with one another in a number of ways using natural human language.

Keywords: AI, Desktop Assistance, virtual

AN AUTOMATED SYSTEM TO SAVE LIFE IN SOME DROPS

Banoj Kumar Panda, Hiren Kumar Praharaj
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Abstract

Consistently patients of different sicknesses need blood. Among them some need ordinary bonding of blood. Consequently, first we safe blood and then save life however hazardous one takes life. Ensure normal progression of safe blood is really difficult for the local area in the non-industrial nations. Different public and private associations are working for this reason. Albeit the quantity of blood doner is expanding, there is as yet a colossal hole sought after and supply. Save life in some drops is points serving for human government assistance. We have all the data you will at any point require. Many individuals are hanging around for you, to help you, able to give blood and save your life anytime. Before seeing the need of blood, we developed this web application for you who need blood in emergency. We have the done the whole work, rest in yours. Search the blood bunch you really want to donate. Given blood is exceptionally critical in saving the existences of those who require huge volumes of blood in a crisis. Factors that advance blood gift incorporate charitableness/ compassionate, individual or family credit, prevailing difficulty, substitution, and prize. Feeling of dread toward needles, getting a contamination, and other antagonistic impacts including clinical issues are reasons which demotivate blood benefactors.

Keywords— Blood donation, Hospital, Recipient receive blood, Doctors, Administrator.

SMOKING BEHAVIOR DETECTION MODEL THROUGH IMAGES BASED ON CNN

Bijaya Nanda, Chinmaya Ranjan Pattnaik
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Abstract

Online videos have recently become hotspot especially online live broadcast have become popular because of the rapid growth in internet technology and video's network quality. As we know, smoking behaviour can not only harm smoker's life but also surrounding people's life. Therefore, it is much more important to detect and thereby effectively control smoking behaviours in video content. Generally, images containing smoking behaviours can be detected using the detection algorithms which were used to detect cigarette smoke. But in live broadcast videos, they usually give the limited resolution of the video. Due to this, cigarette smoke can't be visually detected using detection algorithms used for detecting cigarette smoke, in the video content. So, as a solution for this problem we propose a smoking behaviour detection model utilizing pictures based on CNN, which consequently identifies smoking practices in video content through pictures. This solution or method can detect smoking behaviour in video through images by checking frame to frame by only utilizing the data of human smoking gestures and cigarette image features, instead of detection the cigarette smoke, assuring high accuracy and good performance for real-time monitoring. Also, we built the system in a way that we can give pictures directly to the model to test the smoking behaviour.

Keywords: Transfer learning, CNN, ROI, labelImg tool, ablation study, deep learning, object detection.

ATTRACTIVENESS OF COLLABORATIVE PLATFORMS FOR SUSTAINABLE E-LEARNING IN BUSINESS STUDIES

Sidhanta Kumar Balabantray, Smrutirekha Das
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Abstract

E-learning platforms have become more and more complex. Their functionality included in learning management systems is extended with collaborative platforms, which allow better communication, group collaboration, and face-to-face lectures. Universities are facing the challenge of advanced use of these platforms to fulfil sustainable learning goals. Better usability and attractiveness became essential in successful e-learning platforms, especially due to the more intensive interactivity expected from students. In the study, we researched the user experience of students who have used Moodle, Microsoft Teams, and Google Meet. User experience is, in most cases, connected with a person's perception, person's feelings, and satisfaction with the platform used. Data were collected using a standard UEQ questionnaire. With this research, we examined whether user experience factors: perceived efficiency, perceived perspicuity, perceived dependability, perceived stimulation, and perceived novelty affect perceived attractiveness, which is an important factor in the sustainability of e-learning tools. The collected data were processed using SmartPLS. The research study showed that all studied factors have a statistically significant impact on perceived attractiveness. Factor perceived stimulation has the strongest statistically significant impact on the perceived attractiveness of e-learning platforms, followed by perceived efficiency, perceived perspicuity, perceived novelty, and perceived dependability.

Keywords: e-learning platform; collaboration platform; usability; user experience

BLOCKCHAIN-BASED IDENTITY MANAGEMENT SYSTEM AND SELF-SOVEREIGN IDENTITY ECOSYSTEM: A COMPREHENSIVE SURVEY

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Abstract

Identity Management System (IDMS) refers to how users or individuals are identified and authorized to use organizational systems and services. Since traditional identity management and authentication systems rely heavily on a trusted central authority, they cannot mitigate the effects of single points of failure. As a decentralized and distributed public ledger in a peer-to-peer (P2P) network, Blockchain (BC) technology has garnered a considerable amount of attention in the field of IDMS in recent years. Through Self-Sovereign Identity (SSI), users can have full authority over their digital identity. Successful implementation of a BC-based IDMS can significantly increase the degree of privacy and security of a user's SSI. However, the integration of BC-based IMDS to provide a user with SSI is still an unorganized area of research in its early stages of development. This article presents an extensive literature review of state-of-the-art academic publications as well as commercial market offerings regarding the applicability of BC-based SSI solutions. It also provides a detailed preliminary regarding the building blocks of blockchain technology and a progressive roadmap of IDMS solutions. In order to develop an effective BC-based IDMS solution that focuses on securing a user's SSI, this article outline five essential components of a BC-based IDMS: authentication, integrity, privacy, trust, and simplicity. Furthermore, we perform a security analysis that outlines several types of adversarial threats that can cause potential damage to the BC-based IDMS. We identify and discuss associated issues and challenges by analyzing several notable BC-based IDMS solutions in academic literature. We also highlight potential research gaps and provide future research scope.

INDEX TERMS: Block chain, peer-to-peer network, identity management system, self-sovereign identity, security.

