

**NATIONAL CONFERENCE
ON
CLIMATE CHANGE & FLOOD MANAGEMENT
IN CIVIL ENGINEERING
(NCCCFM-2021)**

15TH TO 17TH FEBRUARY 2021



Organized by:

DEPARTMENT OF CIVIL ENGINEERING

**RAAJDHANI ENGINEERING COLLEGE
BHUBANESWAR**

Near Mancheswar Railway Station

P.O- Mancheswar Railway Colony

Bhubaneswar-751017(Orissa)

www.rec.ac.in

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Raajdhani Engineering College

Bhubaneswar

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Message



**CA.B. Ramprasad Rao,
Chairman
Raajdhani Engineering College
Bhubaneswar.**

I am glad to know that Department of CIVIL of Raajdhani Engineering College is organizing a National Conference on “**CLIMATE CHANGE AND FLOOD MANAGEMENT**” on 15th to 17th February 2021 in our college.

Number of experts, delegates, academicians and students are participating in the workshop and will deliberate on the topic to cope up with the technological interactions among academicians, industries and research communities. I hope that the delegates and participants will be greatly benefitted from the Conference.

My best wishes for grand success of the National Conference CCFM

A handwritten signature in blue ink, consisting of a stylized 'R' followed by a horizontal line and a small flourish.

CA.B. Ramprasad Rao

Message



**Mr. Manoj Kumar Palo,
Vice Chairman**

**Raajdhani Engineering College
Bhubaneswar.**

I am happy to know that Department CIVIL of Raajdhani Engineering College is organizing a National Conference on “**CLIMATE CHANGE AND FLOOD MANAGEMENT**” on 15th to 17th February 2021 in our college

I wish the National Conference CCFM grand success.

A handwritten signature in black ink, appearing to read 'Manoj Kumar Palo'.

Mr. Manoj Kumar Palo

Message



**Prof. (Dr.) S.C. Panda,
Secretary
Raajdhani Engineering College
Bhubaneswar**

I am glad to know that Department CIVIL of Raajdhani Engineering College is organizing a National Conference on “**CLIMATE CHANGE AND FLOOD MANAGEMENT**” on 15th to 17th February 2021 in our college.

I hope this workshop would provide a platform to the faculty members, research scholars, delegates and all the stakeholders an opportunity to interact and creating self awareness on electrical designs.

I wish all the success of the National Conference CCFM

A handwritten signature in black ink, appearing to read 'S.C. Panda'.

Prof. (Dr.) Sarad Chandra Panda

Message

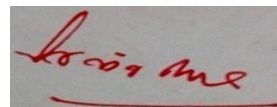


**Prof. G.S.Mishra,
Director(T&P)
Raajdhani Engineering College
Bhubaneswar**

It gives me immense pleasure that the Department CIVIL of Raajdhani Engineering College is organizing a National Conference on “**CLIMATE CHANGE AND FLOOD MANAGEMENT**” on 15th to 17th February 2021 in our college.

This Conference will go a long way in expressing the overview of electrical designs and highlights the issues & challenges faced by the industry in today's economic scenario.

I extend my warm greetings to all delegates and participants in this National Conference and wish the National Conference CCFM a grand success.

A handwritten signature in red ink, appearing to read 'Gouri Shankar Mishra', written on a light-colored background.

Prof. Gouri Shankar Mishra

Message



**Prof. Ramesh Chandra Choudhury,
Director (Administration)
Raajdhani Engineering College,
Bhubaneswar**

I am glad to know that Department CIVIL of Raajdhani Engineering College is organizing a National Conference on “**CLIMATE CHANGE AND FLOOD MANAGEMENT**” on 15th to 17th February 2021 in our college.

I believe the outcome of such kind of Conference shall help the future technology change in the field of CIVIL manufacturing & designs.

I wish all the success of the National Conference CCFM

A handwritten signature in black ink, consisting of a stylized 'R' followed by a horizontal line and a diagonal stroke.

Prof. Ramesh Choudhury

Message



Prof. (Dr.) Bimal Sarangi
Principal
Raajdhani Engineering College,
Bhubaneswar.

It gives me immense pleasure that Department CIVIL of Raajdhani Engineering College is organizing a National Conference on “**CLIMATE CHANGE AND FLOOD MANAGEMENT**” on 15th to 17th February 2021 in our college & to publish its proceedings on this occasion. I believe, the Conference will largely benefit the faculty members, research Scholar & all the stack holders who are involved in it.

I wish the National Conference CCFM all success.

A handwritten signature in black ink, appearing to read 'Bimal Sarangi', with a long horizontal line extending to the right.

Prof. (Dr.) Bimal Sarangi

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Natural flood management as a climate change adaptation option assessed using an ecosystem services approach

Rabindra Kumar Parida

Department of Civil Engineering, Raajdhani Engineering College, Bhubaneswar

Abstract:

The Indian sub-continent climate is projected to get warmer with an increased likelihood of wetter weather and an increased incidence of extreme meteorological events. The risk of inland and coastal flooding is expected to become more severe, though with variable impacts depending on local exposure, vulnerabilities and adaptive capacity. Responding to this challenge will require traditional engineering schemes to protect specific assets but there is an emerging role for natural flood management (NFM) as a means to reduce flood risk while realising multiple co-benefits across the catchment. Here we present a meta-analysis of 20 recent projects, exploring their flood mitigation performance along with their wider impacts (positive and negative) on ecosystem services. Some measures, such as upland afforestation, perform well in reducing flood risk but have significant impacts on food production and cultural services. Other strategies, including restoring floodplain connectivity or re-meandering have the greatest co-benefits e.g. improved biodiversity, water quality and carbon sequestration, but appear to be less effective in reducing the flood risk. A framework is presented as a decision-support tool, to aid options analysis between alternative NFM schemes within the context of different land management scenarios.

Keywords:

NFM, National Ecosystem, Flood Mitigation Performance, Flood Risk

Rainwater harvesting techniques as an adaptation strategy for flood mitigation

Girija Sankar Mohapatra

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Abstract:

The development of adaptation and mitigation strategies to tackle anthropic and climate changes impacts is becoming a priority in drought-prone areas. This study examines the capabilities of indigenous rainwater harvesting techniques (RWHT) to be used as a viable solution for flood mitigation. The study analyses the hydraulic performance of the most used micro-catchment RWHT in sub-Saharan regions, in terms of flow peak reduction (FPR) and volume reduction (VR) at the field and basin scale. Parametrized hyetographs were built to replicate the extreme precipitations that strike Sahelian countries during rainy seasons. 2D hydrodynamic simulations showed that half-moons placed with a staggered configuration (S-HM) have the best performances in reducing runoff. At the field scale, S-HM showed a remarkable FPR of 77% and a VR of 70% in case of extreme rainfall. Instead at the basin scale, in which only 5% of the surface was treated, 13% and 8% respectively for FPR and VR were obtained. In addition, the reduction of the runoff coefficient (R_c) between the different configuration was analyzed. The study critically evaluates hydraulic performances of the different techniques and shows how pitting practices cannot guarantee high performance in case of extreme precipitations. These results will enrich the knowledge of the hydraulic behavior of RWHT; aspect marginally investigated in the scientific literature. Moreover, this study presents the first scientific application of HEC-RAS as a rainfall-runoff model. Despite some limitations, this model has the effective feature of using very highresolution topography as input for hydraulic simulations. The results presented in this study should encourage stakeholders to upscale the use of RWHT in order to lessen the flood hazard and land degradation that oppresses arid and semi-arid areas.

Keywords:

Rainwater harvesting techniques; Extreme rainfall; Runoff; Hydraulic modelling; Flood mitigation; Arid and Semi-Arid climate

The benefits of flood mitigation strategies: effectiveness of integrated protection measures

Sikender Sharma

Department of Civil Engineering, Raajdhani Engineering College, Bhubaneswar

Abstract:

Given the investments that local, regional, and national governments have already made in mitigation and may consider in the future, it is crucial to assess mitigation effectiveness across all scales and determine which strategies are the most appropriate. This is particularly relevant as mitigation is viewed increasingly as a vital action for which investments and the resulting benefits must be evaluated and justified. It is fundamental to determine which measures are the most effective in optimising the response to floods in local communities. The study analyses the current state of knowledge on flood mitigation and reviews what methodologies have been applied in order to assess mitigation effectiveness and positive cost-benefit ratio (CBR). The growing body of literature has shown that losses from natural hazards can be significantly reduced when one or more mitigation techniques are put into practice. Moreover, an effective response to floods requires the contribution of flood-prone households and their local community, known as the bottom-up approach, in order to apply risk management strategies to increase community resilience. The results demonstrate that effectiveness increases when integrated approaches are implemented. In particular, the combination of top-down and bottom-up solutions can provide the best results in terms of socio-economic assessments. The study found that the commitment of both public and private stakeholders was of vital importance in achieving good flood mitigation levels, thus, mitigation must be seen as a joint effort between these actors. The paper also provides key findings from literature and recommendations for further research. 460 AIMS Geosciences Volume 6, Issue 4, 459–472.

Keywords:

Flood mitigation strategies; mitigation benefits; integrated mitigation measures; private mitigation; risk perception

Flood management in India: A focussed review on the current status and future challenges

Abhipsa Mohanty

Department of Civil Engineering, Raajdhani Engineering College, Bhubaneswar

Abstract:

Despite massive investments and continuous flood-control efforts in India, the socio-economic damages and death toll continue to remain high. Undoubtedly, the process of flood management in India is very complex due to the influence of several socio-hydroclimatological factors, such as climate change, sea level rise, and socio-economic dynamics. While these factors influence the intensity and frequency of flood events, factors explicitly related to the process of flood management, such as the improper execution of traditional structural measures, the lack of the proper implementation of schemes, lackadaisical execution of traditional structural measures and end-to-end management of the flood management programs/practices, ensure only partial protection. This review article identifies the region-specific flood problems in India and discusses the initiatives undertaken by major Indian flood management agencies, with an emphasis on the current ongoing flood management practices. The effectiveness of these practices in the long term is discussed, and specific gaps are identified. The recommendations provided in this article may be useful to guide stakeholders and policymakers in formulating and implementing sustainable flood management plans for improved flood resilience.

Keywords:

Flood management programme Policy makers Flood resilience Socio-economic damages Structural measures.

A framework for evaluation of flood management strategies

Sanjay Kumar Behera

Department of Civil Engineering, Raajdhani Engineering College, Bhubaneswar

Abstract:

The resulting impact of disasters on society depends on the affected country's economic strength prior to the disaster. The larger the disaster and the smaller the economy, the more significant is the impact. This is clearest seen in developing countries, where weak economies become even weaker afterwards. Deliberate strategies for the sharing of losses from hazardous events may aid a country or a community in efficiently using scarce prevention and mitigation resources, thus being better prepared for the effects of a disaster. Nevertheless, many governments lack an adequate institutional system for applying cost effective and reliable technologies for disaster prevention, early warnings, and mitigation. Modeling by event analyses and strategy models is one way of planning ahead, but these models have so far not been linked together. An approach to this problem was taken during a large study where a number of policy strategies for spreading of flood loss were formulated. In these strategies, a set of parameters of particular interest were extracted from interviews with stakeholders in the region. However, the study was focused on emerging economies, and, in particular, on insurance strategies. The scope is now extended to become a functional framework also for developing countries. In general, they have a higher degree of vulnerability. We identify important parameters and discuss their importance for flood strategy formulations. Based on the policy strategies, we extract data from the strategies and propose a framework for loss spread in developing and emerging economies. The parameter set can straight forwardly be included in a simulation and decision model for policy formulation and evaluation, taking multiple stakeholders into account.

