



ISLAMIC UNIVERSITY OF SCIENCE &
TECHNOLOGY - KASHMIR



BOOK OF ABSTRACTS

INTERNATIONAL CONFERENCE ON ARTIFICIAL INTELLIGENCE, MACHINE LEARNING & INTELLIGENT SYSTEMS (ICAIMLIS2023)

Organized by
Centre For Artificial Intelligence,
Centre of Excellence, CIED
&
Watson-Crick Centre for Molecular Medicine

in collaboration with
Soft Computing Research Society, New Delhi

30-31 October 2023 (Hybrid Mode)

Foreward

On behalf of the organizing committee and as the Patron of the International Conference on Artificial Intelligence, Machine Learning, and Intelligent Systems (ICAIMLIS2023), it is with great pleasure and immense pride that I extend a warm welcome to each and every one of you. It is indeed an honour to have you join us for this remarkable event.

ICAIMLIS2023 has been made possible through the collective efforts of the Centre for Artificial Intelligence, the Centre of Excellence CIED, and the Watson-Crick Centre for Molecular Medicine at the Islamic University of Science and Technology - Kashmir. Our collaboration with the Soft Computing Research Society, New Delhi, further enriches the fabric of this conference and underscores our commitment to fostering interdisciplinary cooperation.

Our primary focus at this conference is to showcase the latest advances and cutting-edge research in the fields of Artificial Intelligence, Machine Learning, and Intelligent Systems. We place particular emphasis on their applications in various domains of science, recognizing the transformative potential these technologies hold for the betterment of humanity.

ICAIMLIS2023 assembles a diverse community of scholars, scientists, industry professionals, and postgraduates from a wide range of engineering and related fields. The knowledge shared and connections made at this conference will undoubtedly drive innovation, collaboration, and progress in these pivotal domains.

As we embark on this journey of discovery and innovation, I encourage you to engage, share, and learn from one another. Let the interdisciplinary dialogue be a catalyst for groundbreaking solutions and a source of inspiration for the challenges that lie ahead.

I express my heartfelt gratitude to all our sponsors, organizers, reviewers, authors, and attendees who have made ICAIMLIS2023 possible. Your dedication to the pursuit of knowledge is the driving force behind this conference, and your presence here today is a testament to your commitment to excellence.

Prof. A. H. Moon

Patron ICAIMLIS2023

Islamic University of Science and Technology, Kashmir

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About Conference

Artificial Intelligence (AI), Machine Learning (ML), and Intelligent Systems are rapidly evolving fields that have gained immense attention and popularity in recent years. AI refers to the ability of machines to perform tasks that typically require human intelligence, such as perception, reasoning, learning, and problem-solving. ML is a subset of AI that involves the development of algorithms and statistical models that enable machines to learn from data without being explicitly programmed. Intelligent Systems, on the other hand, are computer systems that use AI and ML technologies to interact with their environment and make intelligent decisions. These technologies are transforming industries such as healthcare, finance, manufacturing, and transportation, and have the potential to create new opportunities and solve complex problems. The International Conference on AI, ML, and Intelligent Systems is held to provide an excellent opportunity for researchers and practitioners to showcase their work, share insights, and explore new trends and applications in these exciting fields. The conference will bring together leading researchers, academics, industry professionals, and students from around the world to share their knowledge and experience on the latest trends, developments, and applications of Artificial Intelligence, Machine Learning, and Intelligent Systems. It will provide a unique opportunity for attendees to learn from experts in the field, network with their peers, and gain new insights that can be applied to their work. The conference is technically sponsored by Soft Computing Research Society (SCRS) and is expected to be held for two days (30-31 October, 2023), with a schedule that includes keynote speeches, panel discussions, paper presentations and workshops. The conference will cover a wide range of topics, including:

Machine Learning	Memory Paradigms	Extreme Learning Machines
Artificial Intelligence	Reasoning Models	
Intelligent Agents	Quantum Computing	Nature Inspired Optimization
Big Data Analytics	Swarm Intelligence	
Rough Sets	Cognitive Learning	Adversarial Machine Learning
Fuzzy Logic	Learning Paradigms	Multi-Objective Optimization
Deep Learning	Autonomous Systems	
Explainable AI	Evolutionary Computing	Physics Informed Neural Networks
Computer Vision		
Neural Networks	Reinforcement Learning	Robotics and Intelligent Systems
Bayesian Methods	Ethics and Safety in AI	

Application Areas

The application areas of Artificial Intelligence that could be focused in the conference include but are not limited to:

- **Healthcare and Medical Image Analysis:** AI and ML algorithms can be applied to medical images to assist in diagnosis, treatment planning, and disease monitoring.
- **Drug Discovery and Development:** AI and ML algorithms can be used to help discover new drugs, predict drug efficacy, and minimize adverse effects.
- **Environment and Climate Change:** AI and ML algorithms can be applied to help monitor and predict the impact of climate change, predict natural disasters, and develop sustainable energy solutions.
- **Finance and Banking:** AI and ML algorithms can be used to improve fraud detection, reduce risk, and optimize investment strategies.
- **Agriculture and Food Industry:** AI and ML algorithms can be used to optimize crop yield, predict crop failure, and reduce food waste.
- **Transportation and Logistics:** AI and ML algorithms can be used to improve traffic flow, reduce emissions, and optimize supply chain management.
- **Natural Language Processing (NLP):** AI and ML algorithms can be used to improve language translation, sentiment analysis, and content generation.

Workshops

To enhance the learning experience of participants two engaging workshops will be conducted alongside the conference. These workshops will provide focused and hands-on sessions on specific topics related to artificial intelligence and machine learning.

People

Organizing Committee

CHIEF PATRON

Prof. Shakil A. Ramshoo

Hon'ble Vice Chancellor, IUST Awantipora, India

Prof. Shakil Ahmad Romshoo, the Vice-Chancellor of IUST, is a distinguished academic and researcher with a rich multidisciplinary background. With nearly 34 years of experience, he has worked as a Scientist at the Japan Aerospace Exploration Agency in Tokyo and as a Fellow at the Energy and Resources Institute in New Delhi. Prof. Romshoo is a recognized scholar, being an elected fellow of prestigious organizations such as the Indian Academy of Sciences, Indian Society of Remote Sensing, and Indian Society of Geomatics. He has received numerous national and international awards, including the Satish Dhawan Award from ISRS-ISRO in 2019, and he has made significant contributions to the fields of geomatics, hydrology, glaciology, and climate change. With his extensive involvement in policymaking committees and his guidance of numerous Ph.D. and M.Phil students, he continues to be a leading figure in the realm of environmental and geospatial research.

PATRON **Prof. Ayaz Hassan Moon**

Dean Research, IUST Awantipora, India

Prof. Ayaz Hassan Moon is currently serving as a Professor in the Department of Electronics and Communication Engineering and is holding the office of Dean Research at the Islamic University of Science and Technology (IUST) Awantipora. He has an experience of over 40 years in various fields including 6 years in the Consumer Electronics Industry, about 30 years in Administering Technical Organisation, IT-HRD, Academics, Capacity building, Consultancy, Advisory and R&D with last 5 years in a University System. He has been involved in the execution of various projects for Rs 1200 crores in the last twelve years. At IUST, he is Principal Investigator for major projects like setting-up of IUST Cloud and Centre of Excellence in Innovation. He has been Chief Investigator for IECT projects, like Smart Class Room Project of J&K Education department, Capacity building in ESDM, setting-up of Computer Forensics Lab. He serves on Academic boards of various Universities, apart from being formerly a member of J&K state e-Governance agency, Member IEEE, Fellow IETE, NAAC Assessor as a member/coordinator of NAAC peer teams.

CONVENOR

Dr Assif Assad

Assistant Professor, IUST Awantipora, India

Dr. Assif Assad, is a Senior Assistant Professor at the Department of Computer Science and Engineering, Islamic University of Science & Technology since 2008. Dr. Assad's expertise spans a wide array of disciplines, including Artificial Intelligence, Machine Learning, Deep Learning, Reinforcement Learning, and Nature-Inspired Optimization. Dr. Assad's research contributions are exemplified by over 13 journal articles, 12 conference papers, and 9 workshops. His accomplishments extend to the successful acquisition of multiple research grants, which have funded pioneering projects, including the development of High-Performance Computing Lab at IUST. He has also secured substantial funding for projects like deep learning-based algorithms for disease diagnosis, early detection of Alzheimer's disease among others. Dr. Assad's innovative spirit is further reflected in his patents and copyrights for various AI and machine learning-based systems, such as disease diagnosis and artwork identification. He is a member of prestigious organizations such as IEEE, the Soft Computing Research Society India, and the Computer Society of India. Dr. Assad's remarkable achievements and unwavering commitment to research and education make him a highly respected figure in the field of computer science and artificial intelligence.