A REVIEW OF ENABLING TECHNOLOGIES FOR INTERNET OF MEDICAL THINGS (IOMT) ECOSYSTEM

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Abstract

The goal of Internet of Medical Things (IoMT) and digital healthcare systems is to provide people with the ease of receiving quality healthcare at the comfort of their homes. Hence, the aim of IoMT is the ubiquitous deployment of home-based healthcare systems. Making such systems intelligent and efficient for timely prediction of critical diseases can save millions of lives while simultaneously reducing the burden on the traditional healthcare systems e.g., hospitals. The advancement in IoT has enabled both patients and doctors to access real time data. This advancement has reduced the cost and energy consumption of digital healthcare systems by using efficient sensors and communication technologies. This paper provides a comprehensive review of various studies conducted for the development and improvement of IoMT. It analyses different sensors used for measurement of various parameters ranging from physiological to emotional signals. It also provides a detailed investigation of different communication technologies being used, their advantages, and limitations. Moreover, digital healthcare systems are now deploying machine learning technology for the prediction of health status of patients. These techniques and algorithms are also discussed. Data security and prediction accuracy are the main concerns in the development of this area. In conclusion, this paper reviews the various digital system designs in the context of healthcare, their methodology, limitations, and the present challenges faced by the e-health sector.

A SURVEY OF STRATEGIES FOR COMMUNICATION NETWORKS TO PROTECT AGAINST LARGE-SCALE NATURAL DISASTERS

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Abstract:

Recent natural disasters have revealed that emergency networks presently cannot disseminate the necessary disaster information, making it difficult to deploy and coordinate relief operations. These disasters have reinforced the knowledge that telecommunication networks constitute a critical infrastructure of our society, and the urgency in establishing protection mechanisms against disaster-based disruptions. Hence, it is important to have emergency networks able to maintain sustainable communication in disaster areas. Moreover, the network architecture should be designed so that network connectivity is maintained among nodes outside of the impacted area, while ensuring that services for costumers not in the affected area suffer minimal impact. As a first step towards achieving disaster resilience, the RECODIS project was formed, and its Working Group 1 members conducted a comprehensive literature survey on “strategies for communication networks to protect against large-scale natural disasters,” which is summarized in this article.

Index Terms—vulnerability, end-to-end resilience, natural disasters, disaster-based disruptions.

REVIEW OF THE INTERNET OF THINGS COMMUNICATION TECHNOLOGIES IN SMART AGRICULTURE AND CHALLENGES

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Abstract:

The advent of Internet of Things (IoT) spurred a new direction of research in agriculture, and various IoT communication technologies are used to connect with different devices in different layers. With the rapid increasing number of studies and projects about IoT-based smart agriculture, information got scattered and the involved communication technologies were not been analyzed and discussed before in other reviews. Intending to identify and review scientifically validated literature on IoT communication technologies in smart agriculture, this study critically summarizes the recent research pertinent to the smart agriculture with IoT communication technologies. The employed method was a thorough search from these three databases, namely: ScienceDirect, IEEE Xplore, and Scopus. Total 94 research articles were reviewed after the total of 886 titles being scanned for relevance. The monitored parameters by sensors and communication technologies associated with IoT-based smart agriculture applications are analyzed comprehensively, as well as some specific issues, challenges, and recommendations in IoT applications in agriculture. The study provides reference for researchers, and more burgeoning communication technologies should be applied in agriculture to realize the great-leap forward development in smart agriculture.

SMART GRID COMMUNICATION TECHNOLOGIES-OVERVIEW, RESEARCH CHALLENGES AND OPPORTUNITIES

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Abstract

The smart grid a new generation of standard power distribution grid. The communication infrastructure is critical for the successful operation of the modern smart grids. The use of communication technologies ensures the reduction of energy consumption, optimal operation of the smart grid and coordination between all smart grids' components from generation to the end users. This paper presents an overview of existing communication technologies such as ZigBee, WLAN, cellular communication, WiMAX, Power Line Communication (PLC), their implementation in smart grids, advantages and disadvantages. Moreover, the paper shows comparison of communication infrastructure between the legacy grid and the smart grid and smart grid communication standards. The paper also presents research challenges and future trends in communication systems for smart grid application.

PRIVACY-PRESERVING MACHINE LEARNING: METHODS, CHALLENGES AND DIRECTIONS

Bijaya Nanda, Chinmaya Ranjan Pattnaik
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Abstract

Machine learning (ML) is increasingly being adopted in a wide variety of application domains. Usually, a well-performing ML model, especially, emerging deep neural network model, relies on a large volume of training data and high-powered computational resources. The need for a vast volume of available data raises serious privacy concerns because of the risk of leakage of highly privacy-sensitive information and the evolving regulatory environments that increasingly restrict access to and use of privacy-sensitive data. Furthermore, a trained ML model may also be vulnerable to adversarial attacks such as membership/property inference attacks and model inversion attacks. Hence, well-designed privacy-preserving ML (PPML) solutions are crucial and have attracted increasing research interest from academia and industry. More and more efforts of PPML are proposed via integrating privacy-preserving techniques into ML algorithms, fusing privacy-preserving approaches into ML pipeline, or designing various privacy-preserving architectures for existing ML systems. In particular, existing PPML arts cross-cut ML, system, security, and privacy; hence, there is a critical need to understand state-of-art studies, related challenges, and a roadmap for future research. This paper systematically reviews and summarizes existing privacy-preserving approaches and proposes a PGU model to guide evaluation for various PPML solutions through elaborately decomposing their privacy-preserving functionalities. The PGU model is designed as the triad of Phase, Guarantee, and technical Utility. Furthermore, we also discuss the unique characteristics and challenges of PPML and outline possible directions of future work that benefit a wide range of research communities among ML, distributed systems, security, and privacy areas.