Keywords:

Developing countries, Flood management, Framework, Loss spreading, Policy strategies

Contributor Effort Allocation to Public Projects A Game-theoretic Analysis

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*Department of Computer Science & Engineering, Raajdhani Engineering College, Bhubaneswar, Odisha

Abstract—Public projects can succeed or fail for many reasons such as the feasibility of the original goal and coordination among contributors. One major reason for failure is that insufficient work leaves the project partially completed. For certain types of projects anything short of full completion is a failure (e.g., feature request on software projects in GitHub). Therefore, project success relies heavily on individuals allocating sufficient effort. When there are multiple public projects, each contributor needs to make decisions to best allocate his/her limited effort (e.g., time) to projects while considering the effort allocation decisions of other strategic contributors and his/her parameterized utilities based on values and costs for the projects. In this paper, we introduce a game-theoretic effort allocation model of contributors to public projects for modeling effort allocation of strategic contributors. We study the related Nash equilibrium (NE) computational problems and provide NP-hardness results for the existence of NE and polynomial-time algorithms for finding NE in restricted settings. Finally, we investigate the inefficiency of NE measured by the price of anarchy and price of stability.

Keywords— *meteorological, disaster, comprehensive loss, spatial-temporal change, climate change*

MDS Parametrically Constructed Using Block Cyclic Shift

Jyotikesh Kumar Mallik*

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Abstract—With the advent of the information age, using the same standard algorithm with fixed logic is difficult to meet the increasingly diversified cryptographic application requirements of cloud computing, Internet of things and 5g network environment. Dynamic variable cryptographic algorithm can improve the security and adaptability of cryptographic algorithm, which is the focus of cryptographic algorithm research and design at present. The key to the research and design of dynamic variable cryptographic algorithms is to find dynamic variable cryptographic components with good cryptographic performance. MDS (Maximum Distance Separable) is often used in the diffusion layer design of block ciphers because of its optimal diffusion characteristics. Traditional MDS transformation generally adopts MDS matrices in the finite field. While using them in dynamic variable cryptographic algorithms, it is difficult to realize parametric application because of their logical differences and implementation imbalance. Aiming at the lightweight MDS variable design requirements of dynamic variable cryptographic algorithm, this paper firstly proposes a MDS parametric construction method based on block cyclic shift and XOR operation. Compared with the traditional MDS construction in the finite field, we obtain a class of MDS component clusters with larger scale which is convenient for software and hardware implementation. The main design idea is to convert the multiplication operation in the finite field into cyclic shift operation, and introduce parameters to participate in the MDS operation in the way of direct XOR. Based on the MDS matrix in AES diffusion layer, two kinds of variable MDS diffusion layers are given by this method. The consistent structure based on cyclic shift and XOR operation is adopted, and each parameter corresponds to different MDS transformation, which can be used for the parametric design of diffusion layer of dynamic variable cryptographic algorithm.

Keywords— Traditional, *disaster*, cryptographic, *spatial-temporal change*, *climate change*, advent

Using the Ensemble Method and the BSAF Model to Determine Rumor Stance

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Abstract— With the development of social platforms, the public can easily access lots of online information and express personal opinions. However, various unconfirmed rumors are flooding on social networks and leading public opinion which caused serious social problems. In view of this, scholars pay more and more attention to the research of rumors, such as the rumor stance classification. The rumor stance classification task aims to determine the stance of the target tweet about specific social media posts. The stance is divided into four categories: support, deny, query and comment. SemEval-2019 Task7 provided a dataset of dubious posts and ensuing conversations in social network which annotated the stance and accuracy of posts and subsequent conversations. We proposed a ensemble method based on BSAF model for the rumor stance classification. Pre-processed the original data and extracted the word-level features and tweet-level features of the target tweet are the first step. The pre-training model uses the fine-tuned BERT model to enrich semantic information and the key words are labeled via the self-attention mechanism. Finally the stance of target tweet is predicted with tweet vector, word-level features and tweet-level features. A number of BSAF models are obtained by adjusting the training parameters. According to the results of the validation set, the excellent BSAF model is added to the ensemble to predict the stance of target tweet of test set. In experiments, the ensemble method based on BSAF model has achieved the state-of-the-art results in F1-macro score and accuracy.

Keywords— Traditional, *disaster*, cryptographic, *spatial-temporal change*, *climate change*, advent

BERT-based multi-interest sequence recommendation algorithm

Ranjit Kumar Patra*

*Department of Computer Science & Engineering, Raajdhani Engineering College, Bhubaneswar, Odisha

Abstract— In recommendation systems, utilizing the user interaction history as sequential information has resulted in great performance improvement. However, in many online services, user interactions are commonly grouped by sessions that presumably share preferences, which require a different approach from ordinary sequence representation techniques. To this end, sequence representation models with a hierarchical structure or various viewpoints have been developed but with a rather complex network structure. In this paper, we propose three methods to improve recommendation performance by exploiting session information while minimizing additional parameters in a BERT-based sequential recommendation model: using session tokens, adding session segment embeddings, and a time-aware self-attention. We demonstrate the feasibility of the proposed methods through experiments on widely used recommendation datasets.

Keywords—*Session-aware Recommendation, Sequential Recommendation, Temporal Self-Attention*

Pixel-level Diffusion and Bit Flip are used to encrypt images

Sagar Ranjan Swain*

*Department of Computer Science & Engineering, Raajdhani Engineering College, Bhubaneswar, Odisha

Abstract—With the rapid development of multimedia technology, digital images are increasingly used. These applications bring great convenience to users but increase the risk of information leakage. According to the granularity of operation, the existing image encryption methods can be divided into pixel-level and bit-level. The pixel-level method has high encryption efficiency, but does not break the linear relationship totally; the bit-level method has high security, but it needs to convert pixel value to 8 bits, which causes the low encryption efficiency. The current research on the hybrid encryption method performs pixel-level and bit-level operations in series. Although the methods can improve security to some extent, they still un solve the inefficiencies problem. In this regard, we proposed a pixel-level bit-level hybrid diffusion image encryption method based on the traditional permutation-diffusion structure. The randomness is significantly improved by calculating the diffusion order through a double chaotic matrix. Meanwhile, we embedded bit flip into the diffusion process to further enhance the security of encryption. The experimental results show that our method achieves better results in five security metrics (pixel histogram analysis, key sensitivity, plaintext sensitivity, pixel correlation, and information entropy) compared with existing image encryption methods. Also, the time required for encryption is reduced by 6% compared to mainstream efficient encryption algorithms.

Keywords—*Session-aware Recommendation, Sequential Recommendation, Temporal Self-Attention*

Using a Variable-Order Markov Prediction Model to protect location privacy

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Abstract—Unprecedented volumes of location-based information have been produced as a result of the widespread adoption of social network applications and GPS-enabled devices and sensors. Publication of such location data can provide valuable resources for researchers and government agencies in applications ranging from near real-time population-wide health monitoring to planning for future cities. However, such data hold personally identifying information, which gives rise to many privacy issues. There is thus a pressing need for ways to restrict this inherently identifying location-related information, however ideally we would like to preserve the utility of the data. Importantly, any such solution has to be scalable to large population-wide data scenarios. To tackle this, we introduce a novel differentially private hierarchical location sanitization (DPHLS) approach based on the concept “ (α, r) -dataset” implemented through a Variable Order Mobility Markov Model (VO3M). We show how this system allows individual locations in personal trajectories to be protected using selection and frequency perturbation mechanisms using the “ (α, r) -dataset”, leveraging past (published) location histories to obfuscate the user location in a flexible and controllable manner. The effectiveness and efficiency of the proposed solution is evaluated through the big data experiments that have been carried out using an OpenStack-based Cloud and Apache Spark-based platform utilising large-scale social media trajectories. The experimental results suggest that the privacy publication algorithm can successfully scale to big data scenarios whilst retaining the utility of the datasets (trajectories) and preserving individual user privacy.

Keywords— *Personalized and differentiated privacy, Markov chain, Route prediction*

Software service research Information entropy-based method for calculating risk uncertainty

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Abstract— Because of dynamic, complex and competitive environments, many information technology (IT) projects are plagued by significant cost overruns and unexpected schedule slips. Research suggests that a major reason for project failures is management's inability to address uncertainty during the development of a new management information system. Dealing with project uncertainty consists of three main segments: identifying sources of project development uncertainty, quantifying project uncertainty, and using such uncertainty measure for improving decision making process with respect to projects. While the first segment has been a major concern for researchers and practitioners, very little progress in the way of theoretical development has been achieved in the areas of uncertainty quantification and its use in project management. This paper explores various aspects of project uncertainties and offers three entropy-based uncertainty measures: aggregate uncertainty, weighted aggregate uncertainty, and deviation uncertainty. Aggregate uncertainty incorporates a list of unknown risk factors into a single entropy-based measure. Weighted aggregate uncertainty considers the relative importance of unknown uncertainty factors. Deviation uncertainty is a relative uncertainty measure which indicates the degree of deviation of a given project from an ideal project in which all factors are certain. An actual project is used to demonstrate our measures. The paper also discusses managerial implications of such measure.

Keywords— Risk Measurement, Software Development Project, Information Entropy, Risk Checklis

Supervision from afar Reinforcement-based relationship extraction using the Potential Energy Function to Teach

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Abstract— Due to the limitation of mobile robots' understanding of the environment in local path planning tasks, the problems of local deadlock and path redundancy during planning exist in unknown and complex environments. In this paper, a novel algorithm based on the combination of a long short-term memory (LSTM) neural network, fuzzy logic control, and reinforcement learning is proposed, and uses the advantages of each algorithm to overcome the other's shortcomings. First, a neural network model including LSTM units is designed for local path planning. Second, a low-dimensional input fuzzy logic control (FL) algorithm is used to collect training data, and a network model (LSTM_FT) is pretrained by transferring the learned method to learn the basic ability. Then, reinforcement learning is combined to learn new rules from the environments autonomously to better suit different scenarios. Finally, the fusion algorithm LSTM_FTR is simulated in static and dynamic environments, and compared to FL and LSTM_FT algorithms, respectively. Numerical simulations show that, compared to FL, LSTM_FTR can significantly improve decision-making efficiency, improve the success rate of path planning, and optimize the path length. Compared to the LSTM_FT, LSTM_FTR can improve the success rate and learn new rules.