CO-CONVENOR

Dr Muzafar Rasool

Assistant Professor, IUST Awantipora, India

Dr. Muzafar Rasool is a Senior Assistant Professor in the Department of Computer Science at the Islamic University of Science and Technology. He has been a faculty member at the university since 2008. His research interest is in areas related to artificial intelligence, precisely focusing on Machine Learning and Deep Learning with their applications in fields like Computer Vision, Social Media Analysis, Natural Language Processing and Bioinformatics. He has a solid research track record, having published 16 research papers, presented at 17 conferences, written one book, and co-authored three book chapters. He also holds six patents in the fields of Artificial Intelligence, Machine Learning, and Deep Learning. In addition, he has received seven research grants totaling more than Rs. 26 crore from local and national funding agencies. Dr. Muzafar is one of the leading experts in the valley on Artificial Intelligence and Machine Learning and is currently leading the only state of the art cloud based High Performance Computing Lab of the UT where he is working on the translational research through the application of artificial intelligence in the field of oncology, agriculture, sentiment analysis and many more. Dr. Muzafar is a member of the IEEE, the Mathematical Society of Kashmir, and the Board of Studies of the Cluster University Kashmir.

ORGANISING SECRETARY

Dr Rumaan Bashir

Dean SOET, IUST Awantipora, India

Dr. Rumaan Bashir is a distinguished professional with an impressive career in computer science and academia. With a distinguished academic record, Dr. Rumaan has achieved excellence in all stages of her education securing a Gold Medal during her Masters of Computer Applications. Her leadership qualities are reflected in her roles as Head of the Department of Computer Science and the Dean of the School of Engineering and Technology at Islamic University of Science and Technology, besides her involvement in setting up and leading the Advanced Centre for Information Technology & e-Governance at the university. Dr. Bashir has authored or co-authored more than 20 research publications, one book, three book chapters, and 15 conference papers, solidifying her expertise in areas such as Pattern Recognition, Signal Processing, and Image Processing. Her dedication has been recognized with awards, including Best Oral Presentation awards and recognition from various science congresses and organizations. Her achievements also extend to the development and coordination of the Advanced Centre for Information Technology and e-Governance at the Islamic University of Science and Technology. Her memberships in esteemed professional organizations such as IEEE and the Indian Society for Technical Education (ISTE) underline her commitment to staying connected with industry developments.

Keynote Speakers

PROF. KUSUM DEEP

Professor Mathematics

Joint Faculty, Mehta Family School of Data Science and AI, IIT Roorkee

Prof. Kusum Deep is the professor of Mathematics, joint faculty, Mehta Family School of Data Science and AI, IIT Roorkee, India. She is a distinguished academic figure with a notable presence in the field of mathematics and computer science. As a seasoned researcher, she has contributed extensively to the areas of soft computing, optimization, and their applications across various domains. With a significant number of research publications and awards to her credit, Professor Deep is recognized for her influential work in the academic community. Over the last several years, her research is increasingly well cited making her a central International figure in the area of Nature Inspired Optimization Techniques, Genetic Algorithms and Particle Swarm Optimization. She has won numerous awards like Khosla Research Award, UGC Career Award, Starred Performer of IITR Faculty, best paper awards by Railway Bulletin of Indian Railways, special facilitation in memory of late Prof. M. C. Puri, AIAP Excellence Award.

DR. TAPAN KUMAR GANDHI

Associate Professor, Department of Electrical Engineering

Indian Institute of Technology Delhi

Dr Tapan K Gandhi is currently working as Associate Professor in the Dept. of Electrical Engineering, Cadence Chair Professor of AI and Automation, Joint Faculty in School of AI, IIT Delhi and adjunct faculty in the school of AI and data science, IIT Jodhpur. He is also research affiliate to MIT, USA. He received his Ph.D. fellowship from (MIT, USA) and obtained his Ph.D. in Biomedical Engineering from IIT Delhi. He has published papers in top ranking journals like Nature, PNAS, Current Biology, PloS Biology, IEEE Transactions. He has more than 160 publications in International journals and conference proceedings. He is PI & Co-PI of multi Crore funded projects from Industry as well as Govt. of India organizations. He has received many awards in India (including one from Ex-President of India, Dr Kalam) and abroad for his academic excellence and groundbreaking research. He has four patents and three technologies transfer to Ministry of Social Justice, Govt. of India. He is serving as expert member (Task Force) in various research committees in Govt. of India, UNESCO. He has also received Platinum Jubilee YOUNG SCIENTIST award 2015 by National Academy of Science in INDIA and GYTI 2019 Award. He is elected Fellow of National Academy of Engineering (FNAE). Presently he is the Chairperson of Project Prakash charitable Trust, that helps in Restoration of Vision and providing education to visually impaired in India.

DR. M. TANVEER

Ramanujan Fellow and Associate Professor

Discipline of Mathematics, Indian Institute of Technology, Indore

M. Tanveer is an Associate Professor and Ramanujan Fellow at the Discipline of Mathematics at the IIT Indore. His research interests include support vector machines, optimization, machine learning, deep learning, and their applications in Alzheimer's disease and dementias. He has published over 100 refereed journal papers of international repute, with his publications amassing over 3950 citations and an h-index of 33 (Google Scholar, June 2023). Recently, he was included in the list of the world's top 2% scientists in a study conducted by Stanford University, USA. He has served on review boards for more than 100 scientific journals and on scientific committees for various national and international conferences. He is the recipient of the 2023 IIT Indore Best Research Paper Award, the 2022 Asia Pacific Neural Network Society Young Researcher Award, and was the sole recipient of the 2016 DST-Ramanujan Fellowship in Mathematical Sciences. He serves as the General Chair for the 29th International Conference on Neural Information Processing (ICONIP2022), which is the world's largest and top technical event in Computational Intelligence. Tanveer is currently the Principal Investigator (PI) or Co-PI of 12 major research projects funded by the Government of India, including the Department of Science and Technology (DST), Science & Engineering Research Board (SERB), Council of Scientific & Industrial Research (CSIR), MHRD-SPARC, and ICMR.

DR. MILLIE PANT

Ramanujan Fellow and Associate Professor

Discipline of Mathematics, Indian Institute of Technology, Indore

Millie Pant is an Associate Professor at the Department of Applied Science and Engineering at IIT Roorkee's Saharanpur Campus. Her expertise spans various fields, including Numerical Optimization, Operations Research, Soft Computing, and Swarm Intelligence Techniques, with applications ranging from engineering design problems to image processing and supply chain management. With over 14 years of academic experience at IIT Roorkee, Dr. Millie has contributed significantly to the academic community with 95 publications to her name, including peer-reviewed international and national journal papers, conference proceedings, and book chapters. Her academic influence is substantiated by her citations, encompassing 67 referenced publications and an H-index of 11. Dr. Millie has also been involved in DST sponsored project with a grant of Rs. 13.97 lacs as a Principal Investigator and as a Co-Principal Investigator in another project sponsored by MHRD for Rs. 2.00 Crore.

International Advisory Committee

Name	Affiliation
Prof. Z W Geem	Korea University
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Prof. Alaa El-Hussuna	Aalborg University Hospital

ABSTRACTS

Medical Sciences

[ID: 11] Resnet-Unet With Transformer Blocks For Glioma Brain Tumor Segmentation

Novsheena Rasool (Islamic University Of Science And Technology Kashmir,J&K India)*; Javaid Iqbal Bhat (Islamic University Of Science And Technology Kashmir,J&K India)

Segmenting brain tumors from MRI images is of paramount importance in various clinical scenarios by aiding in the accurate outlining of anatomical features and areas affected by diseases. In this paper, we introduce a novel deep learning approach for the precise glioma brain tumor segmentation. The proposed model combines the strengths of a ResNet U-Net with Transformer blocks to effectively capture both local and global context information in MRI images. The architecture consists of ResNet-based encoder, which extracts hierarchical features from the input images. A series of residual blocks enhance the feature representation while preserving spatial information. Subsequently, a middle transformer block is introduced, incorporating Multi-Head Attention mechanisms to enable long-range dependencies and contextual understanding. This block is iteratively applied to improve feature interactions. To handle the varying scale of structures within MRI images, we employ skip connections during the decoding process. Transposed convolutional layers in the decoder upsample feature maps, preserving details and integrating earlier layer context. The performance of our model has been rigorously assessed using the BraTS2019 training and validation dataset. We assessed the effectiveness of our architecture using a comprehensive set of evaluation metrics, which included accuracy, IoU score, specificity, sensitivity, dice score and precision. Our evaluation focused on individual tumor classes, including the complete tumor, core tumor, and enhancing tumor. During the validation phase, our proposed model achieved remarkable dice scores of 0.91, 0.89, and 0.84 for the complete tumor, core tumor, and enhancing tumor, respectively, demonstrating an impressive overall accuracy rate of 98%.