SOFTWARE-DEFINED NETWORKING SECURITY CHALLENGES AND SOLUTIONS: A COMPREHENSIVE SURVEY

K.G.S. Venkatesan, Sunita Barik
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Abstract:

Software-Defined Networking (SDN) has revolutionized the networking field by addressing scalability, flexibility, and control mechanism issues, which are present in Traditional Networks. One of the major advantages of SDN over Traditional Networks is centralized control over the network. In Traditional Networks, no separate Control Layer is present, due to which configuration and management of the network become extremely difficult. SDN introduces a separate Control Layer, which makes network management an easy and reliable process. Network management is now flexible and does not require expensive hardware and configuration changes. From this, not only the network administrator but also the network intruder benefits. SDN separates the Control and Data Plane of the Network. Due to the separation of the Control Plane, DoS/DDoS attacks on SDN Controller can cause a Single Point of Failure of the entire network, and hence security becomes vital for SDN. In this paper, the security challenges of all three layers of SDN, and solutions that need to be taken by the network administrator has been discussed. Various key benefits of SDN Security has been discussed in this paper. SDN security remains one of the hot topics in the field of networking, and our main goal remains to review the major security advancements, with their scope and limitations.

Keywords: Distributed Denial-of-Service, Open Network Operating System, OpenDaylight, Intrusion Detection System, Blockchain

WIRELESS POWER TRANSFER

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Abstract:

The ubiquitous nature and the proliferation of mobile devices has made wireless power transfer (WPT) a very important area of research. The flexibility and cost effectiveness of charging these enormous devices in our world without having to connect physically to any electrical port especially when the user is indisposed to do so is a very attractive characteristic of WPT. Conventional means of charging the batteries of these mobile devices are wired which invariably means they require physical connection to power sources through electrical cables. Electric power is transmitted wirelessly when a magnetic field produced by the inductive coupling of coils or electrical field produced by the capacitive coupling between electrodes is transferred over a short distance through the air interface and later received by an antenna for utilization. This article gives a detailed review of the existing wireless power transfer technologies, principles of operation, applications and the opportunities for future research in this area of emerging technology. However, WPT has some drawbacks but it is a disruptive technology with the ability to revolutionize the dynamics of mobile wireless systems, internet of things and other allied future technologies

OVERVIEW ON THE BLOCKCHAIN-BASED SUPPLY CHAIN SYSTEMATICS AND THEIR SCALABILITY TOOLS

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Abstract

Modern IT technologies shaped the shift in economic models with many advantages on cost, optimization, and time to market. This economic shift has increased the need for transparency and traceability in supply chain platforms to achieve trust among partners. Distributed ledger technology (DLT) is proposed to enable supply chains systems with trust requirements. In this paper, we investigate the existing DLT-based supply chain projects to show their technical part and limitations and extract the tools and techniques used to avoid the DLT scalability issue. We then set the requirements for a typical DLT-based supply chain in this context. The analyses are based on the scalability metrics such as computing, data storage, and transaction fees that fit the typical supply chain system. This paper highlights the effects of Blockchain techniques on scalability and their incorporation in supply chains systems. It also presents other existing solutions that can be applied to the supply chain. The investigation shows the necessity of having such tools in supply chains and developing them to achieve an efficient and scalable system. The paper calls for further scalability enhancements throughout introducing new tools and/or reutilize the current ones.

DIGITAL TWIN APPLICATIONS: A SURVEY OF RECENT ADVANCES AND CHALLENGES

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Abstract:

Industry 4.0 integrates a series of emerging technologies, such as the Internet of Things (IoT), cyber-physical systems (CPS), cloud computing, and big data, and aims to improve operational efficiency and accelerate productivity inside the industrial environment. This article provides a series of information about the required structure to adopt Industry 4.0 approaches and a brief review of related concepts to finally identify challenges and research opportunities to envision the adoption of so-called digital twins. We want to pay attention to upgrading older systems aiming to provide the well-known advantages of Industry 4.0 to such legacy systems as reducing production costs, increasing efficiency, acquiring better robustness of equipment, and reaching advanced process connectivity.

Keywords: industry 4.0; industrial cyber-physical system; industrial digital twin

ADVANCED INTERFERENCE MANAGEMENT TECHNIQUE: POTENTIALS AND LIMITATIONS

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Abstract:

Interference management has the potential to improve spectrum efficiency in current and next generation wireless systems (e.g., 3GPP LTE and IEEE 802.11). Recently, new paradigms for interference management have emerged to tackle interference in a general class of wireless networks: interference shaping and interference exploitation. Interference shaping is a technique that creates a particular linear combination of interference signals when transmitters propagate signals to minimize the aggregated interference effect at each receiver. Interference exploitation is a method that harnesses interference in decoding as side information to improve data rates. Both approaches offer better performance in interference-limited communication regimes than traditionally thought possible. This article provides a high-level overview of several different interference shaping and exploitation techniques for single-hop, multihop, and multi-way network architectures with graphical illustrations. The article concludes with a discussion of practical challenges associated with adopting sophisticated interference management strategies in the future.

MOBILE CLOUD COMPUTING: CHALLENGES AND FUTURE RESEARCH DIRECTIONS

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Abstract:

In society today, mobile communication and mobile computing have a significant role in every aspect of our lives, both personal and public communication. However, the growth in mobile computing usage can be enhanced by integrating mobile computing into cloud computing. This will result in emerging a new model called Mobile Cloud Computing (MCC) that has recently attracted much attention in academic sector. In this work, the main challenges and issues related to MCC are outlined. We also present the recent work and countermeasure solutions that are proposed by researchers to counter the challenges and lastly, crucial open research and issues that direct future research are highlighted.