Keywords— *Personalized and differentiated privacy, Markov chain, Route prediction*

FSM Conformance Testing Test Sequence Generation Based on Chain Unique Input-Output Sequence

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Abstract— This paper introduces a test method based on chain unique input/output (CUIO) sequence in finite state machine (FSM) conformance testing. For FSMs with UIO for each state, the test sequence based on CUIO can identify all the states and verify all the transitions. For FSMs without UIO for some states, the test sequence based on CUIO can identify as many states and verify as many transitions as possible. Meanwhile, W method is introduced to deal with the unidentified states and the unverified transitions. For FSMs without UIO for each state, the method completely degenerates to W method. It is proved by experiment that the average and maximum reduction rate are 45.5% and 63.2% comparing with UIO method. Moreover, the method is always feasible even when UIO method fails.

Keywords—Machine learning, Deep learning, Reinforced concrete bridges, Strength prediction, Structural health monitoring.

A Review of Electrooculogram-Based Fatigue Driving Detection

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Abstract— In this paper a system for detecting the possibility of eye dystonia, a neural disorder that causes a person to blink excessively, by eye movement analysis is proposed. The designed system counts the number of blinks for a particular time interval and thus detecting the risk of eye dystonia. Electrooculogram (EOG) signal is recorded to collect eye movement data using a laboratory developed acquisition system. Radial Basis Function(RBF) kernel Support Vector Machine (SVM) classifier and Feed forward neural network classifier is used to classify blinks from other types of eye movements using combinations of Wavelet coefficients, Autoregressive (AR) parameters and Hjorth parameters with Power Spectral Density (PSD) as signal features. A maximum average accuracy of 95.33% over all classes and participants is obtained using RBF-SVM classifier with a feature space of AR parameters of order 5 and PSD taken together.

Keywords—*Electrooculogram (EOG), Band Power (BP), Human Computer Interface (HCI), Amyotrophic lateral sclerosis (ALS), Pattern Recognition Neural Network (PRNN)*

Evaluate machine learning methods for intrusion detection systems

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Abstract—Networks play important roles in modern life, and cyber security has become a vital research area. An intrusion detection system (IDS) which is an important cyber security technique, monitors the state of software and hardware running in the network. Despite decades of development, existing IDSs still face challenges in improving the detection accuracy, reducing the false alarm rate and detecting unknown attacks. To solve the above problems, many researchers have focused on developing IDSs that capitalize on machine learning methods. Machine learning methods can automatically discover the essential differences between normal data and abnormal data with high accuracy. In addition, machine learning methods have strong generalizability, so they are also able to detect unknown attacks. Deep learning is a branch of machine learning, whose performance is remarkable and has become a research hotspot. This survey proposes a taxonomy of IDS that takes data objects as the main dimension to classify and summarize machine learning-based and deep learning-based IDS literature. We believe that this type of taxonomy framework is fit for cyber security researchers. The survey first clarifies the concept and taxonomy of IDSs. Then, the machine learning algorithms frequently used in IDSs, metrics, and benchmark datasets are introduced. Next, combined with the representative literature, we take the proposed taxonomic system as a baseline and explain how to solve key IDS issues with machine learning and deep learning techniques. Finally, challenges and future developments are discussed by reviewing recent representative studies.

Keywords—*machine learning; deep learning; intrusion detection system; cyber security*

Filter Preprocessing Improves Graph Neural Networks

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Abstract—For graph-based semi-supervised learning, Graph Convolutional Networks (GCNs) and their variants has shown outstanding results and gained wide attention. Several works on analyzing GCNs from the perspective of spectral graph theory shows that GCNs has the function of low-pass filtering on certain learning tasks, which enables us to have a deeper understanding of GCN. However, GCN achieves the filtering effect through layers of matrix multiplication, so one cannot flexibly control the filtering process. In this paper, we propose to preprocess the graph-structured data by using low-pass filters explicitly before network training and prediction. We conduct experiments on the citation network datasets. Our preliminary results show that, the filter preprocessing step can effectively improve the predicative accuracy of common neural networks or graph neural networks in graph-based semi-supervised learning.

Keywords—*Recommendation system, Session-based recommendation, Graph neural network, Noise filter*

In an educational institution, an examination of machine learning techniques for predicting student success

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Abstract—The student success is one of the essential components to assess the quality of the educational institutions. Monitoring student performance is of no use unless or otherwise it is done from the early stage. This research work will definitely consider two factors in mind about student success, firstly, Academic success. Secondly, Placement success. The goal of the proposed system is to predict the student's success using machine learning techniques and give feedback to the educational institutions. In this work , discussion of factors which affect the prediction, finding out the data sources and discussion about the various techniques used in prediction have been done.

Keywords— *meteorological, disaster,comprehensive loss, spatial-temporal change, climate change*

Creating Software Developer Suitability Criteria: Psychometric Tests for Behavioral analysis

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Abstract— This article examines the definition, importance, conceptual basis, and functional nature of content validity, with an emphasis on psychological assessment in clinical situations. The conditional and dynamic nature of content validity is discussed, and multiple elements of content validity along with quantitative and qualitative methods of content validation are reviewed. Finally, several recommendations for reporting and interpreting content validation evidence are offered. (APA PsycInfo Database Record (c) 2019 APA, all rights reserved).

Keywords-Carbon Emissions; Control; Government Management Functions

Undercarriage System Safety Modeling and Analysis Based on FHA and PHA Cross-Verification

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Abstract - FHA and PHA are two common methods applied in analysis of system safety. However, the two methods have some problems such as to omit hazard analysis or control solution. Meanwhile it is not practical and not effective to deal with enormous work manually in safety analysis. This paper proposed a cross-verification method, developed a tool and applied it to undercarriage which is a typical safety-critical system. The result showed it can make up the omitted work by cross-verification in views of function and hazard instead of independent analysis method. This method can improve the process of safety analysis and enhance the safety of undercarriage system. At the same time, the visual tool can increase the efficiency and usability of system safety analysis.

Keywords- FHA, PHA, Cross-Verification, Undercarriage System.

Video DES Encryption Engine FPGA Implementation

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Abstract- In DVB and VOD system, the DES and Triple DES(3DES) algorithm are still be widely used for MPEG-2 packets encryption during the video traffic transmission. This paper specifies one DES and 3DES mixture encryption engine. This engine supports video DES and 3DES encryption at the same time and it also supports both CBC and ECB mode simultaneously. In this engine, the encryption algorithms and modes can be switched seamless for different MPEG-2 packets. This engine is implemented in FPGA based on pipeline structure and can support higher performance with less FPGA resource.

Keywords- FPGA, VOD, MPEG-2, DES, 3DES, Pipeline, Encryption.

Without a one-time signature, public-key encryption is derived from ID-based encryption.

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Abstract— We propose a simple and efficient construction of a CCA-secure public-key encryption scheme from any CPA-secure identity-based encryption (IBE) scheme. Our construction requires the underlying IBE scheme to satisfy only a relatively “weak” notion of security which is known to be achievable without random oracles; thus, our results provide a new approach for constructing CCA-secure encryption schemes in the standard model. Our approach is quite different from existing ones; in particular, it avoids non-interactive proofs of “well-formedness” which were shown to underlie most previous constructions. Furthermore, applying our conversion to some recently-proposed IBE schemes results in CCA-secure schemes whose efficiency makes them quite practical. Our technique extends to give a simple and reasonably efficient method for securing any binary tree encryption (BTE) scheme against adaptive chosen-ciphertext attacks. This, in turn, yields more efficient CCA-secure hierarchical identity-based and forward-secure encryption schemes in the standard model.

Keywords— Chosen-ciphertext security, Forward-secure encryption, Identity based encryption, Public-key encryption

Fuzzy Comprehensive Online Course Evaluation Using Learner Profile and User Experience

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Abstract— Online learning raises more concerns after it helped many students go through a tough academic year under the shadow of pandemic. But the effects of online courses are not so optimistic. To measure quality of online courses, we propose a comprehensive evaluation framework based on learner profile and user experience, where learner profile is extracted from the online data analysis, and user experience is quantified from data collected in questionnaires. We extract 5 important indices for course evaluation, and quantification model is defined on each individual index; then a fuzzy comprehensive evaluation model is defined to integrate all indices to generate a straightforward evaluation result. Our evaluation models are tested with data from a massive used education platform, it shows that our model is practical and reasonable in online course evaluation.

Keywords— Questionnaires, straightforward, computer-aided drawing, finite element analysis (FEA)

For web-based learning diagnosis, mining learner profiles using association rules

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Abstract- With the rapid growth of computer and Internet technologies, e-learning has become a major trend in the computer assisted teaching and learning fields. Most past researches for web-based learning focused on the issues of adaptive presentation, adaptive navigation support, curriculum sequencing, and intelligent analysis of student's solutions. These systems commonly neglect to consider whether learner can understand the learning courseware and generate misconception or not. To neglect learner's learning misconception will lead to obviously reducing learning performance, thus generating learning difficult. In order to discover common learning misconceptions of learners, this study employs the association rule to mine the learner profile for diagnosing learners' common learning misconceptions during learning processes. In this paper, the association rules that occurring misconception A implies occurring misconception B can be discovered utilizing the proposed association rule learning diagnosis approach. Meanwhile, this study applies the discovered association rules of the common learning misconceptions to tune courseware structure through modifying the difficulty parameters of courseware in the courseware database so that learning pathway is appropriately tuned. Besides, this paper also presents a remedy learning approach based on the discovered common learning misconceptions to promote learning performance. Experiment results indicate that applying the proposed learning diagnosis approach can correctly discover learners' common learning misconceptions according to learner profile and help learners to learn more effectively .

Keywords—Web-based learning; Learning misconception diagnosis; Association rule mining; Learner profile.

Learning Misconception Diagnosis Using Learner Profiles and the Association Rule

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Abstract—Artificial intelligence (AI) for personalized learning has attracted increasing attention in various educational contexts and domains, including language learning. This study systematically reviewed academic studies on AI-assisted personalized language learning (PLL) from the perspectives of article trends, top journals, countries/regions and institutions, AI technology types, learning outcomes and supports, participants, scientific collaborations, and co-citation relations. Results indicated Taiwanese institutions' predominance in the field and the prevalent use of intelligent tutoring systems, natural language processing, and artificial neural network in facilitating personalized diagnosis and learning path and material recommendations in language learning. Furthermore, students' improved language outcomes and positive perception, satisfaction, or motivation towards language learning and AI technologies were commonly reported. The co-authorship analysis results indicated the close inter-regional collaborations, while the cross-regional collaborations are expected to be enhanced. The co-citation network analysis results highlighted the significance of fuzzy systems and item response theory. Additionally, learner profiling mining and learning resource adaptation were important directions to realize mobile- and web-based PLL.

Keywords- artificial intelligence, personalized language learning, systematic review, co-citation network analysis

Using monopulse synthetic aperture radar imaging, moving targets in foliage can be seen

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Abstract—This paper presents a method for detecting moving targets embedded in foliage from the monostatic and bistatic Synthetic Aperture Radar (SAR) data obtained via two airborne radars. The two radars, which are mounted on the same aircraft, have different coordinates in the along track (cross-range) domain. However, unlike the interferometric SAR systems used for topographic mapping, the two radars possess a common range and altitude (i.e., slant range). The resultant monopulse SAR images are used to construct difference and interferometric images for moving target detection. It is shown that the signatures of the stationary targets are weakened in these images. Methods for estimating a moving target's motion parameters are discussed. Results for an ultrawideband UHF SAR system are presented.