[ID: 13] Different Preprocessing And Augmentation Techniques For Segmentation Classification Of Leukemia Using Blood Smear Images: A Comparative Study

Rohini Raina (Shri Mata Vaishno Devi University)*; Dr Naveen Gondhi (Smvdu)

Abstract: The preprocessing technique is the first step in classifying leukemia, a deadly disease due to the uncontrolled production of immature white cells. Noise may occur in microscopic images or electrical data transfer through channels during acquisition. Sometimes, even if there is no detail in the blood cell image, noise may change the brightness level, which lowers the image quality of the blood cell images. Noisy microscopic image segmentation will yield inaccurate segmentation outcomes, which overall affect the accuracy of the classification and detection of the disease. The medical image's contrast is improved, and noise is minimized using preprocessing techniques. This paper summarizes all the preprocessing and data augmentation techniques that improve the dataset, which is later compared using accuracy in the leukemia classification.

[ID: 18] Diagnosing Liver Disorders Using Neuro-Fuzzy Grey Wolf Optimization Method

Mina Rajabi (Department Of Computer Science, Yazd University, Yazd, Iran); Hajar Sadeghizadeh (Department Of Computer Science, Islamic Azad University Of Yazd, Yazd, Iran); Azra Molamasoumi (Islamic Azad University)*; Mohd Asif Hajam (Baba Ghulam Shah Badshah University, Rajouri-India); Tasleem Arif (Department Of Information Technology, Baba Ghulam Shah Badshah University, Rajouri-Jammu And Kashmir-India); Akib Mohi Ud Din Khanday (Department Of Computer Science& Software Engineering-Cit, United Arab Emirates University, Al Ain, Uae); Mehdi Neshat ("University Of Adelaide, Computer Sceince Department")

The hybrid method proposed in the study, ANFIS-GWO, combines the Adaptive Neuro-Fuzzy Inference System (ANFIS) with Grey Wolf Optimization (GWO) for the diagnosis of liver disorders. ANFIS is a powerful tool that combines the advantages of neural networks and fuzzy logic to create a hybrid model capable of handling complex and uncertain data. GWO is a metaheuristic optimization algorithm inspired by the social behaviour of grey wolves. In the ANFIS-GWO method, the hyper-parameters of ANFIS are optimized using GWO. This optimization process aims to fine-tune the ANFIS model based on the available dataset, which consists of 7 characteristic attributes and 354 samples related to liver diseases. By adopting the hyper-parameters, the ANFIS-GWO method enhances the overall performance and accuracy of the diagnostic system. To evaluate the effectiveness of the ANFIS-GWO intelligent medical system, the study employs classification accuracy, sensitivity, and specificity analysis. Classification accuracy measures the overall correctness of the system in predicting liver disease cases. Sensitivity refers to the system's ability to correctly identify individuals with liver disorders, while specificity measures

its ability to correctly identify those without liver disorders. Experimental results demonstrate that the performance of the ANFIS-GWO method surpasses that of traditional Fuzzy Inference Systems (FIS) and ANFIS models that do not undergo an optimization phase. This suggests that the integration of GWO optimization significantly improves the diagnostic accuracy of the ANFIS model for liver disease diagnosis. Keywords: Adaptive Neuro-fuzzy Inference systems, Liver Disorders, Bupa dataset, Grey Wolf Optimization, Swarm Intelligence

[ID: 23] Machine Learning-Based Cervical Cancer Detection: A Comprehensive Study

Inam Ul Haq (Chandigarh University)*

Worldwide, cervical cancer is a major public health concern, and successful treatment and better results depend on early identification. On the basis of information gathered from the UCI repository's health department, a machine learning model was created for this study to predict cervical cancer. A number of models were trained using a variety of techniques, including XG Boost Classifier, Random Forest Classifier, Extra Trees Classifier, Bagging Classifier, and Decision Tree Classifier, after the dataset had undergone pre- processing. The performance metric of accuracy was used to choose the model that performed the best. The dataset had four target variables, and the three models with the greatest accuracy were Hinselmann and Schiller (97.01%), Cytology (95.52%), and Biopsy (96.51%). The findings might help with early detection and preventative measures for cervical cancer and show the possible applications of machine learning algorithms for precise prediction.

[ID: 44] Gastric Cancer Molecular Heterogeneity Analysis: Deep Learning Based Classification Of Mesenchymal And Epithelial Phenotypes From Histopathology Images

Ab Naffi Ahanger (Islamic University Of Science And Technology, Kashmir); Assif Assad (Islamic University Of Science And Technology); Ab Basit Ahanger (Islamic University Of Science And Technology); Syed Wajid Aalam (Islamic University Of Science And Technology); Muzafar Ahmad Macha (Islamic University Of Science And Technology); Muzafar Rasool Bhat (Islamic University Of Science And Technology, Kashmir)*

Gastric cancer exhibits a highly heterogeneous nature, demanding precise classification for tailored treatment strategies. Traditional morphological-based classifications, while foundational, possess limited clinical utility due to the molecular heterogeneity in gastric cancers. As a result, molecular classification has emerged as a critical aspect of cancer diagnosis and treatment planning. However, conventional molecular profiling techniques require time-consuming bioinformatics methods and advanced technology. In contrast, hematoxylin and eosin H&E stained images, a routine component of cancer diagnostics, provide a rich source of informatio. In

this study, we present a deep learning framework capable of automatically classifying gastric cancer into epithelial and mesenchymal phenotype subtypes directly from digital histopathological images. Leveraging a cohort of 61 patients for both training and testing, our framework achieved an impressive ROC-AUC of 81%. Our findings unfold the potential of deep learning-based analysis of histopathological images to find novel therapeutic targets and invaluable prognostic and therapeutic response biomarkers.

[ID: 50] Towards Early Detection: A Deep Learning & Ai Approach To Diabetic Retinopathy Diagnosis

Mufassir Dr. Yaseen (Mitwpu)*; Aditi Kathalay (Mitwpu Pune); Rajeshree Khande (Mit World Peace University, Pune)

By utilizing the strength of deep learning techniques, notably perceptron and convolutional neural networks (CNN), this study investigates the diagnosis of diabetic retinopathy. The demand for accurate and effective screening techniques has increased due to the environment's rising prevalence of diabetic retinopathy cases. The application of these deep learning models is carefully orchestrated to strike a harmonious balance between diagnostic accuracy and timely results, potentially reshaping early disease detection and elevating patient care standards. Amidst the escalating demand for diabetic retinopathy screening, this study focuses on refining computational processes, with a central objective of delivering timely diagnostic results. The research underscores the transformative potential of deep learning techniques, particularly the perceptron and CNN, in revolutionizing early diabetic retinopathy identification. By introducing more resource-efficient and ecologically responsible screening methods, this initiative holds the promise of significantly impacting the healthcare industry, offering prompt interventions and improving patient outcomes.

[ID: 55] Modeling Drug-Target And Drug-Drug Interactions Using Deep Learning Algorithms: A Review

Aga Basit Iqbal (Islamic University Of Science And Technology)*; Syed Za Shah (Islamic University Of Science And Technology, Kashmir, India); Assif Assad (Islamic University Of Science And Technology)

The Interactions between therapeutics and their targets are important in drug development and successfully identify and predict possible Drug Drug Interactions (DDIs). DDIs are a serious public health issue. Recent reports show that DDIs cause 74,000 emergency visits and 195,000 hospitalizations annually in the United States. Deep learning methods are proving very efficient in addressing this issue. This review covers a study about deep learning approaches for DDI, drug-target interaction, and related approaches. We summarize the strengths and limitations of state-of-the-art models concerning various metrics, viz: Area under the receiver operating characteristics (AUCROC), area under the curve (AUC), sensitivity, recall, precision, FI –score, and accuracy.

