INDUS UNIVERSITY

LEARN WELL TO LIVE WELL

IMCERT

INTERNATIONAL MULTI-DISCIPLINARY CONFERENCE IN EMERGING RESEARCH TRENDS

IEEE KARACHI SECTION

IMCERT 2023

INTERNATIONAL MULTI-DISCIPLINARY CONFERENCE IN EMERGING RESEARCH TRENDS

JANUARY 4-5, 2023

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Indus University at a Glance

Indus University primarily established as an Indus Institute of Higher Education (IIHE) on January 7, 2006vide Sindh Assembly Act Ref No. PAS/Legis-B-9/2004. Later, it was awarded the status of Indus University on April 5, 2012vide Sindh Assembly Act No. Ref RAS/Legis-B33/2011. Since its inception, Indus University is striving to impart quality education and playing a significant role in developing indigenous human resource through its landmark achievements and running the following faculties under its portfolio.

- Faculty of Computing & Information Technology (FCIT)
- Faculty of Engineering, Science & Technology (FEST)
- Faculty of Management Sciences (FMS)
- Faculty of Art & Design (FAD)
- Faculty of Health & Medical Science (FHMS)
- Faculty of Social Science (FSS)

Indus University religiously follows the mantra of "LEARN WELL TO LIVE WELL" and we make every possible effort to instill our students with divergent thinking skills. Keeping in view the current socio-economic situation of Pakistan, this underlying task seems daunting however management is eying towards exceeding its stakeholders' expectations in a dignified manner. We believe in developing students into holistic individuals thereby establishing students' societies which will give them the platform that will help in expressing themselves in a better way.

We aim to provide quality education and in this regards Quality Enhancement Cell (QEC) has also been established to assess the quality of programs according to the guidelines prescribed by HEC so our students can come at part with the international standards. The distinguishing features of the Indus University are as follows:

- Centrally located and easily accessible
- Degree programs accredited by the respective councils of HEC and PEC
- HEC Approved PhD Supervisors
- Research-led teaching
- State of the art facilities
- Environment conducive to learning
- Foreign qualified faculty
- Experimental learning
- Academic linkages with national and international universities
- Employability in the job market
- Merit and need based scholarships
- Library housed with latest edition of books and workstations
- Well-ventilated classrooms equipped with multimedia

Message of Prof. Dr. Mukhtar Ahmed, Chairman, HEC

I am pleased to note that the Indus University is organizing an International Conference on "International Multi-disciplinary Conference in Emerging Research Trends (IMCERT) under the technical sponsorship of IEEE Karachi Section on Jan 4-5, 2023 at Karachi.

I am delighted to see that Indus University is developing faster and moving closer to its mission of becoming a research oriented university in the region. The Conference will bring together eminent national and international academicians, researchers and policy makers to deliberate upon important issues in the fields of Electrical Engineering and Computational Technologies. I am sure that new ideas will take birth besides opening doors for future collaboration and linkages with the national and international partners.

At Higher Education Commission (HEC) we are of firm belief that an effective higher education system is indispensable for creating knowledge economy and fostering leadership which can steer the nation to success in every walk of life. HEC will keep on supporting creative initiatives of universities for strengthening research culture in Higher Education Institutions.

I extend my heartiest felicitations to the Indus University, Karachi for organizing this international Conference and wish best success in its future endeavors.

Message of Mr. Khalid Amin, Indus University

I am overwhelmed that Faculty of Computing & Information Technology, and Faculty of Engineering, Science & Technology at Indus University has taken a daring step in organizing the 2023 International Multi-disciplinary Conference in Emerging Research Trends (IMCERT) keeping in view the rising trend being observed in the research related to Computation Intelligence. I extend my heartfelt gratitude to the conference steering committee, organizing team, volunteers, well-renowned sponsors form the corporate world, national / international speakers for making this conference possible.

We hope that the platform of IMCERT 2023 will provide a tremendous opportunity to the audience and they can cultivate conversation with the academicians, practitioners and the industry experts and might generate the possibility of working with them in the joint projects.

In addition, there is a void explicitly noticed between academics and industry and the students are not well-versed with the current developments taking place in the industry hence this conference will expose the young lot with the research & development culture and they would come to know about state of the art research activities.

I once again acknowledge the endeavors of all the stakeholders who have worked relentlessly to make this conference and its associated activities a worth attending event.

Message of Mr. Muhammad Ahmed Amin, Indus University

It is noteworthy to mention that Faculty of Computing, Faculty of Engineering Science & Technology Indus University takes good heed of organizing conferences, colloquiums and guest speaker sessions to equip the students with the current trends and practices an in this regard, 2023 International Multi-disciplinary Conference in Emerging Research Trends (IMCERT) has been held with an aim to:

Develop practical solutions for creating widespread benefits & value for society thereby; enhancing the reputation of electrical, electronics, biological engineering and computer research as a source of wellbeing & prosperity.

Encourage trans-disciplinary and translational research that will identify electrical, electronics, histological engineering and computer science development.

Solicit applications from researchers / scholars to present papers related to electrical, electronics, and computational technology used extensively in Controls, Automation and Power Sector.

Propose techniques / methods that could explore a unique multi-disciplinary approach to electrical, electronics, controls, bio medical and computer engineering challenges that are high risk but have a considerable payoff and also develop data leading to significant future research.

IMCERT 2023 has received a marvelous response and 67 papers were received – confirming a trend of increasing interest in Electrical engineering and Computational Technology – coming from 5+ different counties including UK, Australia, Thailand, and Peru in South America. The proceedings of the papers will be published in IEEE Xplore. The internal reviewing panel approved 32 papers out of the total. The audience will be enthralled with the keynote speaker sessions.

I congratulate the entire team for their tedious efforts and hoping to arrange such kind of events in the future to disseminate knowledge and excel the vision of our pupils.

About 2023 IMCERT

2023 International Multi-disciplinary Conference on Emerging Research & Technologies **(**IMCERT**)** will be held in Karachi, Pakistan during January 4-5 2023. IMCERT is being organized by Faculty of Engineering, Science and Technology (FEST), Faculty of Computing and Information Technology (FCIT), Faculty of Management Sciences (FMS), Faculty of Health and Medical Sciences (FHS), and Faculty of Art and Design (FAD), Indus University Karachi under the technical sponsorship by IEEE Karachi Section and Patronage of Higher Education Commission Islamabad at Indus University, Karachi. The IMCERT will be a great gathering of both industrial and academic professionals from across the world. IMCERT will provide a forum for the exchange of information among practicing professionals, graduate scholars, faculty members and industry professionals from all over the globe in the areas of greater importance in Electrical Engineering, Electronic Engineering and Computational Technologies.