Keywords- Foliage-penetrating SAR, monopulse SAR, moving target detection, Synthetic Aperture Radar (SAR).

Interferometric inverse synthetic aperture radar imaging for automated aeroplane landing

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Abstract—Interferometric inverse synthetic aperture radar (InISAR) imaging provides complementary information to monostatic inverse synthetic aperture radar (ISAR) imaging. This paper proposes a new InISAR imaging system for space targets based on wideband direct sampling using two antennas. The system is easy to realize in engineering since the motion trajectory of space targets can be known in advance, which is simpler than that of three receivers. In the preprocessing step, high speed movement compensation is carried out by designing an adaptive matched filter containing speed that is obtained from the narrow band information. Then, the coherent processing and keystone transform for ISAR imaging are adopted to reserve the phase history of each antenna. Through appropriate collocation of the system, image registration and phase unwrapping can be avoided. Considering the situation not to be satisfied, the influence of baseline variance is analyzed and compensation method is adopted. The corresponding size can be achieved by interferometric processing of the two complex ISAR images. Experimental results prove the validity of the analysis and the three-dimensional imaging algorithm.

Keywords- Interferometric inverse synthetic aperture radar; high speed movement compensation; coherence; image registration; wideband direct sampling; baseline incline.

IoT for Autonomous Driving: Pedestrian Detection and Intention Prediction

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ABSTRACT- This paper explores the potential of machine learning (ML) system which used at a from in-vehicle sensors as well as external IoT data sources to enhance autonomous driving for efficiency and safety in urban environments. We propose a system which combines sensor data from autonomous vehicles and IoT data collected from pedestrians' mobile devices. Our approach includes two methods for vulnerable road user (VRU) detection and pedestrian move men intention prediction, and a model to combine the two outputs for potentially improving the autonomous decision-making. The first method creates a world model (WM) and accurately localizes VRUs using in-vehicle camera as and external mobile device data. These cond method is a deep learning model to predict pedestrian's next movement steps using real-time trajectory and training with historical mobile device data. To test the system, we conduct three pilot tests at a university campus with a custom-built autonomous car and mobile devices carried by pedestrians. The results from our controlled experiments show that VRU detection can more accurately distinguish locations of pedestrians using IoT data. Furthermore, upto five future steps of pedestrian scan be predicted within 2m.

Keywords- Autonomous, vehicles, vulnerable, user detection, deep neural networks, internet of things.

Real-time Object Detection with Edge Assistance for Mobile Augmented Reality

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ABSTRACT - Most existing Augmented Reality (AR) and Mixed Reality (MR) systems are able to understand the 3D geometry of the surroundings but lack the ability to detect and classify complex objects in the real world. Such capabilities can be enabled with deep Convolution Neural Networks(CNN), but it remains difficult to execute large networks on mobile devices. Offloading object detection to the edge or cloud is also very challenging due to the stringent requirements on high detection accuracy and low end-to-end latency. The long latency of existing offloading techniques can significantly reduce the detection accuracy due to changes in the user's view. To address the problem, we design a system that enables high accuracy object detection for commodity AR/MR system running at 60fps. The system employs low latency offloading techniques, decouples the rendering pipeline from the offloading pipeline, and use safest object tracking method to maintain detection accuracy. The result shows that the system can improve the detection accuracy by 20.2%-34.8% for the object detection and human key point detection tasks, and only requires 2.24ms latency for object tracking on the AR device. Thus, the system leaves more time and computational virtual elements for the next frame and enables higher quality AR/MR experiences.

Keywords—Meteorological, disaster, Convolution Neural Networks, spatial-temporal change, pipeline.

Digital Design of Enterprise Visual Identity System for climate change

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Abstract

With the development of information technology, digital graphics are widely into our life. Whether learning, convey or commercial use, digital graphics monopoly on almost all the multimedia media in the modern art design. Sound art, visual arts and interactive art that developed along with the development of modern art design and based on it has also gradually grown up. It is in such a background, digital enterprise image design system quietly born. Because of its particularity, artistic visual communication design and new perspective of technical creativity, we informally defined them as digital image visual identification system.

Keywords

Visual recognition systems; Image recognition; Digital design; Culture and creativity industries

System for Remote Control and Monitoring Using Optical Fiber and GSM Communication for Flood Management

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Abstract

The exposure and subsequent undermining of pier/abutment foundations through the scouring action of a flood can result in the structural failure of a bridge. Bridge scour is one of the leading causes of bridge failure. Bridges subject to periods of flood/high flow require monitoring during those times in order to protect the traveling public. In this study, an innovative scour monitoring system using button-like fiber Bragg grating (FBG) sensors was developed and applied successfully in the field during the Aere typhoon period in 2004. The in situ FBG scour monitoring system has been demonstrated to be robust and reliable for real-time scour-depth measurements, and to be valid for indicating depositional depth at the Dadu Bridge. The field results show that this system can function well and survive a typhoon flood.

Keywords: Scour monitoring sensor; Optical FBG; FRP equi-strength beam; Bridges; Dams; Offshore platforms

Detection System Using IR Sensors and Internet of Things for Climate Change

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Abstract

In recent years, people are getting more conscious of the environment they are living in. This consciousness is driving the need to develop a reliable environmental monitoring system. An environmental air quality monitoring system also has industrial application. In mining or in heavy industry, there is a possibility of air contamination by different harmful gases. In such hazardous situations, an environmental monitoring system can potentially save the life of the workers. In such large-scale sensor deployment, there are data collection, data management, connection, and power consumption issues. IoT technology is specifically suited for this sort of need. This paper presents an IoT based framework that effectively monitors the change in an environment using sensors, microcontroller, and IoT based technology. Users can monitor temperature, humidity, detect the presence of harmful gases both in the indoor and outdoor environment using the proposed module. The data is stored in the web server and the user can access the data anywhere in the world through an internet connection. In the proposed work a web application is developed to provide vital information to the user. The user can also set up a notification for critical changes in the sensor data. In comparison to other closely related systems, the proposed system is a low-cost one, accurate and user friendly. It is also cloud-based and has easy monitoring and data visualization modules. The system has been evaluated in different stages. After testing all the functions in different conditions, it shows a high degree of accuracy and reliability.

Keywords: IOT, environment, big data, machine learning.

Driver's Professional Skills Evaluation with Modified GPS Vehicle Tracking System

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Abstract

This article implies a method of driver's professional skills evaluation using advanced GPS vehicle tracking system. Standard tracking system is supplemented with V-2-V communication system, FMCW radar and dead reckoning (DR) sensors. Algorithms of distance and approach speed determination till calculation to the car moving in front of you are shown.

Keywords: vehicle tracking system, drivers professional skills, safe distance between cars, Global Positioning System, V-2-V communication

Flood management system based on the power line communication

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Abstract

There are many researches and development involving the use of power line as data transmission medium. With multiple power outlets in almost every room in every house, the power line is the most pervasive network and the largest infrastructure available. The aim of this project is to deploy this infrastructure in designing a home automation system. This paper presents a method to develop a home automation system using the AC (alternating current) power line to establish a network between main controlling unit and client units with a proprietary designed power line communication (PLC) protocol. The designed protocol has features such as multinode simplex communication, flood transmission and even parity error detection. The protocol is successfully implemented and tested in a home automation system consisting of one main controlling unit and three client units. Each client unit is able to control three electrical devices. Multipoint of receiver units can be controlled (On / Off) by the main controller unit sending command data using power line as transmission medium to the corresponding devices.

Keywords: Power line communication, multinode communication, flood transmission, parity checking.

Type-2 Fuzzy Logic Control of TCSC to Improve Flooding Technology

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Abstract

Clean and pollutant free energy can be produced from proton exchange membrane fuel cell which is a static power conversion device and can be installed at the point of use eliminating the transmission and distribution losses. The ability to maintain constant voltage by the PEM fuel cell can be achieved by using a Fuzzy Logic controller. The designing of controller is made easy after observing the response of the fuel cell for changes in temperature and pressure of input reactant gas by dynamically modeling the fuel cell. The dynamic model is implemented in MATLAB and simulation results of Fuzzy controlled system confirm improved voltage regulation of the proposed system.

Keywords: Fuzzy, MATLAB, PEM fuel cell flood transmission, parity checking.

On-Chip Antennas using Standard CMOS Technology to control climate change

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Abstract

In this paper, we design a THz CMOS on-chip patch antenna with defected ground structure (DGS) and utilize it to implement a broadband and high gain on-chip antenna array. It is verified from the simulation that the DGS not only can increase the gain and bandwidth of the antenna element, but also can increase the isolation between the antenna elements in the on-chip array. Therefore, it allows the design of the compact 1×2 and 2×2 on-chip antenna array with high gain and broad bandwidth. The element spacing and feedline structures of the antenna array are designed and optimized by the simulations. The designed antenna element, and 1×2 and 2×2 antenna arrays are fabricated in a commercial 65 nm CMOS process. In the on-wafer measurement, they exhibit an antenna gain of 3.1 dBi, 7.2 dBi, and 8.2 dBi with a bandwidth of 14.0%, 21.3%, and 28.0% for the reflection coefficient less than -10 dB, respectively, at 300 GHz. This result corresponds to very good performance compared to the reported THz CMOS on-chip antenna array. Therefore, the designed CMOS on-chip antenna element and array using DGS in this work can be effectively applied to build low-cost and high performance THz systems, because they can be fully implemented in a conventional CMOS process without requiring any additional processes or manufacturing techniques.

Keywords: antenna array; CMOS; defected ground structure; patch antenna; terahertz

Assessment of Climate Change Impact on the Meghna River Basin using geomorphology based hydrological model

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Abstract: Over the last four decades, hydrological models, which are used to examine the behaviour of river networks, have made substantial development. The Geomorphology Based Hydrological Model (GBHM) is one of the distributed hydrological models used in this study. Hillslope elements are the model's most basic computational components. There are several flow intervals in the catchment. The area and width functions are used to represent each interval. GBHM is now capable of thorough hydrological modelling of vast river basins thanks to this topographical representation technique. The Surma-Meghna basin, which is the longest (669 km, inside Bangladesh) of Bangladesh's four major river systems and encompasses a wide area, is studied in this thesis using GBHM. The system also drains one of the wettest locations on the planet (Cherapunji, Meghalaya, India). As a result, studying the Meghna river basin helps researchers to gain a better knowledge of the hydrological processes that influence a large part of the country. For the model's benchmark, observed rainfall data is utilised in simulation. The observed discharge and the simulated discharge are compared. After the model has been verified, it is utilised to forecast future river network discharge. Due to the assumption made in GBHM, the simulated discharge hydrograph utilising TRMM recorded rainfall data exhibits oscillations around the observed discharge levels. The overshootings are due to the TRMM rainfall being overestimated. As a result, a combination strategy is utilised to reduce the impact of TRMM data restrictions. Wherever possible, observed rain gauge data is used, while TRMM data is used for the rest of the area. Then, overshootings are considerably decreased, and the World Meteorological Organization's recommended ratio of absolute error to the mean drops to 0.38, which is within the acceptable error ratio limit for large basins. Finally, discharge calculation is based on PRECIS forecasted rainfall data. For the years 2001, 2031, 2061, and 2091, the average daily simulated discharge is 6370, 4050, 4650, and 7870 cumec, respectively. Because of the changing precipitation pattern caused by climate change, the expected discharge values in 2031 and 2061 are lower than those in 2001, but higher than the other years in 2091. The discharge has been steadily increasing, according to the trend study. Climate change, according to PRECIS, will result in more severe precipitation in the future, impacting basin runoff and river flow. In the next years, increased flow may result in a larger frequency of flood occurrences, and huge changes in discharge may result in water stress.