[ID: 68] Histopathology-Based Detection Of Oral Cavity Squamous Cell Carcinoma Using Deep Learning Models

Tabasum Majeed (Islamic University Of Science And Technology); Syed Wajid Aalam (Islamic University Of Science And Technology); Ab Basit Ahanger (Islamic University Of Science And Technology); Muzafar Ahmad Macha (Islamic University Of Science And Technology); Tariq Ahmad Masoodi (Department Of Cancer Research, Sidra Medicine, Doha, Qatar); Muzafar Rasool Bhat (Islamic University Of Science And Technology, Kashmir); Assif Assad (Islamic University Of Science And Technology)*

Oral Cavity Squamous Cell Carcinoma (OCSCC) is a prevalent malignancy that primarily affects the oral cavity in the head and neck region, posing the challenge of diagnosing more than half of the patients at advanced stages. A fundamental standard in diagnosing OC-SCC relies on examining hematoxylin and eosin (H&E) histopathological whole-slide images (WSIs). Traditional histopathological evaluations, pivotal for diagnosis, heavily depend on pathologist expertise, making it a slow and resource-intensive process. In this context, automating the diagnosis through biopsy analysis becomes crucial for timely patient treatment and predicting outcomes. While the conventional machine learning approach to feature extraction depends on expert insight to identify relevant features, deep learning provides an advanced solution by autonomously isolating and extracting high-level abstract features precisely. In this study, we explore the predictive capabilities of deep neural networks, specifically ResNet101 and VGG16, to detect Oral Cavity Squamous Cell Carcinoma. Two distinct training approaches are investigated: training these models from scratch and employing transfer learning, where pre-trained networks are fine-tuned on our dataset. Our results indicate that ResNet101 consistently outperforms both VGG16 and the same ResNet101 model trained from scratch, achieving an accuracy of 91% and an Area Under the Curve (AUC) of 0.87 on the test set when trained via transfer learning. This study substantially enhances the diagnostic effectiveness for OCSCC patients by utilizing histopathological images while concurrently reducing diagnostic expenses.

[ID: 69] Unveiling The Impact Of Artificial Intelligence On Cancer Histopathological Image Analysis: A Survey

Irfan Rasool (Islamic University Of Science And Technology)*; Irfan Rasool (Islamic University Of Science And Technology); Rafiya Jan (Islamic University Of Science And Technology); Ahsan Hussain (Islamic University Of Science And Technology); Assif Assad (Islamic University Of Science And Technology); Tariq Masoodi (Department Of Cancer Research, Sidra Medicine)

Cancer, a strong foe to human health, has consistently posed challenges to medical personnel in terms of early detection, precise diagnosis, and effective treatment. Computer-aided diagnosis and prognosis are playing a pivotal role in the fight against cancer. Histopathological images provide a microscopic-level view of tissue and cell

anatomy for investigation, giving pathologists insightful knowledge into tissue morphology and assisting in the detection of malignant anomalies. Comprehensive research in Artificial Intelligence (AI) has resulted in efficient, effective, and robust algorithms that power many parts of medical research and clinical practice, including cancer detection, prognosis, and treatment. Deep learning has become a top machine learning approach for computer vision applications. In the survey, we investigated several AI algorithms that were used and contributed to the histopathological image analysis. We first provide a snapshot of histopathological image analysis by addressing the workflow of the histopathological process and briefly introducing the past research and the progress made through, till the present date. In particular, we explain the different preprocessing techniques to handle gigapixel histopathological images, the various Deep Learning architectures used for extracting features and making decisions from histopathological images, and the principles of using Supervised Learning, Semi-supervised Learning and Weakly Supervised Learning. In addition, we discuss the open challenges and the potential trends of future research in Histopathological image analysis using deep learning.

[ID: 70] Machine Learning Prognosis: Predicting Esophageal Cancer Patient Survival With Clinical And Pathological Data

Syed Wajid Aalam (Islamic University Of Science And Technology); Ab Basit Ahanger (Islamic University Of Science And Technology); Tabasum Majeed (Islamic University Of Science And Technology); Ajaz A Bhat (Sidra Medicine); Assif Assad (Islamic University Of Science And Technology); Muzafar A. Macha (Islamic University Of Science And Technology); Muzafar Rasool Bhat (Islamic University Of Science And Technology, Kashmir)*

Esophageal cancer remains a profoundly lethal malignancy, highlighting the need for precise survival prediction models, particularly in advanced stages where evaluating performance status becomes essential for achieving accurate survival estimates. However, the current traditional methods for predicting survival are limited due to their subjective nature. In this study, we explore the potential of machine learning (ML) models to predict the survival outcomes of end-stage cancer patients. Our approach involves pre-processing and feature engineering to handle the diverse data and extract informative features for machine learning. Random Forest, Support Vector Machine, KNN, and Boosting algorithms were used to develop predictive models. Using feature selection algorithms and Five-fold cross-validation, we evaluated the performance of the proposed models on TCGA clinical and pathological data. CatBoost performed better than other models with an AUC of 0.89, standard deviation of 5% and accuracy of 91.8% over five-fold cross-validation. Moreover, feature importance graphs are plotted to understand the contribution of the features in the survival of EC patients. Our findings highlight associations between top features and offer a promising way to enhance EC survival prediction.

[ID: 71] Alzhinet: An Explainable Self-Attention Based Classification Model To Detect Alzheimer From 3D Volumetric Mri Data

Ab Basit Ahanger (Islamic University Of Science And Technology)*; Syed Wajid Aalam (Islamic University Of Science And Technology); Tabasum Majeed (Islamic University Of Science And Technology); Tariq Ahmad Masoodi (Sidrah Medicine); Assif Assad (Islamic University Of Science And Technology); Muzafar Ahmad Macha (Islamic University Of Science And Technology); Muzafar Rasool Bhat (Islamic University Of Science And Technology, Kashmir)

Alzheimer’s Disease is a significant global healthcare challenge that requires early and accurate diagnosis for better patient care and a deeper understanding of its pathology. In this study, we introduce ”AlzhiNet,” an advanced deep learning model designed to diagnose AD by using 3D Volumetric MRI data for multi-class diagnosis. AlzhiNet uses self-attention mechanisms to distinguish between AD stages like Mild Cognitive Impairment, and Alzheimer’s Disease including subjects who are Cognitively Normal as a control group. It is a pioneering step towards interpretability and helps bridge the gap between AI and clinical expertise by unveiling the slices that are essential to diagnostic decisions. We describe AlzhiNet’s architecture, training methodology, and evaluation results, drawing insights from a dataset of 2,098 MRI volumes. AlzhiNet’s impact extends far beyond being just a diagnostic tool, as it signifies a significant stride towards improved patient care and deeper insights into the complex pathology of Alzheimer’s disease.

[ID: 72] Progppi: Unraveling Protein-Protein Interactions Using Message Passing And Attention

Rafiya Jan (Islamic University Of Science And Technology)*; Irfan Rasool (Islamic University Of Science And Technology); Ahsan Hussain (Islamic University Of Science And Technology, Awantipora); Assif Assad (Islamic University Of Science And Technology); Basharat Bhat (University Of Otago)

Proteins are crucial in all biological processes as they are versatile macro molecules in living beings. Proteins usually interact with other proteins, known as Protein-Protein Interaction (PPI), in their environment to perform the cellular functions. PPI regulates almost all cellular processes and is thus crucial to cellular biology. PPI aids in modelling pathways for determining molecular activities and therapeutics, identifying mutations, discovering new drugs, and practising personalized therapy. Graph Neural Networks (GNNs) have emerged as a potential tool for unraveling the complex network of PPI and thus excels at learning expressive nodes. The proposed model uses GCN with mutual attention for the prediction of PPI into the ”-” and ”+” labels where ”-” indicates the two proteins do not interact. In contrast, ”+” indicates proteins interact and form a complex. It relies entirely on geometric structural data and, using the atomic 3D coordinates creates a graph-based representation of a protein. Using a multi-layer GCN, it generates PPI predictions from protein structures. The mutual attention mechanism identifies the essential residues for protein

complex formation. The proposed method achieves better prediction performance, with an accuracy of 96.39

[ID: 106] Cyclegan-Based Data Augmentation For Alzheimer’S Diagnosis Using Deep Learning

Satish Kumar (Bgsbu)*

Alzheimer’s disease is a degenerative condition that damages brain neurons over time, resulting in dementia ultimately leading to death. Alzheimer’s disease is often diagnosed using a combination of laboratory and neuropsychological testing. The reduction of brain mass that is linked to Alzheimer’s disease can be identified by MRI scans, making it an appropriate challenge for deep learning and computer vision. Physicians could benefit greatly from an accurate and effective deep learning model that supports their diagnoses. However, a lot of data is usually needed for deep learning, and medical data is frequently hard to obtain. In order to classify Alzheimer’s illness using MRI scans, we developed convolutional neural networks based on the Google Inceptionv3 CNN architecture for the purpose of this study. We were able to obtain an amazing F-1 score of 89%. Additionally, by creating samples with CycleGAN, we were able to show how effective GANs can be at improving classification accuracy when used for data augmentation, achieving an impressive F-1 score of 95%.