Keywords — Cloud Computing, Computational Offloading, Mobile Computing, Security and Privacy

INFORMATION AND COMMUNICATION TECHNOLOGIES AND THE RIGHT TO INFORMATIONAL PRIVACY IN HEALTH CARE: A COMPREHENSIVE ANALYSIS

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Abstract:

The rapid integration of information and communication technologies (ICTs) into the healthcare field has led to significant advancements, including the development of electronic health records, telemedicine, big data analytics, and artificial intelligence. These technologies have revolutionized medical care by improving accessibility, enhancing quality, and facilitating personalized treatments. However, with these advancements, the issue of health information privacy has become increasingly prominent. This article examines the interplay between ICTs and the right to informational privacy in the healthcare field. More specifically, it explores the core principles of informational privacy by outlining its legal and ethical facets while also underscoring the importance of maintaining the confidentiality and security of personal health information (PHI). The essay also examines the challenges threatening informational privacy—including data breaches, inadequate regulatory frameworks, and ethical dilemmas surrounding big data and AI. Simultaneously, the article identifies opportunities for enhancing privacy protections, including introducing technological innovations, and strengthening legal and regulatory frameworks. The piece also offers practical recommendations for various stakeholders—such as policymakers, healthcare providers, and individuals—for ensuring the protection of PHI. In conclusion, this article emphasizes the importance of striking a delicate balance between leveraging the benefits of ICTs and protecting informational privacy, which is a prerequisite for fostering a resilient, equitable, and patient-centered healthcare system. Keywords: health care; informational privacy; information and communication technologies; personal health information; privacy protection.

SATELLITE COMMUNICATION: STATE-OF-THE-ART AND FUTURE CHALLENGES

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Abstract:

Beyond line of sight communication is important as it provides, for example, tactical data sharing for military advantage. Satellite communication (SATCOM) is the only technology that provides this capability. Recent advances in micro-electronics technology have significantly enhanced the capability of SATCOM systems in terms of their ability to reprogram and reconfigure. Moreover, signal processing units can be simulated using software-defined radios. But a growing demand for high data rates and user anonymity, requiring implementation of higher-order modulation, multiplexing and efficient spread spectrum schemes, pose new challenges for SATCOM. These are compounded in the presence of reliability and low latency requirements for tactical communication as well as communication between various satellite technologies in the future such as constellations and 5G technology. In this survey, we review the state-of-the-art in SATCOM systems with respect to modulation, multiplexing, channel encoding and software-based implementations and discuss future challenges.

Index Terms—Satellite communication, high-throughput, software-defined radio, modulation, multiplexing, channel encoding

QOS AND QOE IN WIRELESS MULTICAST COMMUNICATION

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Abstract

During last decade the deployment of multimedia and real-time applications over the network has grown with large interest. There are some parameters like service level agreements and quality of service such as delay, jitter, and packet loss on which the progress of these multimedia and real time applications depend. Though Multicasting is UDP based, but it is a very efficient group communication technique, it enhances efficiency by controlling network traffic and by reducing server and CPU load. Multicast optimizes performance by eliminating traffic redundancy and it is also helpful in distributed applications as well. Multicasting is a novel area of research in which broad scope of development is possible. In this paper, we are working on Quality of Services and Quality of Experiences and will provide an adaptive approach for data packet in terms of jitter by using the queuing mechanism. Our goal is to improve the performance of Multicast communication. The performance of the Multicast communication is calculated in terms of the throughput, packet loss, link utilization, delay and mean opinion score.

INTERNET OF THINGS (IOT) COMMUNICATION PROTOCOLS : REVIEW

Satya Krishna. V, Sidhanta Kumar Balabantray
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Abstract:

Internet of Things (IoT) consists of smart devices that communicate with each other. It enables these devices to collect and exchange data. Besides, IoT has now a wide range of life applications such as industry, transportation, logistics, healthcare, smart environment, as well as personal, social gaming robot, and city information. Smart devices can have wired or wireless connection. As far as the wireless IoT is the main concern, many different wireless communication technologies and protocols can be used to connect the smart device such as Internet Protocol Version 6 (IPv6), over Low power Wireless Personal Area Networks (6LoWPAN), ZigBee, Bluetooth Low Energy (BLE), Z-Wave and Near Field Communication (NFC). They are short range standard network protocols, while SigFox and Cellular are Low Power Wide Area Network (LPWAN).standard protocols. This paper will be an attempt to review different communication protocols in IoT. In addition, it will compare between commonly IoT communication protocols, with an emphasis on the main features and behaviors of various metrics of power consumption security spreading data rate, and other features. This comparison aims at presenting guidelines for the researchers to be able to select the right protocol for different applications.

Keywords: 6LoWPAN, AES, ASK, BLE, BPSK, BT, CCK, COFDM, DBPSK, DSSS, ESP, FHSS, ICT, IoT, IPv6, MAC, NFC, RC4, WPAN, WSNs, OFDM, O-QPSK, TDMS and UNB.

MULTI-ACCESS EDGE COMPUTING FUNDAMENTALS, SERVICES, ENABLERS AND CHALLENGES: A COMPLETE SURVEY

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Abstract:

Traffic over mobile cellular networks has significantly increased over the past decade, and with the introduction of 5G there is a growing focus on throughput capacity, reliability, and low latency to meet the demands of new and innovative applications. Multi-access Edge Computing (MEC) is being developed to achieve a series of challenges posed by the introduction of new applications and services that require ultra-low latency and high bandwidth. This article is a comprehensive survey of recent advances in MEC and provides a description of the MEC concept, framework, and capabilities. We also summarize a set of MEC technology enablers including Software Defined Networking, Network Function Virtualization, Information-Centric Networking, Service Function Chaining, Cloud-Radio Access Networks, Fog-computing based Radio Access Networks and Network Slicing. The MEC use cases and the open research challenges are presented.