IOT Based fault detection of electrical substations during bad weather conditions

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Abstract:Current temperatures in European district heating networks are still excessively high in comparison to future circumstances, as consumer heat needs decline and alternative heat source options become available. Eliminating current faults in substations and customer heating systems can result in significant temperature reductions. Because neither substations nor consumer heating systems are centralised today, these defects are not properly addressed. This paper presents the systematic model of a distribution management system comprised of substations, distribution lines, and smart meters with the integration of Internet-ofThings (IoT).The transmission line fault is quite harmful for the surrounding area. In comparison to the outside transmission line, the occurrence of faults is higher in the neighbourhood. In our prototype, we created a model that detects transmission line faults by comparing the voltage signal between the transmission line and a specified reference value; if the transmission line voltage is more than or less than the reference value, the fault is displayed. The information about the occurrence of a failure in a certain phase is sent to a web page through an IOT device called a NODE MCU(Esp8266) and shown on the screen. The voltage sensor senses the voltage and sends the result to the microcontroller IC.This IC programming is done on a microcontroller IC ATMEGA 328P, which compares the voltage signal and sends output to the IOT module and display. Climate refers to the state of the environment, such as whether it is hot or cold, wet or dry, calm or stormy, clear or cloudy. Physically checking the weather conditions is inconvenient. The weather station in this article is entirely IoT-based (internet of things). A sensor like the DHT11 measures temperature and humidity in such a framework. The sensor is connected to an e-bulletin board as well as an ESP8266 board, which is a low-cost Wi-Fi module.We can learn about the college campus weather by maintaining embedded devices in the surroundings for tracking. The execution of the climate monitoring system necessitates the deployment of sensor devices in the surrounding area for data collection and analysis.

Indicator-based assessment of climate-change impacts on coasts: A review of concepts, methodological approaches and vulnerability indices

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Abstract:Increasing human pressures on coasts, as well as the hazards posed by sea-level rise, has prompted the creation of a variety of concepts and methods for assessing coastal vulnerability. This paper's initial section outlines the ideas of vulnerability, natural hazards, and climate change. The most extensively used analytical techniques to vulnerability assessment are discussed, including regional scales, the necessity for hybrid approaches that incorporate both biophysical and social dimensions of vulnerability, and the progressive integration of resilience features into such procedures. Based on a study of more than 50 research that employed vulnerability indices across a spectrum of dangers, the creation and implementation of vulnerability indices is studied in depth. The methods of analysis, proposed typologies, and the most widely used variables are all covered. This review exemplifies the diversity of vulnerability research. This necessarily leads to a lack of standardisation of ideas and assumptions, resulting in restricted comparability of outputs for different areas' coastlines. The broad requirement for vulnerability assessments as part of integrated coast management decision-making motivates the pursuit of indicator-based vulnerability assessments. In some circumstances, measures will be generated around specific system components and the site-specific functions for which they are valued, while in others, metrics will be developed around specific system components and the site-specific functions for which they are valued.

IOT based water level monitoring system

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Abstract: Due to exploitation of water resources and speeding of climate change due to human activities, water becoming a luxury these days and keeping tab on water consumption is a necessity now. We know that water conservation starts from a family and a person in a family can easily track their water consumption either by observing day to day activities or checking water level of their overhead tank every day. But for a municipal government who is concerned about the areas they governing cannot track each and every family's water consumption by physically sending a person every day. Instead they can check level of municipal supply tanks where the level of water is direct reflection of water consumed by the people in the area. Again we have to deploy several people to take readings of tens of municipal overhead tanks several times a day. It is a human nature to get inert sometimes or many times and one could manipulate the readings and could push the idea of water consumption of an area in wrong direction and this could also delay the water supply because the actual water level could vary significantly from the manipulated readings which could lead to unexpected shutdown of water supply. By installing IoT based water level monitoring systems in all the important municipal water tanks the local government can know the level of water in real time and they can fill the tank on time and also can understand the consumption of water in the area. The collected data can be sent to higher level governments where they can draw national level conclusions on water consumption. IoT based water level monitoring system can also be installed on individual houses / apartments so that one can check water level of their tank in real time from their own comfort and also track their consumption overtime.

Packet flooding mitigation in CCN-based wireless multimedia sensor networks for smart cities

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Abstract: The content centric network (CCN) is a simple and reliable communication model. Data authenticity, in-networking caching, mobility, flow balance mechanisms, and multi-cast data distribution are all built-in capabilities. Due to the broadcast nature of CCN-based wireless multimedia sensor networks, data packet flooding is a popular research topic (WMSNs). To address this issue, we suggest an unique protocol called packet diffusion-limited protocol for CCN-based WMSNs for smart cities in this study. The suggested protocol is thoroughly evaluated using the ndnSIM simulator, which is based on the NS-3 simulator. The suggested technique not only prevents data packet flooding but also speeds up content download time by selecting the shortest channel, according to simulation findings.

Water level monitoring system: Prediction and Monitoring

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Abstract: In the present study, Landsat-8 data have been used for water identification at the Sangam region, the confluence of the Ganges and Yamuna rivers. Since the water of both the rivers varies in characteristics, it is necessary to explore the most appropriate band of Landsat-8 imagery for the identification of water bodies. Accordingly, a two folded study has been performed, viz., the selection of a suitable band to identify water bodies and to monitor the water level at the Sangam region from 2013 to 2018. It is observed in the study that band-7 is the most suitable band for water identification, which is used for the classification and monitoring of water. The classification results are highly significant as the overall accuracy ranges between 95.49 and 100%. The monitoring of water level is done based on classification results for mapping the area of water in real units which can be useful for the prediction of flood situations. The achievement of the present study is the mapping of water area in real units with the help of image pixels which is one of the prominent applications of image processing in earth sciences. IoT-based water level monitoring provides automatic detection of liquid levels from differently sized tanks or storage containers. It is a state-of-the-art system specially designed to inform the users about the real status of the liquid levels. It is meticulously designed to benefit the industrialists with IoT technology and improve the overall business productivity. IoT-based water level monitoring provides real-time autonomous detection of water levels and takes appropriate action based on the levels including overflowing, water depletion, and water usage. Deploying an autonomous system to keep a real-time check upon the water levels provides an effective solution to water-related challenges. IoT technology provides the ability to monitor the river water or stream levels with the help of sensors. These devices are installed on the appropriate surface, where they detect the water levels and collect data for further analysis. These devices use gateway connectivity to transmit useful information on the interconnected device of the user, allowing him to make informed decisions. The Intellia IoT-based water monitoring system is intelligent enough to provide shareable insights through better visualization and more detail, which assists the managers in taking necessary actions whenever required.

Performance of Dual axis tracking System.

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Abstract: With the use of the TracePro software and an optical model, a parabolic trough solar collector with a concentration ratio of 24 was designed at Nanjing Agricultural University, China. Single-axis and dual-axis tracking modes have different effects, The effects of tracking errors in azimuth and raising angles on optical performance were studied. The solar collector's thermal performance was tested in a laboratory setting. Conclusions demonstrated that the dual-axis tracking's optical efficiency was 0.813 percent, with a year average of 0.813 percent. The value of the east-west and north-south tracking modes was 14.3% and 40.9 percent greater, respectively. Likewise, tracking mode. Furthermore, based on the findings of the experiment, it was determined that elevation angle tracking errors had a substantial impact on optical efficiency, which should be kept below 0.6°. Even though the tracking precision of one axis was compromised, dual-tracking mode was able to achieve high optical efficiency. The collector's instantaneous thermal efficiency was 0.775 percent in real time. Furthermore, the normalised efficiency's linearity was good. The computed thermal efficiency curve was quite similar to the normalised instantaneous efficiency curve produced from the experimental data, with a maximum deviation of 10.3%. In middle-scale thermal collecting systems, this sort of solar collector should be used.

PSO based fault detection system of grid with IoT sensors and cloud data

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Abstract: A study is presented on the application of particle swarm optimization (PSO) combined with other computational intelligence (CI) techniques for bearing fault detection in machines. The time domain vibration signals of a rotating machine with normal and defective bearings are processed for feature extraction. The extracted features from original and preprocessed signals are used as inputs to the classifiers for detection of machine condition. The classifier parameters, are selected along with input features using PSO algorithms. The classifiers are trained with a subset of the experimental data for known machine conditions and are tested using the remaining set of data. The procedure is illustrated using the experimental vibration data of a rotating machine. The roles of the number of features, PSO parameters and CI classifiers on the detection success are investigated. Results are compared with other techniques such as genetic algorithm (GA) and principal component analysis (PCA). The PSO based approach gave a test classification success rate of 98.6–100% which were comparable with GA and much better than with PCA. The results show the effectiveness of the selected features and the classifiers in the detection of the machine condition.

Development of solar based water fountain

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Abstract: A creative replicable hands-on activity is described which introduces the engineering design process and exposes undergraduate students to issues of energy sustainability. The activity can be used in a standard undergraduate science with lab requirement course as offered by physics or engineering faculty or can be incorporated into an undergraduate engineering curriculum. A fountain metaphor symbolizes the human need for water and energy and is used to sensitize the students to the global inequities in water and energy resources. By focusing on a technological issue that impacts both the global community and everyday life, relevance is used as the motivator to recognize energy technology as an accessible and tangible subject. The solar fountain combines a small DC water pump with readily available solar panels. Three unique fixtures were designed specifically to accommodate a wide range of shop skills. These fixtures help to maximize success and minimize frustration in populations with little to no background in tool handling. A successful laboratory experience helps to de-mystify the engineering process. The fountain design is left to the student who is encouraged to mix artistic sensitivity into an engineering process. The resultant fountain builds self-confidence and the activity is highly rated by students. The module was assessed on two levels: attitudinal and learning criteria with a group of female campers at the Science, Technology, and Engineering Preview Summer (STEPS) program 2005.