[ID: 113] Predictive Analytics In Healthcare: Evaluating The Accuracy And Impact Of Machine Learning Models For Disease Diagnosis

Mufassir Dr. Yaseen (Mitwpu)*; Angela Abraham (Mitwpu); Shubhalaxmi S Joshi (Dr. Vishwanath Karad, Mit World Peace University)

Advancements in machine learning and predictive analytics have revolutionized the healthcare industry by offering new tools and methodologies for disease diagnosis and prognosis. This research paper aims to assess the accuracy and impact of machine learning models in healthcare by conducting an extensive evaluation of their performance in disease diagnosis. Various machine learning techniques, from traditional statistical models to deep learning algorithms, are assessed using key metrics such as accuracy, sensitivity, specificity, precision, and AUC-ROC. Beyond performance metrics, the research investigates the practical implications of these models by analyzing their potential to enhance patient outcomes, minimize misdiagnoses, and optimize resource allocation. The findings highlight the significant promise of machine learning in healthcare, as these models consistently demonstrate superior diagnostic accuracy compared to traditional methods. In conclusion, this research underscores the potential of predictive analytics and machine learning to revolutionize disease diagnosis in healthcare. By rigorously assessing their capabilities

and acknowledging the associated challenges, this study contributes valuable insights into improving patient care, reducing healthcare costs, and advancing the field of medical diagnostics.

[ID: 123] Comparative Analysis Of Deep Learning Architectures For Diabetic Retinopathy Detection: A Comprehensive Evaluation Of Cnns And Transformers

Owais Bhat (Islamic University Of Science & Technology); Shabia S Khan (Islamic University Of Science And Technology)*; Zubair Jeelani (Islamic University Of Science And Technology, India); Zahid Huassain Wani (Islamic University Of Science And Technology); Syed Tanzeel Rabani (Islamic University Of Science And Technology); Syed Mohsin Saif (Islamic University Of Science And Technology); Nawaz Ali Lone (Islamic University Of Science And Technology, Kashmir)

Diabetic retinopathy is a common complication of diabetes and a leading cause of vision loss. Early detection and monitoring of diabetic retinopathy are essential to prevent vision impairment. Deep learning techniques have shown promise in automating the detection of diabetic retinopathy from medical images, such as fundus photographs. This research paper evaluates the performance of various deep learning architectures, including Convolutional Neural Networks (CNNs) and Transformers, in the context of diabetic retinopathy detection. The study presents a comparative analysis of these architectures, highlighting their strengths and weaknesses. The results are presented in well-structured tables, showcasing the accuracy, sensitivity, and specificity of each architecture.

[ID: 127] Blockchain In Health Care System

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To safeguard private patient information and adhere to rules, the healthcare sector wants improved privacy and security. Using Blockchain technology, both of these capabilities can be included into the current systems. The main issue here is user convenience, but this can be rapidly overcome by fusing blockchain and the Internet of Things. IoT-based gadgets get around personal intelligent health devices' restricted computational power. IoT devices that use the cloud also need a small amount of storage for things like wearable sensors. It must be remembered, though, that this system still has flaws, which contribute to its inefficiency. Data Privacy and Data Sharing are two of these issues. This study suggests a solution to these issues based on the Interplanetary File System (IPFS). The users post the health information gathered by IoT continuously here.

[ID: 28] Holography Microscopic Medical Imaging For Cancer Detection Via Deep Learning

Asifa Nazir (Islamic University Of Science And Technology)*; Ahsan Hussain (Islamic University Of Science And Technology); Assif Assad (Islamic University Of Science And Technology)

Early cancer diagnosis is crucial in healthcare, as it can greatly improve patient outcomes and transform medical practice. This study provides a comprehensive review of the state-of-the-art application of holography in microscopic medical imaging and Deep Learning (DL) for cancer detection. Various approaches for detecting cancer in medical imaging have been explored, highlighting the significance of early detection and timely identification. The paper explores the core principles of holographic microscopic imaging and the wide-ranging applications of DL in the realm of cancer diagnosis. The authors illustrate how holographic microscopic imaging provides depth information by incorporating both amplitude and phase details. Their research highlights the potential of digital holographic microscopy (DHM) in cellular imaging, enabling the examination of diverse characteristics and monitoring changes in cellular structure. Moreover, this review examines the potential enhancement in identification accuracy through the amalgamation of holography microscopic imaging and DL. The research delves into the synergy between DL and holography microscopy while addressing the challenges that arise when fusing holography microscopic imaging with DL.

Natural Language Processing

[ID: 40] The Integration Of Artificial Intelligence And Natural Language Processing In 3D Printing - A Review

Yasir Hamid (Institute Of Applied Technology)*; Mayed Al Yammahi (Institute Of Applied Technology); Abdulrahman Alshamsi (Institute Of Applied Technology); Nahiyah Al Shehhi (Institute Of Applied Technology); Saud Al Hosani (Institute Of Applied Technology); Saleh Al Katheeri (Institute Of Applied Technology); Nedal Ababneh (Institute Of Applied Technology)

This review delves into the history and challenges of threedimensional (3D) printing while highlighting the transformative role of artificial intelligence (AI) and natural language processing (NLP). The fusion of artificial intelligence AI and 3D printing has democratized manufacturing, enabling faster prototyping, customization, and improved resource efficiency. In education, AI and 3D printing projects have enhanced accessibility and contributed to soil fungi research, medical improvements, and four-dimensional space 4D printing in education. However, addressing challenges like interdisciplinary expertise and computational resources is crucial. The reference list covers applications in dentistry, medicine, regulations, future prospects, and impacts on education and supply chains, including topics like machine learning, optimization, and the Fourth Industrial Revolution.

[ID: 43] Natural Language Processing Based Virtual Assistants - A Review

Yasir Hamid (Institute Of Applied Technology)*; Hamda Mohamed Aldhaheri (Institute Of Applied Technology); Tameema Braiki Almenhali (Institute Of Applied Technology); Shahad Ahmed Alkhoori (Institute Of Applied Technology); Hamdan Marwan Alshehhi (Institute Of Applied Technology); Saif Rashed Alshehhi (Institute Of Applied Technology); Nedal Ababneh (Institute Of Applied Technology)

This paper provides a comprehensive examination of Natural Language-Processing Virtual Assistants (NLP-VAs), focusing on their historical development, technological foundations, impact across industries, challenges, and future directions. The problem addressed is the need for a deeper understanding of NLP-VAs, given their increasing complexity and popularity. The objectives are to highlight the evolution of NLP-VAs, explore their technological foundations, assess their impact on

various industries, and highlight considerations such as privacy, security, ethics, and accessibility. The main findings indicate that NLP-VAs excel at understanding natural language and delivering personalized interactions, offering a more conversational and engaging experience compared to rule-based systems and task-specific chatbots. However, they face challenges related to ambiguity, contextual comprehension, handling complex queries, domain adaptation, bias and fairness, and ensuring explainability. Ongoing research efforts are addressing these challenges through advanced Natural Language Processing (NLP) techniques, domain adaptation methods, debiasing algorithms, and model interpretability approaches. The contributions of this paper lie in enriching the knowledge and understanding of NLP-VAs. It provides a comprehensive historical overview, explores the foundational technologies behind NLP-VAs, investigates their impact across diverse industries, evaluates ethical concerns like privacy and security, and examines their role in enhancing accessibility for individuals with disabilities. Additionally, the paper offers a comparative analysis of other forms of virtual assistance. By addressing limitations and suggesting potential improvements, this study guides future research and development in the field of NLP-VAs, fostering stronger user connections, fairness, transparency, and user satisfaction.