The IMCERT aims to offer a great opportunity to bring together academicians, researchers and scholars around the globe a great platform to deliver the latest innovative research results and the emerging developments and trends in Electrical Engineering, Electronic Engineering and Computational Technologies. The conference will feature invited talks from eminent personalities all around the world, pre-conference tutorial/workshops, poster presentations and referred and peer reviewed paper presentations. The vision of IMCERT is to encourage and promote communication among researchers and practitioners working in a wide variety of the above areas in Engineering and Technology. Accepted papers will be submitted for inclusion into IEEE Xplore subject to meeting IEEE Xplore's scope and quality requirements.

It is expected that IMCERT will receive a large number of manuscripts for consideration and these will be registered after blind review and evaluation by the Technical Program Committee. Authors from different countries will be invited for contributory papers, invited research talks, Key note speeches, and plenary speeches. IMCERT will surely receive excellent response in terms of technical quality, organization, conference kits, informative pre conference workshops and excellent hospitality to the participants.

Program Schedule 2023 IMCERT

Day – 1: Wednesday January 4, 2023

9:00 AM	Registration	
10:00 AM	Chief Guest Arrives	
10:05 AM	Tilawat-e-Quran Hakeem	
10:10 AM	National Anthem	
10:15 AM	Welcome Address: Prof. Dr. Syed Zafar Nasir	
10:20 AM	Conference Briefing: Chair IEEE Karachi Section	
10:30 AM	Address by the Chief Guest	
10:40 AM	Distribution of Souvenirs to Chief Guest	
10:50 AM	**Plenary Talk 1:** Autoregressive Models vs State Space Models vs Recurrent Neural Networks: A Time Series Forecasting Perspective, Dr. Tariq Mahmood	10
11:20 AM	**Plenary Talk 2:** Quantum Security: Opportunities and Challenges in Cyber security, Dr. M. Mubashir Khan	10
11:50 AM	Refreshment	
12:20 PM	**Plenary Talk 3:** Optimal Planning of Distribution System with High Penetration of Renewable Generations, Dr. Mahesh Kumar	10
12:50 PM	**Plenary Talk 4:** Commercialization hurdles for thin film perovskite solar cells Dr. Danish Khan	11
1:20: PM	Distribution of Souvenirs to Plenary Speakers	
1:30 PM	Lunch & Prayer	
	Technical Sessions: 1-A: ML, AI and IoT	
2:30 PM	**Keynote Address 1:** Internationalization of quality assurance vs. quality assurance of internationalization: un-tapping the potential of international education through quality assurance Dr. Fabrizio Trifiro	11
3:00 PM	Rain Predictive Model using Machine learning Techniques, NED, Karachi	15
3:20 PM	Assessment of Advanced Artificial Intelligence Techniques for Flood Forecasting, King Mongkut's University of Technology Thonburi, Thailand	15
3:40 PM	Comparative analysis of deep learning methods in the realm of sentiment Analysis, Indus University, Karachi	16
4:00 PM	An Assessment on Internet of Things (IoT), Bahria University, Karachi	16
4:20 PM	Q/A, Distribution of Souvenirs to Speakers, Session Chairs	16
	Technical Sessions: 1-B: Communications	
2:30 PM	**Keynote Address 2:** IMF Objectives and Lending Impact on Developing Economies-Pakistan. Dr. Habib ur Rehman	12
3:00 PM	Analyzing Doppler Effects in Millimeter Wave VANET Communications Using BCH Coding, Bahria University, Karachi	16
3:20 PM	Multi-feature Integration with Adaptive Learning Based Correlation Filter for Visual Object Tracking, UET, Taxila	17
3:40 PM	Performance Metrics of Rake Receivers, Bahria University, Karachi	17
4:00 PM	Q/A, Distribution of Souvenirs to Speakers, Session Chairs	

Day – 2: Thursday January 5, 2023

9:00 AM	Registration	
	Technical Sessions: 2-A: Machine Learning (ML)	

9:00 AM	Customer Segmentation using Machine learning Techniques, NEDUET, Karachi	18
9:20 AM	Temperature Prediction by Gene Expression Programming, King Mongkut's University of Technology Thonburi, Bangkok, Thailand	18
9:40 AM	Prediction of IMDB Score & Movie Success By using the Facebook, IBA, Sukkur	19
10:00 AM	Fake Review Classification by Deep Learning	19
10:20 AM	Semantic Social Searching-An Ontology Based Approach, IBA, Sukkur	20
10:40 AM	Q/A, Distribution of Souvenirs to Speakers, Session Chairs	
	Technical Sessions: 2-B: MIMO	
9:00 AM	**Keynote Address 3:** Fostering Linkage between Medicine and Engineering for Better Healthcare, Dr. Muhammad Aslam	12
9:30 AM	Investigation of MPC for MIMO system in presence of both input and output constraints with relative parametric variation, Superior University, Lahore	20
9:50 AM	MIMO Antenna for C-band Applications, UET, Taxila	20
10:10 AM	A Real-time Sequence Based Human Activity Detection System, COMSATS, Abbottabad	21
10:30 AM	5 x 5 MIMO Antennas for Future 5G mm-Wave Communication, UET, Taxila	21
10:50 AM	Q/A, Distribution of Souvenirs to Speakers, Session Chairs	
11:00 AM	Refreshment	
	Technical Sessions: 3-A: Deep Learning	
11:30 AM	Network Attack Detection in IoT using Artificial Intelligence, Muhammad Ali Jinnah University, Karachi	22
11:50 AM	Examining Malware Patterns in Android Platform using Sufficient Input Subset (SIS),	22
12:10 PM	Impact of Computer Gaming Addiction on Body Mass Index - A Quantitative Investigation about Sukkur City of Pakistan, IBA, Sukkur	23
12:30 PM	Skin Cancer Prediction using Deep Learning Techniques, UET, Taxila	23
12:50 PM	Hybrid Approach using Extreme Gradient Boosting (XGBoost) and Evolutionary Algorithm for Cancer Classification, NTU, Faisalabad	24
1:10 PM	Q/A, Distribution of Souvenirs to Speakers, Session Chairs	
	Technical Sessions: 3-B: Control and Quality of Education	
11:30 AM	Design and Control of a Bionic Leg, GIK, Topi	24
11:50 AM	Magnetic Anomaly-Based Detection of a Submarine, PIEAS, Islamabad	25
12:10 PM	Implementation of SVPWM based Multilevel Three Phase Inverter to Reduce THD, Superior University, Lahore	25
12:30 PM	Design and Development of Die Sink Electrical Discharge Machine for Melting Point and Removal Rate of Materials, UET, Lahore	26
12:50 PM	MOOCs and their contribution to the continuous development of high school teachers, *Universidad Tecnológica del Perú, Lima, Perú*	26
1:10 PM	Q/A, Distribution of Souvenirs to Speakers, Session Chairs	
1:30 PM	Lunch & Prayer	
	Closing Ceremony	
2:30 PM	Guests to be seated	
2:30 PM	**Keynote Address 4:** Trends in higher education quality assurance, Dr. Jeanette Baird, Australia	13
3:00 PM	Panel Discussion: ‘How to Create Jobs’	
4:00 PM	Chief Guest Arrives	