Prototype of Google maps-based water level monitoring system using Arduino and GSM module

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Abstract: The headway of flood early warning technology has grown rapidly. The technology has led to improvements in terms of communication and information. Internet of Things Technology (IoTs) has greatly influenced the development of early warning information systems. In this article, a prototype of flood monitoring system based on Google Maps has been designed by integrating ultrasonic sensors as a height detector, Arduino Uno as a processor, U-Blox Neo 6m GPS module and GSM module as the sender of water level and the coordinates to the flooded information system station. The design of the prototype produces flood altitude information along with its location based on Google Maps interface.

Infrastructure, Engineering And Climate Change Adaptation – Ensuring Services In An Uncertain Future
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ABSTARCT- Climate change is a reality. While efforts must continue towards mitigating its effects, there is a crucial need to adapt to the changing climatic conditions that are anticipated this Century. Extreme weather and long term climate change threaten critical national infrastructure and the UK economy, since a robust infrastructure is essential to economic functioning and growth. Engineers will have a central role in adapting the UK's infrastructure for resilience to climate change. A holistic approach to the development and protection of infrastructure is essential, with an awareness of where failure in one sector can lead to a cascade of failures elsewhere. Engineers must use systems thinking to manage infrastructure in the light of new climate threats and to deal with systemic risks. An integrated approach to planning and managing infrastructure development is key. Government should take a systems approach to the processes of planning and regulation. Adapting to climate change is not just a matter of managing the risks - it is about taking the opportunities it presents to develop new, innovative infrastructure systems and services. Adaptation to, and mitigation of, climate change provides opportunities in the new Green Economy. New opportunities in engineering design and manufacturing will come from the development of renewable energy technologies and the supply chains that will serve them. Building of resilience into existing infrastructure and designing new systems that are robust and efficient will do the same. If managed correctly, investment in infrastructure adaptation will create quality jobs, increasing the demand for skilled technicians to install, upgrade and maintain the new resilient infrastructure.

KEYWORDS : *climate change; urban risk & planning; structural safety; critical infrastructure*

Systematic Use Of CMIP3 And CMIP5 Climate Models To Simulate Change Discharge In The Chao Phraya River Basin

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Abstract -Reliable estimates of precipitation are essential for both research and practical applications. CMIP3 and CMIP5 climate simulations provide both historical simulations and future projections of extreme climate. The 2011 monsoon season was one of case studies with exceptionally heavy and led to extensive and long-lasting flooding in the Chao Phraya river basin, Thailand. Flooding was exacerbated by the rapid expansion of urban areas into flood plains and was the costliest natural disaster in the country's history, with direct damages estimated at US\$45 billion. The present paper focuses on the precipitation downscaling of CMIP3 and CMIP5 models. The majority of CMIP3 and CMIP5 models overestimate the dry spell (in June and July) and underestimate the peak precipitation (in May and September). The interquartile model range for precipitation, which is spanned by the 25th and 75th quantiles, is closer to the observed data for CMIP5 than CMIP3 models. However, overall results suggest that the performance of CMIP5 models cannot be readily distinguished from of CMIP3 models, although there are clear signals of improvements over Bangkok. The correlation coefficient is found between 0.6 - 0.8, implying that most of the models simulate the mean rainfall reasonably well. Both model generations have approximately the same standard deviation as observed, but more spatial variability and more RMS error are found for the future projections. Use of the Multi Model mean shows continuously increased rainfall from the near future to the far future while the Multi Model Median shows increased rainfall only for the far future. These findings in changing precipitation are discussed through the flood behavior in 2011. Results from flood simulation with several adaptation measures reveal that flood cannot be completely avoided. One of the best practices for highflood risk communities is to raise the house with open space in the first floor.

Keywords :*Precipitation Downscaling; CMIP3; CMIP5; The 2011 Great Flood*

Study On Different Research Techniques And Design Criteria For Mass Rating And Slope Stability Analysis For Landslides

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.Abstract- Slope stability in Civil Engineering projects is a most important problem. Since 1920's techniques are persistent to stabilize a given slope. The analyses are habitually developed to assess safety of an excavated slope. In the 1950's, many researchers developed different methods like Bishop, Janbu and so on. Tremendous changes took place in the 1960's. Rock Mass Rating and Slope Stability analysis has provided a tremendous amount of information on stability of terrain. Rock or soil slope failure is highly important to prevent one of the important disasters in landslide which has affected many people of the society. This paper highlights different methods to identify slope instability failure and rating. In this paper, the author studies and discusses the available methods – Rock Mass Rating, Rock Mass Classification system and Slope stability analysis in detail. The article discusses the literatures available from 1950 to till date.

Keywords- Rock mass rating;slope mass rating,slope stability

Rainfall Prediction for Pantnagar (Uttarakhand) Using Multiple Linear Regression Based Statistical Downscaling

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Abstract- In this study, three different statistical downscale method namely delta method (DM), quantile mapping method (QMM) and empirical quantile mapping method (EQMM) are compare to downscale precipitation for Upper Shivnath basin. Model for Interdisciplinary Research on Climate 5 (MIRCO5) simulation model is used for future Representative Concentration Pathways (RCP) scenarios (RCP4.5) to project decadal changes in precipitation across eighteen selected stations of Upper Shivnath basin. Three decades are selected for future prediction viz. 2020–2039, 2040–2059, 2060–2079 and 2080-2099 and are compared decadal variabilities with period 1990–2013. Delta method is accurately downscale precipitation from Model for Interdisciplinary Research on Climate (MIRCO5) model for future Representative Concentration Pathways (RCP) scenarios (RCP4.5) to project decadal changes in precipitation across eighteen selected stations of Upper Shivnath basin as compere to quantile mapping and empirical quantile mapping methods. The downscale precipitation of Upper Shivnath basin from Interdisciplinary Research on Climate (MIRCO5) model for 2020-2039, 2040- 2059, 2060-2079 and 2080-2099 scenarios are observed decrease trend in future.

Keywords: *Climate change; Global climate model; Scenario generation; Statistical downscaling; Precipitation*

Temperature Generation And Traverse Force Analysis During Friction Stir Welding In Air And Water

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Abstract- Friction stir welding (FSW) is an auspicious clean welding method to join marine grade aluminum alloys (AAs). Underwater Friction Stir Welding (UFSW), can extend the marine application of the FSW due to its superior mechanical properties over its contemporary FSW. In FSW/UFSW the weld thermal cycles and tool forces exhibit a noteworthy effect on the weld properties. Force and temperature measurement during UFSW process play a pivotal role in understanding the process, prediction of tool life, microstructure and mechanical properties of the welded joints. As such an attempt has been made in this study to investigate the effect of welding speed (50–80 mm/min) on temperature distribution and traverse force during UFSW of AA 6082–T6. The results revealed that increase in welding speed caused high traverse force and low peak temperature. Furthermore, the increase in temperature was observed as the tool approaches the thermocouple near the weld center. After that, the temperature reduces due to a decrease in the thermal gradient. The maximum peak temperature of 137 °C was observed at the retreating side (RS) in heat affected zone (HAZ) at a low welding speed of 50 mm/min due to high heat input and slow cooling rate. Additionally, the maximum traverse force of 103 kgf was attained at a high welding speed of 80 mm/min due to high material flow stresses resulting from high strain rate and low temperature.

Keywords- Friction stir welding (FSW); Underwater friction stir welding (UFSW);temperature;Transverse force; Tool

Design Flood Estimation And Dam Safety Measures For Flood Mitigation

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There are currently about 4839 completed large dams in India. More than three-fourth of Indian dams, carrying substantial storage behind them, are at least two decades old; and for these dams the original design floods call for revisions. Examination of revised design flood studies carried out for a set of 94 dams under 'Dam Rehabilitation and Improvement Project (DRIP)' reveal that the design flood values have increased substantially with trends indicating that percentage increases in the revised design flood values are greater for lower dams and also for older dams. Paper illustrates that the upward revision in the design flood estimate of existing dam in no way leads to amplification of the actual risk associated with that dam, and it only underlines the gap between existing risk level and the acceptable risk level. Narrating the implementation methodologies proposed under DRIP, the paper shows that flood related risk mitigation in existing dams is a challenging task often facing constraints of technical and economical viabilities. With the substantial data set of design flood revisions of DRIP dams, the paper brings out the skew observed in distribution of revised design floods on account of present-day norms related to computation of design floods, as contained in the Indian Standard IS: 11223 – 1985. Paper also proposes amendments in this Standard in respect of existing large dams with an alternative recourse of formulating a new Standard for revision of design floods of these existing large dams.

Keywords: DRIP; Design Flood Revision; Design Flood Risk Mitigation

Risk Assessment And Emergency Preparedness on Climate Change & Flood Management
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Abstract-Damage and losses due to extreme events depend upon the magnitude and intensity of hazardous event along the vulnerability of population, habitat, resources, and developmental settings, as against the capacity to withstand the risk. Designing of approach for convergence of Climate Change Adaptation and DRR and mainstreaming towards development needs detailed information of relevant programmes, regional geography and administrative settings. Dataset categories for disaster risk management are (i) baseline information for hazard identification (ii) system application for prediction, forecasting and modeling (iii) assessing multi-hazard vulnerability (iv) risk mapping and risk characterization (v) DRR strategy & planning (v) monitoring and evaluation i.e. tools for quantifying DRR measures. Data may be required /available in form of images/satellite data, toposheets, statistics, narrations/reports or other records and is processed to information to yield knowledge for a targeted purpose.

Keywords - *Data needs; sources ; CCA adaptation; hazards; risk mapping; disaster management*

Institutional Arrangements And Good Management Practices For Sustainable Dam Safety

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Abstract- India has 5334 large dams; the largest number of dams in the world a USA and China. It is number is set to increase in the coming years as India constructs more dams to meet the rising demand for electricity and water. Constructing dams exposes downstream areas to the risk of catastrophic flooding in the event the dam fails or water has to be released in an emergency. Adopting risk-based decision-making systems for making policy, implementation and management decisions regarding dams are crucial for mitigating this risk. Conducting dam break analyses is a basic requirement for creating such a system. In the existing regulatory system, clearance for constructing new dams requires the builder to conduct a dam break analysis. However, there is no standardisation in how the dam break analyses are conducted and reported. It is also unclear how many projects actually comply with this requirement. there is no statutory requirement for conducting a consequence analysis to estimate the likely loss of life and property, and economic damage in the event of dam failure. Existing design standards for dams are not based on the risk created by the dam, but rather on their heights and storage capacities. Further, there is no centralised system for documenting and reporting actual dam failures, which is another crucial component of dam risk mitigation. Putting in place systems for regularly conducting dam break analyses, regular reporting of dam failure events, and ready public availability of such data is a necessary precondition for the development of risk-based decision-making systems to mitigate risk from dams.

Keywords - Dam; river regulation; hydropower; water supply; flood control; win-win; adaptive management

Latest Innovations And Methods For Monitoring Dam Health

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Abstract- In order to execute dam safety planning, it is necessary to develop an index, which considers and simulates actual physical dam deterioration. The objective of this study is to monitor the behavior of dams by the experimental modal analysis. Ten model dams were tested by free drop of a steel ball to generate the different degree of damage to the dams. The experimental data was recorded in time domain. In each case of deterioration, the post processing was to transform these data to obtain the different natural frequencies, the global condition. Next, the local condition was further investigated using the finite element model, which was developed and calibrated using these obtained natural frequencies. The local dam deterioration could be evaluated and monitored from a number of the calibration parameters, i.e. boundary conditions and strength of dam materials. In addition, the different natural frequencies would be used as a simple index for the dam health monitoring.