[ID: 52] Handwritten And Natural Image Character Recognition Using Non-Parametric Approach

Arivazhagan Selvaraj (Mepco Schlenk Engineering College); Arun Madakannu (Mepcoschlenk Engineering College)*; Rathina D (Mepco Schlenk Engineering College)

Handwritten and natural image character recognition is an active and challenging research field in pattern recognition. It finds applications in aiding the visually impaired, business data entry, recognizing bank cheques, and converting handwritten documents into structured text. Handwritten character recognition is complex due to variations in writing styles and shapes. To address this challenge, efficient feature extraction is crucial for capturing character shape and orientation. Recognizing characters in natural images adds another layer of complexity. Natural scenes often involve various backgrounds, lighting conditions, and distortions, making character recognition even more challenging. In our study, we aimed to recognize handwritten characters and characters from natural scenes using the Chars74K database, which includes both uppercase and lowercase English letters and numerals from 0 to 9. Our proposed method utilizes Log Gabor Transform and Histogram of Orientation Gradients (HOG) for feature extraction. These features are then input into a KNN classifier, a non-parametric approach, for classification. The results demonstrate that our system achieves high recognition rates, comparable to other approaches in both handwritten and natural image character recognition.

[ID: 54] Improving Word Sense Disambiguation Performance Using Lemmatization

Tawseef Ahmad Mir (Alliance University); Aadil Ahmad Lawaye (Baba Ghulam Shah Badshah University)*; Mehmood Mir (Alliance University)

A word or sentence is “ambiguous” if it can be interpreted in more than one way. The process of assigning the correct meaning to a word with respect to its context is known as Word Sense Disambiguation (WSD). WSD is intended to be a very imperious problem in Natural Language Processing (NLP) that requires proper attention as it impacts the performance of various NLP applications. In this paper, an attempt is made to propose a supervised machine-learning Kashmiri WSD system using the decision tree algorithm. The overall process is carried out in two different phases. In the first phase, the decision tree based WSD model is trained on regular text for disambiguation. In the second phase, the WSD model is modified by applying lemmatization on the regular text. The proposed system is tested using both regular as well as lemmatized text and evaluation is carried out using accuracy, precision, recall and F-1 measures. Results produced by the proposed model show that lemmatization enhances the performance of the WSD model.

[ID: 58] Urdu Text Recognition In Videos: Techniques And Challenges

Shaik Moinuddin Ahmed (Maulana Azad National Urdu University)*

This review article describes in detail cutting-edge deep learning techniques for identifying Urdu text in videos. It investigates the challenges of detecting Urdu text in videos, such as variations in font styles, sizes, and orientations, and discusses the growing demand for accurate and effective detection systems as the amount of Urdu text in videos grows. The article examines various deep learning models used to recognise Urdu text in videos, such as CNNs and RNNs. It also summarises the datasets available for Urdu text recognition and their limitations. The article also explores the various uses of video OCR technology in industries such as education, entertainment, and security. Video OCR enables users to extract substantial information from video recordings, such as text annotations, subtitles, and captions, making it extremely useful for Urdu language learners and those interested in Urdu media. The article discusses how video OCR can help people who are blind or have low literacy skills gain access to Urdu-language video information. This paper examines the challenges and limitations of Urdu text detection in videos as well as future research directions.

[ID: 66] Sustainable Signals: A Heterogeneous Graph Neural Framework For Fake News Detection

Adil Mudasir Malla (Islamic University Of Science & Technology,J&K)*; Dr. Asif Banka (Islamic University Of Science & Technology,J&K)

Digital technology has increased information pollution, especially due to the dissemination of fake news. The intentional spread of offensive, illegal, or harmful content can cause misperceptions, misunderstandings, and social unrest, affecting social stability and economic sustainability. Researchers established automated intelligent and automated data mining and analysis of news using various information characteristics to identify false information. This has been made possible due to the ongoing advancements in artificial intelligence technology. Most algorithms that identify fake news focus on extracting misleading signals from the news itself and/or its external context. When deciding whether to spread fake news, these algorithms ignore user preferences. According to the confirmation bias theory, people are more likely to spread false information that matches their beliefs. Users' historical and social activities, like their postings, can help identify fake news and inform about their news choices. There is little research on considering user preferences for identifying fake news. This study introduces a heterogeneous framework based on graph neural networks and natural language models to capture graph and content modeling signals from a user preference perspective. The efficacy of the unique combinational framework is demonstrated through experimental findings on real-world datasets.

[ID: 103] Sign Language Recognition Using Deep Learning

Sahil Birjee (Mit World Peace University); Mufassir Dr. Yaseen (Mitwpu)*; Drsyed Irfan Yaqoob (Mit World Peace University); Amit Mishra (Mitwpu Pune)

This research focuses on developing an advanced sign language recognition system to bridge the persistent gap between sign language and spoken language. This system aims to translate sign gestures into textual or spoken language with high accuracy and real-time responsiveness. The research aims at training a sequential CNN model which can recognize the alphabets of the American Sign Language. This model should assist in bridging the gap between hearing-impaired and others while communicating and assist in verifying if the signers are signing accurately.

[ID: 105] Asvspoof 2019: Significance Of Speech Features For Classification Of Spoofed Speech Detection

Samar Pandey (Iiit Allahabad); Deepanshu Mahto (Iiit Allahabad); Pulkit Gupta (Iiit Allahabad); Ramesh K Bhukya (Iiit Allahabad)*

ASVspoof is a series of challenges that aim towards the research in spoofing threats of the automatic speaker verification (ASV) systems. The practice of fooling an ASV system is by giving a fake speech signal that imitates the traits of a real speaker is known as spoofing. Two evaluation metrics, Logical Access (LA) and Physical Access (PA), are employed by ASVspoof to rate the efficacy of spoofing defenses created for ASV systems. Each job has its own database, which contains three types of data called train, development, and evaluation or test data that are mutually exclusive. The LA uses text-to-speech and voice conversion techniques to impersonate the target speaker, and attacks involve the use of acoustic environments with specified dimensions and controllable reverberation. On the other hand, in PA, attackers obtain a recording of the target speaker and play it back to the ASV system. It includes both real replay and simulated attacks, and these attacks consist of replay recordings collected at three different locations. In this paper, we evaluated the ASVspoof on the LA and PA datasets using support vector machine (SVM) and Gaussian mixture model (GMM) models. The SVM and GMM models are applied on the LA with 98% and 96% accuracies with MFCCs as well as 92% and 90% accuracies with CQCCs. Similarly, on PA dataset, the SVM and GMM model obtained 98% and 96% accuracies with MFCCs and 94% and 93% accuracies with CQCCs respectively, on the ASVspoof2019 dataset.

[ID: 118] Text Classification Using Deep Learning

Masooda Masarat (University)*; Rumaan Bashir (Islamic University Of Science And Technology)

Natural language processing (NLP) is a subfield of artificial intelligence that focuses on how computers and human language interact. It includes the creation of algorithms and models that give computers the ability to comprehend, translate, and produce text or voice in human language. Machine learning, linguistics, and computer science are all combined in the multidisciplinary area of NLP. The ambiguity of words, the impact of context, and the nuances of grammar are only a few of the difficulties it faces as a result of the complexity and diversity of human languages. The main objectives of NLP include interpretation, analysis, and manipulation of natural language data for the intended purpose with the use of various algorithms, tools, and methods. The field of natural language processing (NLP) has made tremendous strides throughout time and has found use in a variety of languages including, sentiment analysis, Text summarization, Text Classification etc. NLP has played a significant role in the field of Kashmiri language also like machine translation, speech recognition, question-answering etc. Kashmiri being a rich and complex language with a long history, but there is a shortage of computational

resources for Kashmiri, including text classification systems. This paper analyzes the use of deep learning tools and techniques for improving the processing tasks of text classification in various national and international languages specifically to the Kashmiri languages.

[ID: 120] A Review On Named Entity Recognition—Challenges, Datasets, And Tools

Aadil Ahmad Lawaye (Baba Ghulam Shah Badshah University)*; Tawseef Mir (Alliance University, Bangalore); Irfan Shiekh (Baba Ghulam Shah Badshah University); Riffat Ali (Shiekh-Ul-Alam Memorial College)

With the increasing availability of content on the internet, there is a growing need for methods and tools to extract information. Named Entity Recognition (NER) is a task in this regard. It involves identifying categories such as people organizations, locations, dates/times amounts, numbers, and more. The concept of NER was first introduced at the Message Understanding Conference in 1996. Since then, numerous researchers have developed algorithms to extract types of entities from different languages and text styles. However, there is still an interest among academics to explore approaches for extracting diverse named entities that can be applied in various natural language applications. This review paper provides an overview of NER techniques ranging from rule-based methods to machine learning and deep learning approaches. Additionally, it discusses the challenges associated with NER along, with tools and datasets.