Keywords: Multi-access Edge Computing Software Defined Networking Network Function Virtualization Information-Centric Networking Service Function Chaining Network Slicing Cloud-Radio Access Network Fog-computing based Radio Access Network.

EDGE INTELLIGENCE: THE CONVERGENCE OF HUMANS, THINGS, AND AI

Bijaya Nanda, Chinmaya Ranjan Pattnaik
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract

Edge AI and Human Augmentation are two major technology trends, driven by recent advancements in edge computing, IoT, and AI accelerators. As humans, things, and AI continue to grow closer together, systems engineers and researchers are faced with new and unique challenges. In this paper, we analyze the role of edge computing and AI in the cyberhuman evolution, and identify challenges that edge computing systems will consequently be faced with. We take a closer look at how a cyber-physical fabric will be complemented by AI operationalization to enable seamless end-to-end edge intelligence systems.

Index Terms—edge AI, human augmentation, edge intelligence, edge computing, AI systems, AI operations

HUMAN-COMPUTER INTERACTION: ENHANCING USER EXPERIENCE IN INTERACTIVE SYSTEMS

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ABSTRACT

In this research, we investigate how human-computer interaction (HCI) can be used to improve the user experience (UX) of interactive systems. Studies in cognitive psychology, information processing, and human factors are examined as they relate to the development of HCI. It highlights how HCI has shifted its focus from functionality to user-friendliness, teaching ability, efficiency, enjoyment, and emotion. To better understand the current state of HCI and UX research, practice, and theory, a systematic literature study is performed. Focusing on users' goals wants, and characteristics at every stage of the design process is central to user-centered design (UCD) ideas and approaches, which are discussed at length in this article. We investigate usability testing as a crucial technique for bettering HCI, focusing on its advantages in pinpointing usability problems, boosting system efficacy, and boosting user pleasure. Methods for creating tests, finding participants, collecting data, and analyzing results are discussed. The importance of prototype methods in HCI and user-centric design is also emphasized in the study. This article delves into the practice of creating prototypes to collect user feedback, iterate designs, and perfect interactive systems. Techniques covered include paper prototyping, interactive wireframes, and high-fidelity prototypes. We propose interaction design frameworks like the User-Centered Design Process (UCDP) and the Double Diamond model to help designers prioritize users when developing interactive systems. The study also delves into how technologies like augmented reality, virtual reality, natural language processing, machine learning, and gesture-based interfaces have revolutionized HCI in recent years. The paper defends user-centric design's place in HCI, pointing out how UX affects user happiness, participation, and output. Researchers and practitioners in HCI and software engineering can greatly benefit from this paper's findings.

KEYWORDS: Human-computer interaction, HCI, User Experience, Software, UCD.

DISTRIBUTED LEDGER TECHNOLOGY FOR SECURING IOT

Bijaya Nanda, Chinmaya Ranjan Pattnaik
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Abstract:

Computing and communication are getting increasingly ubiquitous with the inclusion of sophisticated devices like electric vehicles, smart phones and other house hold appliances. Due to the constant evolution in Internet of Things (IoT), the process of collaboration of these devices at a mass scale in order to provide improved and better services to the society. Traditional mechanisms which are used to sustain privacy and security become incapable from achieving the same for IoT systems having distributed or decentralized topology. Distributed Ledger Technologies (DLT), an emerging digital technology, consists of different kinds of decentralized data structures to ensure immutability by linking blocks using cryptographic measures. DLT has the ability to ensure privacy, security and distributed or decentralized computations with adhering to the constraints of IoT nodes. This study is motivated due to the lack of an in-depth analysis on how the characteristics of DLT can be exploited to secure IoT systems. So, an in depth overview of DLT along with some of the existing solutions to meet security requirements of IoT systems employing DLT have been provided in this paper. With respect to integrating DLT with IoT, this article also highlights the different challenges.

Index Terms—Distributed Ledger Technologies (DLT), Internet of Things (IoT), Security, Privacy.

TOWARDS A DESIGN OF E-HEALTH SYSTEMS T DS A DESIGN OF E-HEALTH SYSTEMS TO IMPROVING HEALTHCAR VING HEALTHCARE SERVICE DELIVERY

Aurobindo Kar, Purnya Prava Nayak
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract

Patients' medical records are critical to services, it helps to prevent errors in prescriptions and medications. Despite the understanding of these consequential risks to patients, medical errors remain prevalence in South Africa and many parts of the world. Empirically, this study reports medical errors and their consequences to patients. Qualitative and quantitative data relating to healthcare services delivery were used. The interpretation of the data reveals that medical errors manifest wrong medications, misrepresentations in prescriptions and mismanagement by facility. Also, patients' lack of access to medical records and the use of incomplete medical records were other factors identified. This study lays justification and motivation for patients' unique identifier, which contributes to improving the quality of healthcare service delivery.

Keywords: Healthcare, Medical errors, Healthcare service, Health in Africa, Medical records.

INTEROPERABILITY ISSUES AND CHALLENGES IN 6G NETWORKS

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Abstract

Interoperability allows seamless data exchange among the heterogeneous networks and is a crucial problem for the growth of forthcoming 6G networks. The research has focussed on the interoperability issues in the Internet of Things (IoT) related to cross-domain and cross-platform applications. However, the future 6G communication networks are not limited to interoperating with IoT. The 6G networks must interoperate with the Wearable IoT (WIoT), brain abstracted Internet of Thinking (IoTk), Internet of Everything, and other space and undersea networks. The network softwarization, slicing, and intelligentization techniques are envisioned to support seamless data exchange between 6G and other heterogeneous networks. However, to successfully achieve the goal of global 360◦ connectivity in 3D space, interoperability issues with heterogeneous services, applications, protocols, networks, etc., must be solved. The integration and interoperability of 6G networks with all aforementioned heterogeneous networks are inevitable to realize the goals of 3D communication successfully. The paper proposes a taxonomy to provide deep insights into interoperability issues, challenges, and possible solutions for 6G interoperability with WIoT, IoTk, IoE, and other networks. Though the techniques mentioned above in 6G networks will allow interoperable solutions, the integration and interoperability issues persist due to heterogeneities in high-frequency bands, base stations, technologies, device identities, protocols, and interfaces. The paper summarizes significant challenges regarding interoperability issues in various areas related to 6G and highlights the broad scope to further research.