Keywords- *Embankment dams; Health monitoring; liquefaction; Vibration; Physical model*

New Materials And Methods For Dam Rehabilitation

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Abstract- There are more than 36 000 dams in the world. In 1950 there were 20 000. That means there are now at least 20 000 dams in the world more than 50 years old. This is the challenge we face in dealing with rehabilitation. Many of these dams were built under difficult circumstances with inadequate resources, the population in desperate need of drinking water, hydro electric power, or flood relief. The world is becoming more litigious and many countries regulate dam design, construction and operation. There is therefore often a need to rehabilitate a dam following a review of the design to check that it complies with current standards. The purpose of this article is to present an overview of the state of the art in dam rehabilitation, to highlight the major innovations and to provide sufficient references for the non-specialist to pursue areas of particular interest. Case histories are used to illustrate the methods.

Keywords: *dams; embankments; reservoirs; foundations; reservoir safety; reservoir regulations; ageing; rehabilitation; deterioration; upgrading*

Compliance With The Provisions Of Design Standards – Issues & Strategies For Existing Dams

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Abstract-When a dam is built, its safety becomes a constant concern for the owner, the public and for governments. Therefore, continuous observation through routine inspections and safety reviews become necessary. Acting as protectors of public safety, governments and professional organizations save no effort in the promulgation of legislations and laying out guidelines for such inspections and reviews. These issues are discussed here starting with the basic first step of visual inspections by the operators and the follow up of detailed safety reviews by specialists. Careful visual inspections assisted by instrumentation measurements may reveal an early negative issue such as, but not limited to, increased seepage, increased uplift pressure, signs of weakness like cracking in the body of the dam, or dams' slope sloughing, and even damaged hydraulic control equipment. Documenting and reporting these observation helps in taking remedial measures in good time and may lead to more intensive safety reviews. Suggested check lists for the inspection engineers are given here, but these may be tailored for each dam according to its needs. These lists cover issues common to both embankment and concrete dams, and include other specific issues related to each type of them. Metal equipment take their share by listing such areas as corrosion, fatigue and cracking, tear, and wear and so on. Instrumentation measurements are also given their due consideration by giving brief mention of types of measurements needed and points to be observed in instrumentation control work.

Keywords- *Normal human caused incidents; extraordinary human caused incidents; SCADA systems; ICS systems; software*

**Planning Of Flood Storage Capacities Of Upstream Reservoirs For Flood Mitigation At
Akola City
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Abstract-In this study an attempt has been made to understand the hydrogeological investigations of Katepurna River basin, Akola District, Maharashtra with reference to groundwater and environmental management. Continuous pumping test data, collected from fifteen boreholes was used to determine productivity of the aquifers. 50 water samples were tested for water quality in pre and post monsoon periods. In addition, static water levels were observed for 40 dug wells for understanding the various hydrological parameters. The aquifers on the basis of permeability, potential and extent of aquifers, are categorized into i) extended and shallow aquifers with intergranular porosity and permeability, and with moderate to high potential (alluvial horizons); ii) limited and shallow aquifers with fracture and/or porosity and permeability, and with moderate potential (highly fractured and weathered basalt); and iii) limited and shallow aquifers with intergranular and fracture porosity and permeability, and with low potential (massive basalt). Present research work was proposed to conduct hydrogeological investigation and assess groundwater potential of the Katepurna watershed with an objective of identification of the major water bearing formations, characterization of different aquifers and determination of aquifer productivity, transmissivity and hydraulic conductivity. The results of this study demonstrate the presence of potential groundwater bearing horizons with the identification of promising aquifer zones which can be tapped for the drinking and agricultural needs of the region for the watershed management of the Katepurna River basin.

Keywords: *Flood control; simulation model; storage tank; storm water*

Flood Estimate For Possible Dam Break Scenario Of Sun Kosi Landslide Dam

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Abstract- Among the more complex and devastating interactions between climate and hydromorphological processes in mountain environments are landslide lake outburst floods (LLOFs), resulting from mass movements temporarily blocking a drainage system. This work reviews these processes in the Himalayas and highlights the high frequency of this type of phenomenon in the region. In addition, we analyse two recent catastrophic trans-national LLOFs occurring in the Sutlej river basin during 2000 and 2005. Based on high resolution satellite images, Tropical Rainfall Measuring Mission (TRMM), Moderate-Resolution Imaging Spectroradiometer (MODIS) derived evolution of snowline elevation and discharge data we reconstruct the timing and hydrometeorological conditions related to the formation and failure of landslide dams. Results showed that the 2005 flood, originating from the outburst of the Parchu lake, was not related to heavy precipitation, but was likely enhanced by the rapid and late snowmelt of an unusually deep and widespread snowpack. The flood in 2000 was triggered by the outburst of an unnamed lake located on the Tibetan plateau, identified here for the first time. In this case, the outburst followed intense precipitation in the lake watershed, which raised the level of the lake and thus caused the breaching of the dam. As stream gauges were damaged during the events detailed discharge data is not available, but we estimated the peak discharges ranging between 1100 m³·s⁻¹ and 2000 m³·s⁻¹ in 2005, and 1024 m³·s⁻¹ and 1800 m³·s⁻¹ in 2000. These events caused significant geomorphic changes along the river valleys, with observed changes in channel width exceeding 200 m. Results also demonstrate that remotely-sensed data enables valuable large-scale monitoring of lake development and related hydrometeorological conditions, and may thereby inform early warning strategies, and provide a basis for flood risk reduction measures that focus on disaster preparedness and response strategies.

Keywords- *Extreme flood; lake outburst; landslide; precipitation; Himalayas*

Flood Estimate For Possible Dam Break Scenario Of Sun Kosi Landslide Dam

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Abstract- The design of flood defence structures requires the estimation of flood water levels corresponding to a given probability of exceedance, or return period. In river flood management, this estimation is often done by statistically analysing the frequency of flood discharge peaks. This typically requires three main steps. First, direct measurements of annual maximum water levels at a river cross-section are converted into annual maximum flows by using a rating curve. Second, a probability distribution function is fitted to these annual maximum flows to derive the design peak flow corresponding to a given return period. Third, the design peak flow is used as input to a hydraulic model to derive the corresponding design flood level. Each of these three steps is associated with significant uncertainty that affects the accuracy of estimated design flood levels. Here, we propose a simulation framework to compare this common approach (based on the frequency analysis of annual maximum flows) with an alternative approach based on the frequency analysis of annual maximum water levels. The rationale behind this study is that high water levels are directly measured, and they often come along with less uncertainty than river flows. While this alternative approach is common for storm surge and coastal flooding, the potential of this approach in the context of river flooding has not been sufficiently explored. Our framework is based on the generation of synthetic data to perform a numerical experiment and compare the accuracy and precision of estimated design flood levels based on either annual maximum river flows (common approach) or annual maximum water levels (alternative approach)

Keywords-*flood defence; design floods; peaklevels; peak flows; uncernity*

Risk Informed Decision Making For Dam Maintenance And Rehabilitation In India

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Abstract- The use of risk informed decision making in the dam safety industry has been growing since the introduction of a formal (albeit simplified) risk assessment process by the US Federal Energy Regulatory Commission (FERC) in 2000. This Probable Failure Modes Analysis (PFMA) technique is widely used throughout the United States and elsewhere but recently has come under some criticism. However, despite the shortcomings with this, and other, simplified risk assessment methodologies, when used in conjunction with standards-based analyses and sound engineering judgement the qualitative approach to risk informed dam safety management and prioritization offers great value. These approaches can be further enhanced through the use of a semi-quantitative approach that makes use of a new risk screening tool to assess the probability of failure of potential failure modes in a transparent and scientific manner.

Keyword-Risk analysis; Dam safety; Hydroelectric

A Two Dimensional Dam Break Flow Simulation Model For Preparing Emergency Action Plans

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Abstract-Study of dam breach analysis is necessary because of the tragic consequences that can result in dam failure. After dam had breached, it is difficult to prevent the flood. Therefore engineers focused more over the flood management for the protection of the population at downstream of dam. This can be done by knowing different types of dam failure, by calculating the consequences of each type of failure, and by evaluating the risk associated with that failure type. In India till now 37 dam's failure has been reported. Bargi Dam or Rani Avanti Bai Lodhi Sagar Dam comes under the category of large dams constructed across Narmada River and breaching of this dam can cause disaster in Madhya Pradesh as well as Gujarat. This study is focused over the overtopping failure of the earthen part of the Bargi Dam. The present work comprise of three objectives: (1) case study of Bargi Dam failure using hydrodynamic model MIKE11, (2) Bargi dam failure impact on Narmada River and Jabalpur city, (3) preparation of inundation map for Bargi dam failure. Further, the present research also presents the applicability and usability of MIKE11-DB developed by the Danish Hydraulic Institute.

Keywords: *Bargi dam; Breach parameters; Flood inundation map; Overtopping failure;MIKE11*

Organisational Set Up And Monitoring Systems For Sustainable Dam Safety In Maharashtra State

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Abstract -Today India is the third largest dam building country in the world with over five thousand large dams. However, despite the significantly large expenditure, the actual area irrigated by canal has shown an overall decline since 1991. Today, more than 60% of India's irrigation happens through groundwater. Evaluation reports by official agencies like Comptroller and Auditor General of India (CAG), and independent evaluations by civil society organizations have pointed out to the poor performance of dams during construction, operation and maintenance. Despite this, the narrative that the dams "play a vital role in providing overall water security to the country" has not been validated with help of a closer look at the empirical evidence on performance of dams in the academia. To address this, we embark on a comprehensive socio-hydrologic review of evaluation studies to understand if large dams have in fact improved water security defined broadly (beyond just the canal command area). We ask two questions (i) What types of studies have been conducted? (ii) What do they collectively say about dams improving water security? In the way forward, we have discussed the need to design and implement dams as socio-technical systems, need for empirical field-based ex-post research to establish factual evidence. Further, it must feed back into ex-ante water planning. Structured processes like shared vision planning can be used to negotiate competing normative claims.