[ID: 122] Facial Expression-Driven Emotional Detection And Personalized Music Recommendation System

Arulnidhi A (Srm Institute Of Science And Technology)*; Jospin J Jeya (Srm Institute Of Science And Technology); Karthik M (Srmist); Dhiwakar S Sridharan (Srm University)

Music recommendation systems have changed the way people find and listen to music, customizing playlists to fit their needs. But this project takes it to the next level by using real-time face expression analysis to personalize recommendations and make them even more emotional. By combining computer vision with emotion recognition, the system creates a deeper connection between you and your music, taking your listening experience to new heights. This project's impact goes far beyond music platforms and content delivery. With instant emotional insight, you can explore and express your emotions through music, all in the language of the universal language. This project is also set to revolutionize the conversation around responsible data usage and user privacy, as well as the future of emotion-based computing. Basically, it's a new way to bridge the gap between our emotions and the digital world.

Social Sciences

[ID: 6] Predictive Student Behavior Classification And Insights Using Data Science

Tejashwi Anugandula (Gokaraju Rangaraju Institute Of Engineering And Technology)*; Jeevan Nagendra Kumar Yella (Gokaraju Rangaraju Institute Of Engineering And Technology); Rajasekar Nuvvusetty (Gokaraju Rangaraju Institute Of Engineering And Technology)

In existing times, one of the widespread issues is the alarming increase in suicides among the younger generation worldwide, including India. According to the National Crime Record Bureau (NCRB) of India, more than 35 students between the ages of 18-30 experience Accidental Deaths & suicides every day, predominantly affecting young adults. These suicides can be attributed to various factors, such as educational backlogs, failed relationships, unemployment, professional or career difficulties, and a decline in social reputation. In India, around 3.2% of suicides are observed among educated graduates. The tendency to experience failure or depression depends on how an individual perceives a situation. Education should equip individuals with the necessary skills to navigate life's challenges, including academic proficiency, emotional stability, and a positive mindset. Therefore, it becomes crucial to conduct a study to analyze how students respond to specific situations. This study aims to identify students with reduced personality traits, draw conclusions about their behavior, and finally provide guidance to those students facing academic difficulties, failures, or depressive events. The main aim of this research is to group engineering college students into five different personality traits. To achieve this, the study gathered about 800 survey responses from the students, covering different aspects of their personalities. Advanced machine learning and deep learning techniques, such as Decision Tree, Random Forest, SVM, KNN, Naive Bayes, CNN with AlexNet, ResNet, and GoogleNet Architecture, were used, resulting in an impressive accuracy rate of 100%.

[ID: 30] Personality Prediction Through Cv Analysis Using Knn

Ankit Shrivastava (Manipal University Jaipur)*; Devesh Kumar Srivastava
(Manipal University Jaipur Rajasthan India)

Organizations need to ensure that they employ the right person for the right job. No organization is identical in terms of workforce, talent, environment, strategies, and market type. Hence, one recruitment method cannot be applied to all. The system will help to reduce the HR department's workload. The system will help the HR department to easily shortlist candidates based on the CV ranking policy. HR needs to add qualifications and experience and the other important aspects that are required for a job position. This system will select the right candidate for a particular job profile based on the post requirements. Candidates will register him/herself with all their details and will upload their own CVs into the system which will be further used by the system to shortlist them for the position. Thus, the system will enable a more effective way to shortlist candidates from many applicants providing the expert workforce for the organization.

[ID: 48] Social Synchrony Detection Framework Using Graph Based Approach

Shabana Nargis Rasool (Amity University Noida)*; Sarika Jain (Amity University); Ajaz Hassan Moon (Islamic University Of Science And Technology Awantipora)

Abstract Social synchrony (SS) is the latest dynamic and intricate phenomenon witnessed on popular online social networks such as Twitter, Facebook, etc. A large population of users acting in synergy within a confined time constitutes social synchrony. The paper proposes a novel framework, Probability-based Influential User and Event Detection for Social Synchrony (PIE-SS), offering insights into social synchrony on the popular social network Twitter. The purpose of this study is to consider not only hashtags but also all user interactions, such as re-tweets, replies, mentions, and hashtags to offer a comprehensive view of the Twitter network. The study presents a probabilistic model in collaboration with temporal graphs, wherein the dynamic Twitter network has been divided into static sub-graphs across time, and the probability function monitors each sub-graph user states. The model considers the state of the nodes at each time frame and accordingly evolves the sub-graphs at respective time steps. Consequently, modeling temporal dependencies in graphs offers a better understanding and representation of the network. When compared to several state-of-the-art technologies mentioned in the existing literature, the results provide evidence of the effectiveness of the suggested PIE-SS strategy.

[ID: 56] Modeling Online User Behaviour Using Temporal Data

Anam Iqbal (Nit Srinagar)*; Shaima Qureshi (Nit Srinagar); Mohammad Ahsan Chishti (Nit Srinagar)

Human beings nowadays use social media to communicate with each other. This has resulted in vast amounts of data being generated. If this data is used in prediction, it can serve various applications. A simple graph model only has users and their associations, but as the system's complexity increases, nodes have associated attributes, which requires an extension of graph models through attributes. This paper proposes a time-varying attribute graph (TVAG) to represent social media interactions and user relationships. We have emphasized how TVAG can be the better choice for prediction regarding dynamic data, like human interaction and behavior dynamically. The other factors discussed in the paper reflect upon how efficient and timely feature extraction is for prediction and how the TVAG implementation can enhance that.

[ID: 114] Impact Of Chat Gpt Innovation

Yi Ding (St. Michael'S College School)*

Artificial intelligence has led to the development of CHAT GPT application which has positively and negatively impacted humanity. Some of the positive impacts of the CHAT GPT application is the ability to correctly predict the upcoming disasters, usage as a writing tool in academics and its ability to decipher disinformation. Still, there are downsides of CHAT GPT such as data insecurity and the take-over of CHAT GPT of human jobs. Therefore, this paper discusses the negative and positive impact of CHAT GPT and how its regulation can be beneficial.

[ID: 115] Artificial Intelligence And Ethics

Alex Meng (Shanghai American School)*

Artificial Intelligence (AI) is an innovation that has served to improve work in many fields such as medicine. However, the wrong use of AI is unethical. There exist several arguments that advocate for the use of AI in writing. One major argument is that everyone is using AI to write so why shouldn't I use it? An additional claim in using AI for writing is that it is more creative than human beings. However, there exists against the use of AI such as killing the spirit of the competition and unoriginal content portrayed as original content. This paper argues that it is unethical to use AI for writing entirely as it undermines creativity.

[ID: 116] Deepfake Technology: Analysis, Implications, And Safeguarding Strategies

Saimul Bashir (Chandigarh University)*; Faisal Firdous (Jaypee University Of Information And Technology)

The paper analyzes the rise of deepfake pornography, a disturbing use of artificial intelligence (AI) creating hyperrealistic explicit content by superimposing faces onto inappropriate images. It discusses the deepfake technology, societal impacts, ethical issues, and potential mitigation strategies. The technology, backed by deep learning algorithms like Generative Adversarial Networks (GANs), raises privacy, consent, and mental health concerns. The dissemination of such content via social media influences societal views on consent and sexual objectification, disrupting relationships and intimacy. The paper urges an examination of consent, exploitation, and the need for legal frameworks. Mitigation efforts encompass technological and legal measures, and the possible role of AI in identifying and countering these deceptions. The importance of media literacy and education in discerning deepfake content is underscored. Despite the continuous evolution of deepfake technology, the paper urges for collective action, urging tech companies, governments, and advocacy groups to mitigate the harmful impacts of deepfake pornography. It emphasizes the need for ethical and responsible AI use to protect individual rights and privacy.