Keywords: Interoperability, 6G, Internet of Thinking (IoTk), heterogeneous, Wearable Internet of Things (WIoT).

A REVIEW ON CROSS-LAYER DESIGN APPROACH IN WSN BY DIFFERENT TECHNIQUES

Banoj Kumar Panda, Madhulita Mothapatra
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract

Wireless Sensor Networks (WSN) include a large number of sensor nodes that are connected to each other with the limitations in energy sources, battery life, memory, mobility and computational capacity. Since the traditional layered architecture was appropriate only for the wired network. It works within a strict boundary that leads to more energy usage as well as more communication traffic. It also impacts on the overall network lifespan and performance of the system. Energy efficiency and network lifespan are the primary concern of WSN due to the fact that each node in the network operates with extremely limited energy. Recent studies have shown that the Open System Interconnection (OSI) model cannot meet the demands of the wireless sensor network. To overcome such limitations, the cross-layer design has been introduced. It allows direct interactions between protocol at non-adjacent layers. In this paper, we present different types of cross-layer design techniques in Wireless Sensor Network (WSN) and discusses several cross-layer proposals given by researchers. At the end, the paper highlights some challenges faced in implementing CLD in Wireless Sensor Networks.

Keywords: Cross-Layer Design (CLD) Cross-layer Framework (CLF) Data management Framework Energy efficiency Quality of Service (QoS) TinyCubus Wireless Sensor Network (WSN)

EDGE-COMPUTING-ENABLED LOW-LATENCY COMMUNICATION FOR A WIRELESS NETWORKED CONTROL SYSTEM

Banoj Kumar Panda, Madhulita Mohapatra
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract:

This study proposes a novel strategy for enhancing low-latency control performance in Wireless Networked Control Systems (WNCSs) through the integration of edge computing. Traditional networked control systems require the receipt of raw data from remote sensors to enable the controller to generate an appropriate control command, a process that can result in substantial periodic communication traffic and consequent performance degradation in some applications. To counteract this, we suggest the use of edge computing to preprocess the raw data, extract the essential features, and subsequently transmit them. Additionally, we introduce an adaptive scheme designed to curtail frequent data traffic by adaptively modifying periodic data transmission based on necessity. This scheme is achieved by refraining from data transmission when a comparative analysis of the previously transmitted and newly generated data shows no significant change. The effectiveness of our proposed strategy is empirically validated through experiments conducted on a remote control system testbed using a mobile robot that navigates the road by utilizing camera information. Through leveraging edge computing, only 3.42% of the raw data was transmitted. Our adaptive scheme reduced the transmission frequency by 20%, while maintaining an acceptable control performance. Moreover, we conducted a comparative analysis between our proposed solution and the state-of-the-art communication framework, WebRTC technology. The results demonstrate that our method effectively reduces the latency by 58.16% compared to utilizing the WebRTC alone in a 5G environment. The experimental results confirm that our proposed strategy significantly improves the latency performance of a WNCS.

Keywords: wireless networked control system; edge computing; low latency; testbed

MOBILE EDGE COMPUTING AND NETWORKING FOR GREEN AND LOW-LATENCY INTERNET OF THINGS

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Abstract

IoT, a heterogeneous interconnection of smart devices, is a great platform to develop novel mobile applications. Resource constrained smart devices, however, often become the bottlenecks to fully realize such developments, especially when it comes to intensive-computation-oriented and low-latency-demanding applications. MEC is a promising approach to address such challenges. In this article, we focus on MEC applications for IoT, and address energy efficiency as well as offloading performance of such applications in terms of end-user experience. In this regard, we present a mobility-aware hierarchical MEC framework for green and low-latency IoT. We deploy a game theoretic approach for computation offloading in order to optimize the utility of the service providers while also reducing the energy cost and the task execution time of the smart devices. Numerical results indicate that the proposed scheme does brings significant enhancement in both energy efficiency and latency performance of MEC applications for IoT.

SPECTRUM DECISION FOR COGNITIVE RADIO NETWORKS WITH VARIOUS-BANDWIDTH CHANNELS

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Abstract:

Cognitive radio (CR) systems can enhance the licensed spectrum efficiency by finding and allocating the underutilized channels of the primary users to the secondary users. After scanning a wide range of spectrum. A general CR system needs to utilize all the available channels of various bandwidths. Whenever the active primary users appear, the secondary users shall return the borrowed channels, causing interruption even during a transmission period. The behavior of changing the operating channels is called hopping mode in this paper. In this paper we propose an improved preemptive resume priority (PRP) M/G/1 queueing network model for such a general CR system, aiming to characterize the impacts of hopping-mode behaviors and various bandwidth on the delay performance of the secondary users. We further propose a probability-based various-bandwidth channel selection scheme to reduce the overall system time for the hopping-mode secondary users with multiple interruptions, where the overall system time is defined as the sum of transmission time and waiting time. Our analytical results, validated by simulations, show that the proposed probability-based various-bandwidth channel selection scheme can improve the overall system time by 20% compared to the existing methods.