4:05 PM	Tilawat e Quran e Hakim
4:10 PM	National Anthem
4:15 PM	Vote of Thanks by Chair, Conference Organizing Committee
4:20 PM	Closing Remarks: V. Chair IEEE Karachi Section
4:30 PM	Address by the Chief Guest
4:40 PM	Souvenir Distribution

Keynote Talks for Plenary Sessions

[Document subtitle]

Autoregressive Models vs State Space Models vs Recurrent Neural Networks: A Time Series Forecasting Perspective

Prof. Dr. Tariq Mahmood, IBA, Karachi, Pakistan

ABSTRACT

Time series forecasting (TSF) is an important data science activity, based primarily on prediction of numerical business KPIs based on time. Many standard BI tools (e.g., Tableau) also incorporate built-in TSF modules. Three state-of-the-art categories of TSF models include Autoregressive models, State Space models and Neural Network (Deep Learning) models. Although DL models have demonstrated exponential rise in applications, the utility of the other two can hardly be ignored and they continue to be used in diverse and critical domains. This talk will briefly discuss the details of these technologies, and apparent pros and cons. Then, results of multiple simulations with these technologies will be presented to allow the audience to gauge the strengths and weaknesses from a practical perspective. Besides technical knowledge, a potential take-away of the talk is that TSF models are complicated applications and accurate forecasts need to be potentially engineered; a simple BI tool execution might not be always generalizable in the long run.

Quantum Security: Opportunities and Challenges in Cybersecurity

Prof. Dr. Muhammad Mubashir Khan, NEDUET, Karachi, Pakistan

ABSTRACT

Quantum Technology has emerged with several interesting branches including Quantum Computing, Quantum Cryptography, Quantum Imaging, and Quantum Teleportation in the last two decades. Several promising theoretical results of quantum technology have been presented to show the advantages of quantum technology over its classical counterpart. The immense potential of a quantum computer to quickly solve complex computing problems has flared up a debate among the cybersecurity community about the future of existing cybersecurity systems because of the possible capability of quantum technology to break them. This talk will shed light on the recent development in quantum technologies in the context of global cybersecurity.

Optimal Planning of Distribution System with High Penetration of Renewable Generations

Dr. Mahesh Kumar, Mehran UET, Jamshoro, Pakistan

ABSTRACT

Recently, the renewable distributed generations (DGS) are proposed in the planning frameworks of distribution system to increase the renewable energy mix and maximize its performance. These renewable energy include wind turbines, photovoltaic (PV) and biomass that produce the electricity, which are freely available in the nature. The operational and maintenance (O&M) cost of these renewable energy resources is very less as compared to existing fuel-fired power stations. Currently, around 24 % of global electrical needs are being fulfilled by the renewable energy. Moreover, it is projected that the

wind turbines, solar PV, and biomass will remain the dominating sources for producing electricity for more than three decades in the future energy mix. However, the renewable energy especially wind and solar possess the seasonal nature. The fluctuations in the power generation from wind turbines and solar PV modules, and variations in the electricity demand are considered to be major obstacles for the integration of DGs in radial distribution system. The impacts from the installations of small-scaled DGs in the distribution system are minimal or negligible, but this impact could be profound with the penetration of 20 - 30 percent [5]. To that end, we will start to think of the utility as a platform, enabling DERs across the grid by integrating resource, transmission and distribution planning, properly valuing locational net benefits, making it possible for the grid to continue to function at the level customers and society expect.

Commercialization Hurdles for Thin Film Perovskite Solar Cells

Dr. Danish Khan, Shenzhen, China

ABSTRACT

The escalating power conversion efficiency (PCE) from 3% to 25.7% of perovskite solar cells (PSCs) within a decade is just more than a record-breaking achievement. This blistering rise in PCE, even higher than the currently available photovoltaics (PV) in the market, is catching the eye of PV market players as the PSCs are among the emerging PV. The aim of emerging thin-film PV is to be efficient, stable, mechanically flexible, and cost-effective so that the building-integrated PV can be designed at a lower cost. PSCs will soon be the winner among all the emerging thin-film PV technologies. Consequently, big economies such as the USA, China, Japan, Korea, Germany, etc., are ready to pour huge amounts of money into the research of PSCs to boost their commercial deployment. High PCEs with a handsome amount of long-term stabilities are achieved in lab-scale experiments. And now, the challenge is to bring similar results on the industrial level. In this keynote speech, I will discuss the reasons behind these challenges and recent developments which are tried to overcome these issues.

Internationalization of Quality Assurance vs. Quality Assurance of Internationalization: Untapping the Potential of International Education through Quality Assurance

Dr. Fabrizio Trifiro, London, UK

ABSTRACT

International education, in all its forms, has tremendous socially progressive potential as a means to widening access to quality education and meeting skills and training needs at the global level, as well as fostering a sense of global citizenship critical for constructive relationships between cultures and nations. There are however important challenges to the fuller realization of this progressive potential, which can be related to a gamut of quality assurance issues.

In order to clearly identify these challenges and thus facilitate the development of quality assurance and recognition solutions capable to support the internationalization of quality education, it might be helpful to distinguish between two different aspects: the quality assurance of internationalized practices and activities, and the internationalization of quality assurance practices and activities.