Keywords- *Dams; Post-facto; Assessments; India*

Leveraging Web Based Applications For Monitoring Rehabilitation Of Dams

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Abstract-This has led to data collection with an improved temporal and spatial resolution. Robotic totalstations and GNSS (Global Navigation Satellite System) techniques, often in an integrated manner, may provide efficient solutions for measuring 3D displacements on precise locations on the outersurfaces of dams. On the other hand, remote-sensing techniques, such as terrestrial laserscanning, ground-based SAR (synthetic aperture radar) and satellite differential interferometricSAR offer the chance to extend the observed region to a large portion of a structure and its surrounding areas, integrating the information that is usually provided in a limited number of in-situ control points. The design and implementation of integrated monitoring systems have been revealed as a strategic solution to analyze different situations in a spatial and temporal context. Research devoted to the optimization of data processing tools has evolved with the aim of improving the accuracy and reliability of the measured deformations. The analysis of the observed data for the interpretation and prediction of dam deformations under external loads has been largely investigated on the basis of purely statistical or deterministic methods. The latter may integrate observation from geodetic, remote-sensing and geotechnical/structural sensors with mechanical models of the dam structure. In this paper, a review of the available technologies for dam deformation monitoring is provided, including those sensors that are already applied in routine operations and some experimental solutions. The aim was to support people who are working in this field to have a complete view of existing solutions, as well as to understand future directions and trends.

Keywords: dams; deformation measurement; D-InSAR; GNSS; ground-based SAR; integrated monitoring systems; terrestrial laser scanning

Real Time Infrastructure Monitoring For Dams (RTIM): Using Artificial Intelligence (AI) For Data Analysis

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ABSTRACT-This report uses strategic foresight to study applications of Artificial Intelligence (AI) to achieve water-related Sustainable Development Goals (SDGs). The report discusses motivations, applications, and opportunities related to the adoption of AI for sustainable development. AI is a thriving field, that aims to build systems that function intelligently and independently. The global market size of AI, currently valued at USD 2 trillion, is forecasted to contribute USD 16 trillion to the global economy by 2030. AI is expected to drive the next era of technological and economic development, similar to past developments such as the industrial revolution, the silicon chip era, and the emergence of smart devices. Strategic foresight uses insight about the future state of an industry to guide present-day decision-making. It is used as a tool in policy planning for assessing the potential impact of AI in fulfilling water-related SDGs. The foresight highlights findings from relevant literature and an expert panel, concluding with suggestions and policy recommendations for consideration by national Governments, and other relevant stakeholders.

Keywords: Artificial Intelligence, deep learning; machine learning; Sustainable Development Goals;strategic foresight; disruptive technologies.

Geosynthetics Water Barriers In Kadamparai Dam: Observed Behaviour Of Its Exposed Geomembrane After 10 Years Of Installation

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ABSTRACT-After more than 30 years of successful experience, geosynthetics are very well established for many applications in hydraulic engineering (dams, canals, basins, erosion protection, scour countermeasures, coastal protection, ...) and the possible uses are growing continuously. There is a great variety in materials as well as in products and application areas. Geosynthetics in hydraulic applications cover mainly the following functions: separation, filtration, draining and lining. The manufactured products comprise wovens and nonwovens made from natural and synthetic fibres, bituminous and synthetic geomembranes, all kinds of composites manufactured according to the specific requirements. For all these applications, experience has been gained, tests have been developed, regulations and recommendations have been written. The paper will give insight into the different applications and the corresponding design theories, material testing, installation procedures, regulations and long-term experience. Examples are given from all over the world with the aim that this information leads to a unified approach for the application of geosynthetics in hydraulic engineering,

Keywords:*filter; filter testing; drainage; erosion scour, silt; fence; vertical barrier; geomembrane; geosynthetic clay liner. drainscapillary*

Failure of Spillway Radial Gate Of Narayanapur Dam In Karnataka – A Case Study

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Abstract-Engineering geologists provide the basic geological and geotechnical recommendations based on certain details analysis and design associated survey. These structures include dam as the major construction project. Explains different aspects related to dams, types of dam and cause of failure. Natural disaster like earthquake, flood, rockslides, and poor design or lack of maintenance affect the dam structure. Failure of dams occur because of overtopping, inadequate spillway capacity, excessive seepage across the body, alkali aggregate reaction, cavitation in energy dissipaters, stresses due to external force, gates of dam not working effectively etc. Excessive scouring below spillway may be dangerous for foundation. Analysis and study of failed dam structure can give reasons behind the failure of any dam

Key Words:Reservoir;Dams; Dam breach; Overtopping; seepage, piping

State-Of-The-Art On The Applications Of Geosynthetics For Dam Repair And Rehabilitation

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ABSTRACT- The geosynthetics have become common construction materials in several construction projects including the dams. The family of geosynthetic products consists of geotextiles, geogrids, geomembranes, geocells, geotubes, geosynthetic clay liners, geocomposites, etc. The varieties of geosynthetics and their engineering applications are increasing rapidly every year. The geosynthetics were mostly tarpaulin sheets in the mid 1930's. Next, the PVC membranes were introduced, and were widely applied in Europe for canal linings and landfill linings. Most of the early applications of geosynthetics were for construction of haul roads in forests, landfill linings, etc. Following, the reinforcement applications also started in field practice from late 1960's. From the early 1970's more varieties of the geosynthetics have come into the market. The particular geosynthetics that are most relevant to dams are the geomembranes and the geotextiles. The geomembranes are impermeable polymeric sheets made of PVC, High Density Polyethylene (HDPE), LDPE, etc. The geotextiles are of two varieties, woven and nonwoven. The woven geotextiles are mainly used for reinforcement applications while the nonwoven geotextiles are mainly used for filtration, drainage and separation applications. In the context of dams, the filter and drain applications are important for ensuring their safety. Over the past forty years or more, the geosynthetics have been applied for the repair of several dams across the world. The Kadamparai dam operated by Tamil Nadu Electricity Board (TNEB) in the state of Tamil Nadu was repaired recently by lining it with PVC geomembrane to significantly reduce the seepage rate from a whopping 38,000 liters per minute to about 30 liters per minute. This paper will discuss the different varieties of the geosynthetics, their functions and engineering applications particular to dams. The different applications of the geosynthetics for repair of different dams all over the world will be summarized in detail. The presentations will include the brief details of the dams, the particular problems faced and how the solutions were achieved at using the geosynthetics. The manuscript also highlights the role of ageing mechanism and durability of individual geosynthetic components to accomplish the required overall performance of the dam.

Keywords-Geosynthetics Shoreline protection; Coastal engineering; Hydraulic performance

A study of Emergency warning and response to flooding in a changing climate

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Abstract

This paper begins with an analysis of flooding as a natural disaster for which the solutions to the environmental, social and economic problems are essentially those of identifying and overcoming hazards and vulnerability, reducing risk and damaging consequences. Long-term solutions to flooding problems, especially in a changing climate, should be sought in the wider context of developing more sustainable social organization, economics and technology. Then, developments are described of how scientific understanding, supported by practical modelling, is leading to predictions of how human-induced changes to climatic and geological conditions are likely to influence flooding over at least the next 300 years, through their influences on evaporation, precipitation, run-off, wind storm and sea-level rise. Some of the outstanding scientific questions raised by these problems are highlighted, such as the statistical and deterministic prediction of extreme events, the understanding and modelling of mechanisms that operate on varying length- and time-scales, and the complex interactions between biological, ecological and physical problems. Some options for reducing the impact of flooding by new technology include both improved prediction and monitoring with computer models, and remote sensing, flexible and focused warning systems, and permanent and temporary flood-reduction systems.

Impact of Risk analysis in the light of climate related hazards

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Abstract

Mountains are highly sensitive to climate change. Their elevated areas provide essential ecosystem services both for the surrounding mountainous regions and particularly for adjacent lowlands. Impacts of a warmer climate affect these services and have negative consequences on the supply of water, on biodiversity and on protection from natural hazards. Mountain social-ecological systems are affected by these changes, which also influence communities' risk perception and responses to changing climate conditions. Therefore, to understand individual and societal responses to climate change in mountain areas, aspects and drivers of risk perception need to be scrutinised. This article presents the findings of a literature review of recent English language publications on risk perception in connection to climate change and related natural hazards in mountain regions worldwide. Studies were selected from recorded entries in JSTOR, Science Direct, Scopus and Web of Science covering the period 2000–2019 and analysed in two steps (structured exploratory analysis, $n = 249$ and in-depth analysis, $n = 72$) with respect to the studies' research question, methodology, geographical scope and risk perception drivers. The review reveals that socio-demographic factors, like gender, age and personal experiences, have a crucial impact on individual risk perception. Some of the less tangible but nevertheless decisive factors are important in mountain regions such as place attachment and socio-cultural practices. In conclusion, there is however little information in the literature which addresses the specific situation of risk perception in mountain areas and its influence on communities' responses to environmental changes. Further, we observed a strong gap concerning the integration of indigenous knowledge in risk perception research. Many studies overlook or oversimplify local knowledge and the cultural dimensions of risk perception. Based on these results, the paper identifies several gaps in research and knowledge which may influence the design of climate risk management strategies as well as on their successful implementation.

Effective designing for flood risk management in an uncertain climate

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Abstract

There is compelling evidence that climate change may lead to increases in heavy rainfall and significantly increased risks from fluvial and surface flooding. Rising sea levels may also lead to further increase the risk of flooding and erosion along coastlines. This special issue will explore the implications of a changing climate to the challenges associated with managing the risks of flooding. The issue will consider the risks, approaches to adaptation and mitigation as well as actions to improve our readiness for flooding in the short and long term. How we can reduce the impacts and the consequent costs and disruption to communities, businesses and our economy will also be considered. The effects of climate change on flood risk in urban, rural and coastal communities as well as in developed and developing regions will be explored. With the increased importance of resilience in modern approaches to flood risk management, contributions that incorporate the complexities and uncertainties of a changing climate and extreme weather will be most welcome. By design the issue will incorporate multi and interdisciplinary perspectives from scholars located in all regions and with expertise in disciplines including engineering, computer science, design, social sciences, natural sciences, hydrology, health and business.

Climate change projections and flood risk assessment: a study analysis

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Abstract

This paper discusses theories and methods of climate change risk studies for the research expansion in Odisha. Climate change risks consist of three basic components including sensitivity, exposure, and possibility. Uncertainty, future events, damages, and relativity are the major features of climate change risk. Climate change risk research includes two key steps: risk assessment and risk management, the former is the process, and the latter is the ultimate goal which is the basis for actions to address climate change. We present the main framework and methods for climate change risk research. A case study on Odisha's floods risk is taken as an example of climate change risk study. Finally, we point out main aspects of climate change risk research, including ensemble-based probabilistic projection, quantitative risk assessment, risk zoning and mapping, and risk management.

Social and health implications of increased flood risk due to climate change

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Abstract

We all know that 2014 has been declared as the hottest year globally by the Meteorological department of United States of America. Climate change is a global challenge which is likely to affect the mankind in substantial ways. Not only climate change is expected to affect physical health, it is also likely to affect mental health. Increasing ambient temperatures is likely to increase rates of aggression and violent suicides, while prolonged droughts due to climate change can lead to more number of farmer suicides. Droughts otherwise can lead to impaired mental health and stress. Increased frequency of disasters with climate change can lead to posttraumatic stress disorder, adjustment disorder, and depression. Changes in climate and global warming may require population to migrate, which can lead to acculturation stress. It can also lead to increased rates of physical illnesses, which secondarily would be associated with psychological distress. The possible effects of mitigation measures on mental health are also discussed. The paper concludes with a discussion of what can and should be done to tackle the expected mental health issues consequent to climate change.