PERFORMANCE ANALYSIS OF VIRTUALIZED NETWORK FUNCTIONS ON VIRTUALIZED SYSTEMS ARCHITECTURES

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Abstract:

Network Function Virtualization (NFV) is an emerging network architecture that employs the concept of virtualization and allows the consolidation of many network services on top of an industry standard off-the-shelf server. This decoupling of network functions and services from dedicated and expensive hardware appliances has led the Enterprise and Service Providers to increasingly make use of Virtualized Network Functions (VNFs) to reap the benefits of reduced capital and operational expenses. Total cost of ownership calculations however are typically a function of the attainable network throughput and performance, which in a virtualized system is highly dependent on the overall system architecture. The number of VNFs running on the server, their I/O demands, the performance characterization of the underlying hypervisor scheduler, or the packet path from physical interfaces into the VNFs are examples of how the system architecture can influence overall performance and throughput. This article provides the challenges of deploying VNFs on a virtualized system architecture and analyzes the impact of the architecture on the overall VNF performance under both single-VNF and multi-VNF configurations.

SMART CITIES AND GREEN BUILDING TECHNOLOGY

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Abstract

Just construction of tall buildings alone does not make a smart city. A smart city should comprise of free wifi access, mobile accessibility, surveillance security to avoid cyber threats, reduction in carbon emission and footprints, easier and faster commutes, etc. which ultimately should provide a hassle free, healthier, qualitative and safe environment for the public. These can be attained by availing the green building technology, Internet of Things (IoT), Artificial Intelligence (AI), and cloud computing etc. These can be achieved only when the private and public sector acts in coordination with the government and the technical department.

Keywords: smart city, sustainability, green building technology, AI, IoT, cloud computing.

A STUDY OF MOVING FROM CLOUD COMPUTING TO FOG COMPUTING

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Abstract

The exponential growth of the Internet of Things (IoT) technology poses various challenges to the classic centralized cloud computing paradigm, including high latency, limited capacity, and network failure. Cloud computing and Fog computing carry the cloud closer to IoT computers in order to overcome these problems. Cloud and Fog provide IoT processing and storage of IoT items locally instead of sending them to the cloud. Cloud and Fog provide quicker reactions and better efficiency in conjunction with the cloud. Cloud and fog computing should also be viewed as the safest approach to ensure that IoT delivers reliable and stable resources to multiple IoT customers. This article discusses the latest in cloud and Fog computing and their convergence with IoT by stressing deployment's advantages and complexities. It also concentrates on cloud and Fog design and new IoT technologies, enhanced by utilizing the cloud and Fog model. Finally, transparent topics are addressed, along with potential testing recommendations for cloud storage and Fog computing, and IoT.

Keywords— Cloud Computing, Fog Computing, Internet of Things (IoT). I. INTRODU

BIOMETRICS-BASED AUTHENTICATION: A NEW APPROACH

Prakash Chandra Jena, Batakrishna Tripathy
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Abstract:

Authentication is a fundamental issue to any trust-oriented computing system and also a critical part in many security protocols. Performing authentication is notoriously difficult. Biometrics has been widely used and adopted as a promising authentication method due to its advantages over some existing methods, particularly, its resistance to losses incurred by theft of passwords and smart cards. However, biometrics introduces its own challenges, such as being irreplaceable once compromised. Moreover, the use of biometrics introduces privacy concern. In this paper, we propose a simple yet effective biometrics-based authentication solution. The proposed approach introduces new constructs - Reference Subject and Biometric Capsule, and stores the ``difference'' (called Biometric Capsule) between the user and the Reference Subject for authentication without revealing a user's original biometric information. This approach supports replaceability and protect users' privacy. Moreover, the proposed approach creates more advantages: (a) being user-friendly without any additional burden on users and possessing one-for-all power; (b) being generic enough to be applied to various biometrics (e.g., fingerprint, face, iris) or combinations of them; and (c) being adaptive in terms of security and privacy to fit different authentication models, application requirements, available resources, and trusted or non-fully-trusted environments. The experimental results on iris validate its performance and prove it a practical mechanism.

AN OVERVIEW OF NEXT-GENERATION ARCHITECTURES FOR MACHINE LEARNING: ROADMAP, OPPORTUNITIES AND CHALLENGES IN THE IOT ERA

Bikash Chandra Pattanaik, Batakrishna Tripathy
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Abstract:

The number of connected Internet of Things (IoT) devices are expected to reach over 20 billion by 2020. These range from basic sensor nodes that log and report the data to the ones that are capable of processing the incoming information and taking an action accordingly. Machine learning, and in particular deep learning, is the de facto processing paradigm for intelligently processing these immense volumes of data. However, the resource inhibited environment of IoT devices, owing to their limited energy budget and low compute capabilities, render them a challenging platform for deployment of desired data analytics. This paper provides an overview of the current and emerging trends in designing highly efficient, reliable, secure and scalable machine learning architectures for such devices. The paper highlights the focal challenges and obstacles being faced by the community in achieving its desired goals. The paper further presents a roadmap that can help in addressing the highlighted challenges and thereby designing scalable, high-performance, and energy efficient architectures for performing machine learning on the edge.

BIG DATA ANALYTICS FOR COMMUNICATION SYSTEMS OPTIMIZATION

Bikash Chandra Pattanaik , Sambit Kumar Mishra
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract :

The ever-growing volume, variety, and velocity of data generated by communication systems presents both challenges and opportunities for network optimization. This conference explores the application of big data analytics to improve communication system performance. We will discuss techniques for data collection, storage, and analysis, along with the use of machine learning and artificial intelligence to extract valuable insights from network data. Key application areas include resource management, network planning, congestion control, and improved user experience. The conference will bring together researchers, engineers, and industry professionals to share knowledge and explore the future of big data-driven communication systems.

Keywords: Big Data, Communication Systems, Network Optimization, Machine Learning, Artificial Intelligence, Resource Management, Network Planning, Congestion Control, User Experience.