This presentation will reflect on the specific challenges, issues, dynamics, and opportunities associated with these two different ways in which internationalization can affect quality assurance. It is important to be aware of these differences, not only to avoid possible misunderstandings (far too easy to occur in an increasingly varied and complex international education and quality assurance landscape), but also and specifically to inform the development of fit-for-purpose quality assurance strategies and practices capable to foster the growth of quality international education.

IMF Objectives and Lending Impact on Developing Economies- Pakistan

Prof. Dr. Habib ur Rahman, Sarhad University of Science and Information Technology, Peshawar, Pakistan

ABSTRACT

Countries of low income group are characterized with low productivity and consequently little to export. On the other hand, they are required to attain a self-sustaining stage by improving their gross national product growth rate for minimizing reliance on import and also earning surplus for export. Most of the developing countries have not been able to increase their GDP level and produce goods for export and also those import substituents which can help the country in improving its balance of payment. Almost all the low income countries including Pakistan are facing serious problem of balance of payment which phenomena has necessitated to resort to borrowing from various national and international agencies to boost up their production. Persistently declining export and fast growth in import has been widening the gap between export and import. Such countries are constrained to knock at the door of IMF for financial help. The financial assistance ever extended by IMF always carries with it conditionalaties which entail serious consequences. This paper discusses the functions and objectives of IMF and also throws light on its role in helping countries suffering from balance of payment. This paper finds the growth rate of Pakistan economy during specific period. It discloses the various IMF credit line allowed to Pakistan and their ultimate over all psychological effect on the common citizen of Pakistan.

Fostering Linkage between Medicine and Engineering for Better Healthcare

Dr. Muhammad Aslam, Shifa Tameer-e-Millat University H-8/4 Islamabad, Pakistan

ABSTRACT

In the middle of twentieth century, many new scientific fields have emerged to interlink multiple sciences with Medicine for an innovative, interventional and interesting healthcare delivery to improve health for all. Thus, we need to develop an integration between Medical Sciences and Emerging Sciences in in-numerous fields. The inter-disciplinary and trans-disciplinary areas of Health and Engineering Sciences include (but not limited to) Biophysics, Bio-mathematics, Biomedical Engineering, Public Health Engineering, Hospital Architecting, Intensive Care Unit Fabrication, Operation Theatres Designing, Environmental Health & Engineering, Bio-material Sciences, Bio-material Manufacturing, Genetic Medicine & Engineering, Interventional Radiology, Cyber/ Gamma Knife Surgery, Robotic Surgeries, Development of Artificial Skin, Neuroscience, Development of Cardiac Stents, Development of Urinary Stents, Development of Gut Stents, Development of Artificial Fingers/ Toes and Joints, Optometry, Cochlear Implants, Radiation Oncology, Stem Cell Laboratory, Computational Science, Bio-Instrumentation, Clinical Imaging, Dental Implants, Mobile Health, Telemedicine, Microscopy Analysis, Prosthetics, Bionics in Health, Regenerative Cellular Devices, Neural Tissues Development, Conduction Studies, Genes Designs, Genes Therapy, Reconstructive Devices, Clinical Engineering Biomechanics, Models for Neuro-rehabilitation, Nanotechnology and Nano-biotechnology. Furthermore, devices to undo Biological Warfare, Development of

Ventilators, Cardio-pulmonary Resuscitation Machines, Bio-informatics, Health Informatics, Drug Discovery, Drug Development, Electro-medical Equipment, Development of Vaccines, Formulation of Diagnostic Kits, Hospital Consumables and many others require integration of Healthcare Professionals and Multifarious Sciences. Therefore, combination of Medicine with Emerging Sciences may facilitate precision in diagnostics and Therapeutics to improve healthcare delivery for all. Translation Medicine is an Interdisciplinary and Trans-disciplinary science. Doctors, Scientists and Engineers together can bring revolution in diagnostic and therapeutics for better healthcare.

Trends in Higher Education Quality Assurance

Dr. Jeanette Heather Baird, Australia

ABSTRACT

My presentation reflects on changes in the quality assurance of higher education over the past decade, under the following overlapping themes: 1) Changes in conceptions of quality in higher education; 2) Changes in who decides what 'quality' is; 3) Changes in risks to quality; 4) Changes in how quality is assessed. I offer a perspective that is drawn from my Australian and international experience, noting that the dynamics of higher education quality assurance dare different in differing national contexts.

Under the first theme, I discuss ideas about learning, student engagement and well-being, online education, efficiency and the Sustainable Development Goals as changes in the content of the attributes comprising 'quality' in higher education, due to external societal and environmental challenges. I also consider a possible shifting of emphasis away from quality as 'fitness for purpose' and towards quality as 'comparative excellence', through the use of rankings, ratings and 'badges'. Under the second theme, I discuss the increasing influence of global conventions and managerial systematisation of quality assurance and compliance. Changing risks to quality under the third theme include risks to academic integrity, credential security and cybersecurity. On the fourth theme, I discuss the rise of comparative analyses and benchmarking, the increasing role of data and metrics, and institutional 'self-assessment' using external experts. These changes are of themselves neither good or bad but reflective of the fact that ideas about 'quality' do change over time, the affordances of technology and the embeddedness of quality assurance into routine institutional management.

Abstracts of Research Papers

[Document subtitle]

Rain Predictive Model using Machine learning Techniques

Muhammad Shahbaz Muneer, Syed Muhammad Nabeel Mustafa, Syeda Sundus Zehra, Haniya Maqsood

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Keywords: Rain prediction, Machine Learning, Prediction techniques, Climate Change

ABSTRACT

Climate is rapidly changing around the world. Over time, there have been significant changes in the weather. Rainfall is now erratic due to climate change. The frequency of extreme weather events like droughts and floods has increased due to climate change, necessitating the need for more precise and timely rainfall forecasts. For strategic reasons including agriculture, water resource management, and architectural design, rain forecasting is crucial. The naturally occurring non-stationary component in the rainfall time series impairs model performance for practical hydrologists and drought risk assessors. We present a rain predicting model based on machine learning to address the forecasting issue. In our work, we predict the possibility of rain the next day on the basis of last 10 years' data. The variables that were calculated during the experiments were humidity, pressure, evaporation, sunshine, rainfall, and so on. Random Forest gave the 90% accuracy with 0.904 Area under Curve, highest out of all the algorithms. The model's performance will significantly aid in the rain forecast**.**

Assessment of Advanced Artificial Intelligence Techniques for Flood Forecasting

Muhammad Waqas, Sebastien Bonnet, Usa Humphries Wannasing, Phyo Thandar Hlaing, Hnin Aye Lin, Sarfraz Hashim