MESSAGE FROM THE GREENCOM 2022 GENERAL CHAIRS AND PROGRAM CHAIRS: ITHINGS-GREENCOM-CPSCOM-SMARTDATA-CYBERMATICS 2022

Satya Krishna. V, P.Karunakar Reddy
Gandhi Institute for Education and Technology, Baniatangi, Bhubaneswar

Abstract:

The joint conference iThings-GreenCom-CPSCom-SmartData-Cybermatics 2021 serves as a premier forum for researchers, practitioners, and industry experts to exchange insights and innovations in the realm of intelligent systems and green computing. With a focus on sustainability, this interdisciplinary event fosters collaboration towards building eco-friendly smart technologies that address societal challenges.

Topics encompass the Internet of Things (IoT), green computing, Cyber-Physical Systems (CPS), Smart Data, and Cybermatics, highlighting their interconnectedness and potential for positive impact. Through keynote speeches, technical sessions, and interactive discussions, participants explore cutting-edge research, practical applications, and emerging trends in sustainable smart systems.

We invite contributions that push the boundaries of traditional paradigms, emphasizing energy efficiency, resource optimization, and environmental stewardship. Together, let us forge a path towards a more sustainable future, where intelligent technologies empower communities, preserve natural resources, and enhance quality of life. Join us at iThings-GreenCom-CPSCom-SmartData-Cybermatics 2022 to shape the next generation of smart and sustainable systems.

EXPANDING HORIZONS: VIRTUAL REALITY AND AUGMENTED REALITY IN COMMUNICATION

Amita Rani Das,Sambit Kumar Mishra
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Abstract:

This conference explores the transformative impact of Virtual Reality (VR) and Augmented Reality (AR) on communication practices. As these immersive technologies continue to evolve, they reshape the landscape of interpersonal, organizational, and mass communication. VR offers simulated environments that enable users to interact and communicate in novel ways, fostering experiential learning and empathy-building. AR overlays digital content onto the physical world, enriching real-time communication and enhancing user experiences. From telepresence applications to immersive storytelling, VR and AR offer unprecedented opportunities for engagement and collaboration across diverse contexts. This interdisciplinary conference invites scholars, practitioners, and industry professionals to explore the theoretical foundations, methodological approaches, and practical implications of integrating VR and AR into communication processes. Through presentations, workshops, and discussions, participants will examine the challenges and opportunities of leveraging these technologies to enhance communication effectiveness and foster meaningful connections in an increasingly digital world.

Keywords: Virtual Reality, Augmented Reality, Immersive Communication, Experiential Learning, Empathy-building, Telepresence, Storytelling, Engagement, Collaboration, Digital Age.

SOCIAL MEDIA ANALYTICS AND COMMUNICATION TRENDS

Satyaranjan Mishra, Madhulita Mohapatra
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Abstract:

This paper investigates the dynamic intersection of Social Media Analytics and Communication Trends, shedding light on the evolving landscape of digital discourse. Social Media Analytics leverages data-driven approaches to unearth actionable insights from vast online interactions, informing strategic communication decisions. As social platforms evolve, understanding emerging trends becomes pivotal in navigating the ever-changing digital ecosystem. From sentiment analysis to influencer marketing, this event delves into cutting-edge methodologies and best practices for harnessing social data to drive engagement and enhance communication effectiveness. Scholars, analysts, and industry professionals are invited to explore innovative strategies, case studies, and ethical considerations in social media analytics. Through interactive sessions and workshops, participants will glean valuable insights and forge connections at the forefront of contemporary communication research and practice.

Keywords: Social Media Analytics, Communication Trends, Digital Discourse, Data-driven Insights, Sentiment Analysis, Influencer Marketing, Engagement, Communication Effectiveness, Methodologies, Ethics.

FUTURE DIRECTIONS IN MOBILE COMMUNICATION

Saswati Pattnaik, Madhulita Mohapatra
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Abstract:

This conference examines the transformative trajectory of mobile communication, focusing on the evolution from 5G to future technologies. 5G networks have revolutionized connectivity, enabling unprecedented speeds and low latency, but the journey doesn't end there. As we envision the next generation of mobile communication, exploring future directions becomes imperative. From enhanced mobile broadband to massive machine-type communication and ultra-reliable low-latency communication, the landscape of possibilities is vast. This event gathers researchers, engineers, and industry leaders to discuss emerging technologies, standards, and applications shaping the future of mobile communication. Through presentations, panels, and demonstrations, participants will delve into key challenges and opportunities on the path towards realizing the full potential of 5G and beyond.

Keywords: 5G, Mobile Communication, Future Technologies, Connectivity, Enhanced Mobile Broadband, Massive Machine-Type Communication, Ultra-Reliable Low-Latency Communication, Standards, Applications.

SOFTWARE-DEFINED NETWORKING (SDN) IN COMMUNICATION

Smrutirekha Das, Sambit Kumar Mishra
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Abstract:

This conference explores the paradigm shift brought by Software-Defined Networking (SDN) in communication infrastructure. SDN decouples network control and data forwarding, offering dynamic, programmable, and centralized management. By abstracting network functionality, SDN enables unprecedented flexibility and scalability, empowering communication networks to adapt to evolving demands efficiently. From optimizing resource allocation to enhancing security and enabling innovative services, SDN reshapes the very fabric of communication infrastructure. Researchers, engineers, and industry experts convene to discuss cutting-edge developments, challenges, and opportunities in SDN deployment and integration. Through presentations, workshops, and demonstrations, participants will delve into key aspects such as network virtualization, orchestration, and software-defined security, charting the course for the future of communication infrastructure.

Keywords: Software-Defined Networking, Communication Infrastructure, Network Control, Programmability, Flexibility, Scalability, Resource Allocation, Security, Network Virtualization, Orchestration.

"Technology is just a tool. In terms of getting the kids working together and motivating them, the teacher is the most important."

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