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The Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi. Bangkok, Thailand, Department of Agricultural Engineering, MNS University of Agriculture, Multan, Pakistan

Keywords: Climate Change, Weather, Artificial Intelligence, Modeling

ABSTRACT

Flooding is a natural calamity that can destroy people's lives, infrastructure, and the economy. Forecasting floods is critical for providing people with long-term flood risk management. Flood forecasting is essential in providing early information and knowledge to decision-makers to reduce the impact of flooding. The warning can also be given to potential flood victims and locations, and necessary action, such as mitigation and evacuation, can be taken. With current estimates showing increasing future scenarios, comprehensive flood risk management measures, including flood modelling, are needed. This publication aims to analyses flood risks worldwide. Various AI techniques have been developed and deployed to predict floods and take preventative actions. The primary goal of this study is to assess current improvements in flood forecasting utilizing artificial neural networks (ANNs), adaptive neuro-fuzzy inference systems (ANFIS), support vector machines (SVMs), and k-nearest neighbors (KNNs). As a result, this research presents the most effective short and long-term flood modelling techniques. ANNs, ANFIS, and SVMs are the most successful solutions for forecasting floods. Finally, new research and development directions are suggested to predict floods and take preventative actions.

Comparative Analysis of Deep Learning Methods in the Realm of Sentiment Analysis

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Keywords: Deep Learning; Neural Networks; Natural language processing; text classification; Sentiment Analysis

ABSTRACT

Recent advances in deep learning have suggested number of methods which can be employed in several domains. Text classification is one of the most common natural language processing tasks and have given relevant results at the level of text classification to perform sentiment analysis. This paper compares the efficacy of di erent algorithms used to perform sentiment analysis. The comparison offers a global vision to contribute to a relevant system that can evaluate the di erent types of sentiment analysis by a Corpus (restaurant reviews). In our study we have used word embedding techniques to compare the efficacy of the simple RNN, LSTM, and BERT neural networks in the context of sentiment analysis. This research indicates that the use of BERT and LSTM yields the better outcomes, although BERT requires a longer training period.

An Assessment on Internet of Things

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Keywords: Internet of things, Sensors, Devices, Technologies, Applications

ABSTRACT

These days we are spending our lives where we are heavily dependent on IT developments. Technology plays a major role in our daily routine as we are relying on these technologies to get maximum comfort and benefits. Among many others, Internet of Things (IoT) also shows a rapid advancement through passage of time. IoT is a huge domain that deals with sensor based gadgets and has a lot of applications all around us. The world is swinging around with sensors and devices which will help humans to communicate with ease. In this research paper, we are going to provide a comprehensive survey of IoT technologies and also enlighten the issues associated with the technologies**.**

Analyzing Doppler Effects in Millimeter Wave VANET Communications Using BCH Coding

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Keywords: BCH coding, Millimeter wave, Reliability, Doppler Effect, VANET, and Relative velocity

ABSTRACT

The signal is attenuated and distorted in millimeter wave communication due to the short wavelength. Path loss is also significant because of its high carrier frequency. Further, it is more susceptible to rain and atmospheric attenuation. So the demand for reliable communication links and high transmission rates have tremendously increased during the last few years. The wireless communication in Vehicular Ad-Hoc Network (VANET) involves the transmission with lowest number of errors. The high mobility of the nodes in VANET results in an Induced Doppler Shift (IDS) in the carrier frequency at the receiver end. Therefore, effective communication in millimeter wave links for vehicular environments can be achieved by a deep understanding of the VANET communication channel, which is importantly different from those studied at frequencies below 6 GHz. Doppler shifts can negatively impact the reliability of V2V communication. In this paper, the analytical expression of the Doppler Effect for VANET communication is derived using our previous derived expression for Bose–Chaudhuri–Hocquenghem (BCH) coding in millimeter waves. It is observed that the proposed model results outmatch existing techniques addressing Doppler shifts.

Multi-feature Integration with Adaptive Learning Based Correlation Filter for Visual Object Tracking

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Department of Electrical Engineering, University of Engineering and Technology, Taxila

Keywords: Visual object tracking; feature fusion; peak-to-sidelobe ratio; adaptive learning; occlusion

ABSTRACT

Correlation Filter (CF) based tracking is the most imperative part of computer vision and offers many potential benefits. To get maximum benefits, object trackers need to provide better accuracy in presence of visually challenging scenarios with less computational burden. Therefore, this research aims to develop a robust object tracker to deal with target variations in a real-time environment. At first, the multi-feature descriptor is implemented using the feature fusion technique which combines the response of Histogram of gradient (HOG), saliency, gray level intensities, and Color Naming (CN) features. Afterward, an adaptive learning strategy is integrated by utilizing the Peak-to-Sidelobe Ratio (PSR) to evaluate correlation peaks. The quality of the proposed methodology is validated on challenging datasets. Tracking results reveal that the proposed scheme outperforms the other advanced CF trackers with Distant Precision (DP) scores of 88.2%, 85.9%, and 74.1% over OTB2013, OTB2015, and TempleColor128 datasets respectively.

Performance Metrics of RAKE receivers

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Keywords: delay in signals; time shifting; Bayesian belief networks; modulation; redundant systems; demodulation of signals; oscillators; receivers; transmitters

ABSTRACT

This paper deals with performance evaluation of RAKE receivers. The need to evaluate the performance of RAKE receivers is the necessity of quantitative analysis for the purpose of comparison with other wireless communications based receivers and analysis of market value for deployment in receiver based devices. In CDMA spread spectrum systems, the multipath components of transmitted signals are those signals which are received at the CDMA receiver side after some propagation delay involved during transmission from the transmitter side. Therefore multipath

components are referred as morphological forms of transmitted signals in CDMA spread spectrum based systems. It has been said that the propagation delay of multipath components must not exceed the chip rate of CDMA receivers. The RAKE receiver is CDMA spread spectrum system based receiver designed on the basis of triple modular redundant system. The RAKE receiver has three correlators which work as sub modules of triple modular redundant system. The three correlators of RAKE receiver are receivers which receive and process the time shifted multipath signals and propagate the processed signals to summer or integrator if the propagation delay is lesser than chip period after assigning weights to the processed time shifted multipath signals. The outputs of correlators are weighted with waiting coefficients then propagated to the summer for further signal processing. The RAKE receiver is always CDMA spread spectrum system based receiver. Using quantitative modeling techniques I found out that using M decision based correlators in RAKE receivers for receiving time shifted multipath signals improves the overall performance of RAKE receivers by reducing the bit error rate of the time shifted multipath signals and overcoming signal fading effects.

Customer Segmentation using Machine learning Techniques

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Keywords: E-commerce, Machine learning, customer segmentation, Data mining

ABSTRACT

The rapid expansion of e-commerce resulted in the influx of data in the mainstream. The data of customers can lead to better results and can help the stakeholders to take better results and improve their business. Machine learning also found its application in the e-commerce. Machine learning provides a vast collection of algorithms that produce efficient results in segmenting the customers. In this research paper, we explore e-commerce dataset to perform the segmentation of customers. We used ensemble technique to classify the customers using Support vector Machine (SVC), Logistics Regression, KNearest Neighbors, Decision Tree, Random Forest, AdaBoost Classifier and Gradient Boosting Classifier. We performed in dept analysis on the dataset, studying behaviors and forming clusters. In results, the ensemble model of ensembled Random Forest, Gradient Boosting and k-Nearest Neighbors gave 76.83 % precision.

Temperature Prediction by Gene Expression Programming

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Keywords: Climate Change, Weather, Artificial Intelligence, Modeling

ABSTRACT

Air temperature is a crucial climatic component. Because of ever-changing weather, the prediction has evolved into a difficult feat. This research aims to predict the maximum temperature of the central region of Thailand by Gene expression programming (GEP). This technique is a fast and precise prediction technique results using climate

measurements from previous years. The variables needed to construct the model are the daily maximum and minimum temperatures, relative humidity, and precipitation. Using Nash-Sutcliffe efficiency (NSE), Root mean square error (RMSE), and coefficient of determination (R^2) statistics, the performance of the GEP was examined. The results indicate that the GEP is reliable for predicting daily temperatures**.**

Prediction of IMDB Movie Score & Movie Success by Using the Facebook

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Keywords: Sentiment Analysis, Facebook, Movie, SVM, IMDB Score, Linear Regression

ABSTRACT

Movie industry is considered a high risk cultural industry. Prediction of the movie success before the release of a movie is of critical importance. Prior studies have been conducted to predict the movie success on the basis of sentiment analysis of movie reviews, IMDB score, tweets etc. However, this study implies the exploration of relationship b/w the Facebook features on the movie success and IMDB score. Two data sets were used for this study. Sentiment analysis of Facebook movie page was done through lexalytics to calculate the hype factor of that movie. A predictive model is developed that exploits Facebook features to predict movie success and IMDB score. Linear regression (LM) revealed that Facebook features are not solely important in the prediction of IMDB score and SVM shows the 84% accuracy in the prediction of movie success in terms of Hit and Flop; hence conclusion drawn is that the sentiment score of Facebook page will improve the accuracy of a prediction model for movie success.

Fake Reviews Classification using Deep Learning

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Keywords: Convolutional networks, Deep learning in NLP, Ensemble models, Fake reviews detection ,information retrieval, Social behavior

Customer decisions are heavily influenced by online reviews. Scammers and spammers can now influence consumer behavior by spreading false information in the form of reviews, either by promoting nonexistent goods or by disparaging rival goods. This means that identifying bogus from genuine reviews is more crucial than ever. For text classification, the standard method employs a bag-of-words model to represent text, leading to sparsity and word representations learned from neural networks with poor capacity for handling unknown words. In this work, we offer a method that uses an ensemble of models built using an aggregation methodology to make predictions based on data from three individual models trained using a multi-view learning approach. Our technology is based around a central idea of using bag-of-n-grams in conjunction with parallel convolution neural networks to extract valuable information from review text (CNNs). With the same amount of computing needed to train deep and sophisticated CNNs, we can leverage local context with an n-gram embedding layer that has tiny kernel sizes. In order to better extract feature representations from text, our CNN-based architecture takes n-gram embeddings as input and processes them with concurrent convolutional blocks. In addition to including linguistic aspects of the review text and non-textual information associated with reviewer behavior, our method for identifying fraudulent reviews also considers reviewer

activity. We test our method using the openly available Yelp Filtered Dataset, and get F1 scores as high as 92% for recognizing fraudulent reviews.

Semantic Social Searching-An Ontology Based Approach

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Keywords—component; formatting; style; styling; insert.

ABSTRACT

Nowadays, people rely on search engines for retrieving information. However, by submitting a query to traditional web search engines they get bundle of information at just one place. On the other hand when people wants to get expert opinion, they first try to approach their friends, families, and colleagues rather than a search engine because of the high level of intimacy trust. The recent and rapid rise of online social networking sites has made it possible to do it on a large scale. By keeping this in view many social searching tools are developed to facilitate the user to get the information from multiple social networking sites such as Google Social search, Social mention etc. These tool search information using keyword-based matching criteria, which makes it harder for normal user to find his/her desired information from the huge amount of retrieved data. This research work is intended to provide a social searching framework so that users can get the desired result easily. The proposed framework will first analyze the query semantically and filter out the irrelevant results and then results are ordered according to the user as well as post ranks. For that a ranking function will be devised that will compute users and posts ranking. As a result, user experience of performing social search will be improved.

Investigation of MPC for MIMO system in presence of both input and output constraints with relative parametric variation

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Keywords: Constraints; DC motor; MIMO, MPC; Parametric variation; Quadcopter; Simulink

ABSTRACT

This paper is an extension of the series of work published in consecutive two IEEE ICECCE conference proceedings. In this paper, MPC has been implemented to control a fast dynamic MIMO system i.e., rotors of the quadcopter in the presence of both input and output constraints along with some system's internal physical gains variations. The simulations are done by first developing the mathematical model of DC motor and then the MPC controller is designed. Finally, numerical simulations are done by using the MATLAB/SIMULINK software. The numerical results are demonstrated for roll, pitch, and yaw motions. The performance investigations are done in terms of percentage overshoot, steady-state error, and number of constraints violations. The results have shown that the MPC controller successfully control the speed of DC motors in the presence of operational constraints and parametric variations. The results indicate that MPC is a robust controller for fast dynamic MIMO systems.

MIMO Antenna for C-band Applications

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Keywords: MIMO, Patch Antenna, C-Band, WLAN, IoT

ABSTRACT

Two elements of MIMO antenna for WLAN, IoT, and satellite applications are anticipated and scrutinized. The proposed antenna is comprised of a rectangular ring with two curved patches and is fed by a feed line. This miniaturized antenna has an area of 15×20 mm^2 that can function at 6.14 GHz with a return loss of -10 dB. The resonance at 6.14 GHz is obtained by introducing two curves in a rectangular ring with concave surfaces. Antenna gain at resonance frequency is 5.4 dBi. It has an omnidirectional pattern in terms of H-Plane and a dipole pattern in terms of E-Plane as well as acquiring stable gain while using a partial ground plane. The antenna is successfully stimulated with a maximum ECC value of 0.02 and a diversity gain of 9.98 dB.

A Real-time Sequence Based Human Activity Detection System

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Keywords: CNN-LSTM, intelligent surveillance system, real-time activity classification, sequence-based detection, suspicious activity detection

ABSTRACT

During the last decade, human activity detection is increasingly attracting the attention of researchers, due to its numerous applications, such as in smart and automated shopping malls, hospitals, etc. Particularly, detecting human activity has been a challenge for researchers because complex situations may arise such as background clutter or changing illumination. To solve this issue, video segment classification cannot be tackled just as object identification. Therefore, it becomes inevitable to employ sequence-based techniques for video classification. In this paper, a Convolution Neural Network (CNN) is used in conjunction with Long Short-Term Memory (LSTM) to accomplish real-time human activity detection. In the proposed method, CNN serves as a spatial information detection algorithm from video while LSTM helps in the sequential tracking of identified objects quickly and accurately. This CNN-LSTM approach reduces the complexity of the model while also enhancing its accuracy along with enabling its real-time execution. Finally, a Raspberry Pi that functions as a standalone system is utilized for the implementation of the proposed CNN-LSTM approach. The results are presented and analyzed to solidify that the proposed standalone system can detect and classify events for real-time surveillance.

5 × 5 MIMO Antennas for Future 5G mm-Wave Communication

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Keywords: MIMO, FCC, spectral bands, 5G, CST

ABSTRACT
A suggested MIMO antenna's goal is to function in one of the Federal Communication Commission's designated 5G spectral bands (FCC). Due to its propensity to handle both many inputs and numerous outputs, MIMO technology may effectively address issues with large amounts of transportation and high data rates. The overall dimension of a single-element antenna is 10 x 10 mm^2. The proposed MIMO antenna design consists of twenty-five elements and the resonance frequency of each antenna element is 37 GHz. The maximum gain and directivity of an antenna are greater than 6 dB. For the designing and simulation of the proposed twenty-five element MIMO antennas is CST Studio Suite software. The proposed antenna will be a candidate for future mm-Wave communication applications in terms of compactness.

Network Attack Detection in IoT using Artificial Intelligence

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Keywords: Network Attack Detection, Malware Detection, Malware in IoT, Machine Learning Classifiers, Aposemat IoT-23 dataset

ABSTRACT

We like to have simple and automated solutions, but these simple and automated solutions in technology could also contains risks if not deal properly. Due to no international standard of compatibility for IoT, security and privacy concerns are there which needs to be focus. There can be multiple types of attack on IoT networks which can damage the device or steal the sensitive information. Therefore, artificial intelligence (AI) techniques has an ability to detect and classify an unknown network behavior by learning the network attacks patterns based on large volumes of historical data. We considered Aposemat IoT-23 which is a labelled dataset and created in the Avast laboratory. Basically, the goal of this large dataset is to provide labelled and real IoT attacks. In this paper, we used this dataset, considered the relevant workings, investigate the background and implement the machine learning algorithms such as Decision Tree, Random Forest and Naive Bayes. We also compared the accuracy among these machine learning algorithms on the IoT-23 dataset and showed the most efficient machine learning algorithm is Random Forest as per results by using Aposemat IoT-23 dataset, as well as showed feature engineering techniques to preprocess the mentioned dataset for detection and classification of IoT network attacks.

Examining Malware Patterns in Android Platform using Sufficient Input Subset (SIS)

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Keywords: SIS, machine learning, black box model, black box prediction, black box explain-ability

ABSTRACT

Smartphones are now inseparable part of our reality. Several machine learning algorithms exists for detection of malwares in android applications; however, these techniques fail to rationalize specific decisions made by a “Black Box” therefore lacking explain-ability. To overcome this limitation, Sufficient Input Subset (SIS) technique is used along with convolutional neural network (CNN). SIS categorizes minimal subsets of features who’s observed values alone be sufficient for the same verdict to be reached. The results of the proposed technique are very promising, where

its detection accuracy reached more than 90% and we were able to rationalize why the Black box classified a file as malware.

Impact of Computer Gaming Addiction on Body Mass Index - A Quantitative Investigation about Sukkur City of Pakistan

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Keywords: computer gaming addiction; BMI Body Mass Index; Chi-Square; Sukkur

ABSTRACT

Computer gaming addiction has been evolved as a detrimental form of addiction in yesteryears. The past researches show that internet and gaming addiction is as problematic as it takes a toll on one's mental and physical health. Body Mass Index (BMI) is one of the key facets to determine one's physical health fitness since the last two centuries. Consequently, gaming and addiction and body mass index strike as being associated to each other. Thus, this paper aims to investigate the impact of computer gaming addiction (CGA) on the Body Mass Index (BMI) of a person. The research methodology is based on a survey conducted in the Sukkur city of Pakistan where 300 respondents participated. To ensure the legitimacy of research, consensus based scaling was used and the responses were validated by performing Chi square test. The results indicated a significant impact of Computer gaming addiction (CGA) on the Body mass index (BMI) of an individual.

Skin Cancer Prediction using Deep Learning Techniques

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Keywords: Deep learning, CNN, Skin Cancer, Melanoma, Detection, Diagnosis

ABSTRACT

There is a growing need for early diagnosis of skin cancer because of the rapid growth rate of melanoma skin cancer, its high treatment costs and high mortality rate. The detection of skin cancer cells was usually done manually, and most cases require a lengthy cure. Currently the main problem in skin cancer detection is high misclassification rate and low accuracy. This paper provides a technique based on deep learning techniques to detect the cancer from skin images. Convolutional neural network-based model consisting of six layers with hidden layers is used in this work. The problem of low accuracy is addressed with the help of regularization technique and features are selected with the help of convolution method. To improve the accuracy of the model hyper parameter tuning along with model parameter tuning are performed. Publicly available dataset is used in the research which contains images with cancer and normal instances. The major steps in this work includes data collection, preprocessing, data cleaning, visualization, and model development. At the end a comparative analysis is performed with state-of-the-art techniques. The proposed model achieved good accuracy of 88% on HAM dataset as compared to state of the art techniques.

Hybrid Approach using Extreme Gradient Boosting (XGBoost) and Evolutionary Algorithm for Cancer Classification

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Keywords: XGBoost, Feature selection, GCO, Classification, evolutionary algorithm

ABSTRACT

Cancer is a leading cause of mortality globally. World Health Organization estimates that around 10 million people die from cancer in 2020. Cancers of the colon, breast, lung, central nervous system, cervix, and prostate are quite common. In most cases, cancer may be efficiently treated if caught early. The biological data included in microarrays is very informative. This data analysis aids in the identification and treatment of difficult illnesses. It is quite difficult and time consuming to train a model with such a large number of features when they are all input directly. This is why we employ an Evolutionary Algorithm named as Group Counseling Optimizer (GCO) in tandem with Extreme gradient boost (XGBoost) to classify cancer in microarray data. At the outset, we have the Extreme Gradient Boosting ensemble-selected features. In this step, irrelevant features will be eliminated, and a set of optimal characteristics for detecting cancer has been generated. In a second usage, the evolutionary method is used for cancer classification.

Design and Control of a Bionic Leg

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Keywords: Prosthetic leg, Adaptive control, Bionic leg control

ABSTRACT

The limb amputation rate around the world is rising due to several reasons. Robotic prosthetic devices are now evolving that assist amputees in walking, picking and grasping objects, climbing stairs, and even running. However, the design and control of these robotic-powered prosthetic devices is still a big challenge. A major problem in the implementation of these devices is their safe interaction with the human amputee. This paper proposes the design and control of a robotic prosthetic knee for lower limb amputees. Design and analysis were carried out in SolidWorks and ANSYS respectively to visualize the device behavior under whole human weight. The prosthetic leg is designed for knee and ankle joints, where the knee joint is an active joint using a hydraulic actuator and the ankle joint is designed as a passive joint for flexion and extension as per the natural gait of a human. The hydraulic actuator acts as a rigid link for supporting the amputee's load; and requires no additional breaking mechanism in case of knee extension beyond the safety range. Finally, a model reference adaptive control is employed to control the torque provided to the knee joint of a prosthetic knee using MATLAB Simulink. The simulation results obtained show validation of the developed model and the controller employed for control of the knee joint.

Magnetic Anomaly-Based Detection of a Submarine

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Keywords: MAD, aircraft, submarine, magnetic interference field, COMSOL Multiphysics, OBF, detection

ABSTRACT

Seawater provides a natural hideout for seaborne vehicles and weapons. So the detection of seaborne objects/vehicles has been an area of strategic interest. Earth's magnetic field is a global phenomenon that travels in a straight path deviating only from the presence of permeable objects. This deviation from the straight path can be sensed passively by a magnetic sensor. Magnetic anomaly detection (MAD) is a technology used to detect submarines based on the principle that a moving magnetic object will disturb the Earth's magnetic field. This article discusses the basics of magnetic anomaly detection for submerged objects, including how it works, its history, and recent advances in technology. A magnetic signature of the submarine and aircraft's interference field has been created for exploring passive detection by sensors to demonstrate the MAD process. Work is simulated in COMSOL Multiphysics and results are added. The validation of this work will be done in the future by hardware implementation of MAD**.**

Implementation of SVPWM based Multilevel Three Phase Inverter to Reduce THD

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Keywords: Harmonics, Multilevel Inverters, Space Vector Pulse Width Modulation, Switching losses, Total Harmonic Distortion

ABSTRACT

The Multilevel inverter has gained great attention from the academia and industry due to its increased number of applications in the power sector. However, effective control of semiconductor switches plays very crucial role in the output of inverter, as any wrong execution of two switching patterns simultaneously may result in short circuit. Moreover, high frequency switching of these switches cause power losses and harmonic distortion. Soft switching techniques are used to reduce switching losses and consequently improve Total Harmonic Distortion (THD). In this research work, Space Vector Pulse Width Modulation (SVPWM) technique is employed to improve the switching loss and THD of multilevel three phase inverter and consequently increase the efficiency of system. The performance has been investigated in terms of THD, fundamental output line voltage and output line current for multiple resistive loads. The results show that proposed technique has successfully controlled the output in both scenarios and reduced the THD to an acceptable limit of 2.91%. Thus, the results validate that SVPWM is an effective technique for multilevel inverters.

Design and Development of Die Sink Electrical Discharge Machine for Melting Point and Removal Rate of Materials

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Keywords: Micro-EDM, Die Sink EDM, Material Removal Rate, Lathe machine, Milling Machine, Flow System, Surface Roughness

ABSTRACT

In this world of advanced technology, unconventional Micro-EDM technology has shown extraordinary interest in the development of microstructure. This work presents the development of the Die Sink EDM machine and investigates the relation and effect of melting point of the electrode materials on Material Removal Rate (MRR) by machining on brass and steel. Unlike traditional Lathe and Milling Machines, the Die Sink EDM machine is an environmentally friendly thermal process that generates sparks to melt workpiece materials at high temperature. The removal of workpiece materials depends on the melting point of the electrodes. In addition, the Flow System was used to remove debris from the dielectric fluid and to act as an insulator to cool the workpiece. Overall, it is concluded that the materials with higher melting points took longer to process than materials with lower melting points. Moreover, electrode materials with high material removal rate (MRR) provided more Surface Roughness.

MOOCs and their contribution to the continuous development of high school teachers

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Keywords: MOOC, professional training, teachers, high school, virtual classes

ABSTRACT

The objective was to know the contribution of MOOCs in the continuous training of Peruvian high school teachers and also to highlight the challenges and difficulties they presented. The research was mixed with a sequential explanatory design; initially 311 participants entered the survey, but after the corresponding filters, an effective sample of 149 secondary education teachers was reached. According to the results, 63% of initial participants completed a MOOC, of these 92% obtained certification, the majority invested up to 50 dollars to obtain a certificate and a large number of promoters appeared in the NPS survey. On the other hand, it was shown that MOOCs contribute positively to the development of digital, didactic and pedagogical skills; however, it was identified that passive and detractor teachers do not agree with the autonomy of MOOCs because they demanded personalized attention**.**

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