[ID: 117] Safety Risks, Ethical Implications Of Ai And Applications In Consciousness Studies

Sabreen Syeed (Islamic University Of Science And Technology)*

The development of sophisticated Artificial intelligence (AI) is on the rise. But it brings with it great existential challenges. Would future AI possess consciousness and free will? If it will, then conscious AI would have significant existential, ethical and social implications for humanity. This paper explores the difference between machine intelligence and human intelligence. It then expounds on the plausibility of consciousness ever emerging in an AI system and the existential risks that would pose for the human race. Multiple theories of consciousness have been proposed by philosophers and scientists. A group of physicalist and neurobiological theories predict that it is possible to simulate a human brain and even consciousness. But is a simulation, a replication? It is proposed that so long as a system does not show signs of free will, it cannot be called truly autonomous and therefore can be brought under human control. Whereas, if AI exhibits indicators of consciousness and free will, then these systems will pose serious existential risks. This paper discusses two tests by Schneider and their shortcomings in testing for consciousness in AI. A new test called the Free Will Test is proposed in the paper to provide clear indicators of conscious behavior in AI. The possibility of AI creating the first Philosophical Zombie, a concept belonging to the mind-body problem, is discussed. This field has great potential to assess the different theories of consciousness. The collaborative development of the fields of AI, Philosophy of Mind and Brain Science has multifaceted

benefits to offer to all three of these fields. And such an interdisciplinary approach would minimize the safety risks and manage the ethical and social challenges that AI systems pose.

[ID: 121] Deep Learning Based Approach For Authenticating Kashmiri Saffron

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Saffron, derived from the remarkable herbaceous plant ‘Crocus Sativus’, stands as a prized spice with diverse applications in cuisine, medicine, and cosmetics worldwide. Kashmiri saffron, in particular, is known for its long stigmas, deep red colour, and unique aroma. It’s a vital export for Jammu & Kashmir. However, the saffron industry faces a significant challenge due to rampant adulteration practices, threatening its authenticity and integrity. This paper explores the pervasive issue of saffron adulteration, particularly focusing on the premium Kashmiri saffron, coveted for its unique attributes. To combat this challenge, traditional chemical methods have been employed, but these techniques are laborious. Recent advancements in Artificial Intelligence (AI) have provided the way for innovative solutions. This study introduces a novel approach utilising deep learning-based computer vision technologies to identify genuine and counterfeit saffron. By analysing saffron imagery dataset, a deep learning model is developed, aiming to categorise authentic saffron from adulterated samples in real-time. This proposed framework addresses past limitations, offering immediate validation and transforming the saffron trade in Kashmir. Through the integration of state-of-the-art technology, this study presents a pivotal step towards a more secure and authentic saffron market.

[ID: 152] Judging The Future: Ai’S Role In Climate Change Litigation

Shabeena Akhter (School Of Law, University Of Kashmir)*

In an era defined by the profound impacts of climate change, the legal world finds itself grappling with multifaceted challenges that demand innovative solutions. One emerging trend is the integration of Artificial Intelligence (AI) into climate change litigation. AI, with its unparalleled computational capabilities, offers the potential to process vast amounts of environmental data, predict future scenarios, and even analyze the financial implications of climate related damages. It can identify patterns and links that the human mind might overlook, thereby strengthening the case for or against certain parties in climate lawsuits. The integration of AI in this realm not only streamlines the process but ensures that decisions are rooted in comprehensive, accurate data. However, this melding of technology and law also presents ethical dilemmas. Concerns about the neutrality of AI models, transparency of their methodologies, and potential biases in their outputs necessitate rigorous scrutiny. As the world braces for more climate-related disputes, the role of AI will undoubtedly grow. While it promises efficiency and precision, the legal fraternity must approach its adoption judiciously, ensuring fairness, transparency, and accountability in the new age of environmental justice. This abstract explores the growing influence of AI in climate change litigation. AI technologies, including machine learning and data analytics, enable legal professionals to sift through vast volumes of scientific data, assess environmental impacts, and model future climate scenarios with unparalleled accuracy. Key words: artificial intelligence, climate change litigation, machine learning and environmental justice

Web Technologies

[ID: 16] Automated Power Factor Correction And Energy Monitoring Using Iot

Adarsha B Kamble (Savitribai Phule Pune University)*

This paper presents the simple and low-cost design of an IOT based automatic power factor correction (APFC) system for single-phase domestic loads. The proposed design uses relays to switch the capacitor banks in order to correct the power factor of inductive loads. An Arduino board controls the switching of relays based capacitor reactor bank depending on power factor measured. The Arduino is programmed to non-stop monitor and calculate the power factor of the connecting load by sensing the signal from CT, PT and Zero Cross Detectors (ZCDs), and keep the power factor of the load above the reference value (0.95) by appropriately energizing the capacitors in parallel to the connecting load through relays switching so as to correct power factor close to unity. The value of power factor before and after improvement is displayed on LCD. The hardware prototype of the proposed APFC design is also developed to validate its operation. The satisfactory and acceptable results of the APFC system test have confirmed that the suggested design yields a reliable output and can be further used in any single-phase practical application to ensure the power factor close to unity. This setup improves power factor up to 0.99. Power factor can be monitored on thing speak website transmitted via nodemcu module

[ID: 47] An Architectural Approach For The Privacy Preservation In Cloud Computing Using Centralized Key Encryption

Saleh Ibrahim Jauro (Career Point University, Kota India)*; Dr. Abid Hussain (Associate Professor, School Of Computer Applications, Career Point University, Kota, Rajasthan)

Cloud computing offers a more adaptable, cost-effective, and time-tested delivery system for business or consumer services delivered over the Internet. A centralized service-oriented architecture, as well as a user and multi-domain administrative infrastructure, are supported by cloud computing. As a result, it's more important to address centralized key encryption and security flaws. The most difficult challenge in cloud computing is the lack of a single architectural approach capable of meeting the needs of centralized key encryption in the cloud. In this paper, we investigate

the architectural features of cloud computing and categorize them based on end-user requirements. With that, several architectural features will play a significant role in cloud computing adoption. In this paper, we discuss some of the techniques that were implemented to protect data and propose an architecture to protect data in the cloud. This architecture was developed to store data in the cloud in encrypted format using cryptography techniques.

[ID: 49] Implications Of Multi-Factor Authentication To Improve The User Security In Cloud Computing

Shreekant Sharma (Research Scholar Career Point University Kota)*; Dr. Abid Hussain (Associate Professor, School Of Computer Applications, Career Point University, Kota, Rajasthan)

The two biggest issues with cloud computing are authentication and access control. Many academics in this subject offer a variety of suggestions for strengthening cloud authentication in the direction of resilience. Single Factor Authentication has long been used in conjunction with usernames and their associated passwords. However, improvements in computing power and the use of basic techniques, such as the Brute Force method and the application of sophisticated and effective cryptographic algorithms, have created several threats and vulnerabilities for authentication systems, resulting in a decline in their effectiveness. In cloud computing, there are a number of services and resources that must be safeguarded from unauthorised use with simultaneous and various authentication methods, multi-factor authentication has become a reliable method of protecting the cloud. This paper focuses on various Implications of Multi-Factor Authentication to Improve User Security in Cloud Computing. The paper is arranged in the following manner, Section 1 Introduction, Section 2 Extensive and systematic literature survey and section three implications of multifactor authentication.

[ID: 86] Revolutionizing Academic Certificate Validation Using Blockchain

Rabia Nazir (Islamic University Of Science And Technology)*; Ahsan Hussain (Islamic University Of Science And Technology, Kashmir, India); Syed Za Shah (Islamic University Of Science And Technology, Kashmir, India); Firas Javid (Islamic University Of Science And Technology, Kashmir, India); Uzair Nisar (Islamic University Of Science And Technology, Kashmir, India)

Academic Certificate Validation is a crucial process to ensure the integrity of credentials. Traditional methods are time consuming and error-prone. Degree authentication and traceability is a convoluted process that takes an ample amount of time and resources. Counterfeit certification has led to burgeoning challenges of misrepresentation of credentials. This paper proposes a blockchain based system to provide a secure and efficient platform for certificate validation. The proposed system employs

smart contracts for automation of validation and ensures authenticity of certificates. The suggested system safeguards student data and allows for authentication of certificates even after a long time-period. This platform provides counterfeit protection and secure certificate management corresponding to the requirements of students, companies and certifying authorities.

[ID: 92] Iot Enabled Live Information Status Indicator For Atms: An Innovative Solution Towards Convenient Banking

Amit Kumar Ahuja (Jss Academy Of Technical Education, Noida)*; Vishu Sharma (Tata Consultancy Services); Divyansh S Sharma (Tata Consultancy Services); Vidhu Sharma (Graduate Trainee Engineer); Shivam Semwal (Anr Soft Private Limited)

Automated Teller Machine (ATM) is widely used for banking transactions around the world. It has added much-needed convenience to its customers through the ease of banking. However, there exist limitations in the conventional banking ATMs which need to be addressed appropriately. For example, traditionally, ATM users often face inconveniences, and uncertainty due to non-functional ATMs, cash shortages, cash unavailability etc. which they may come to know upon their visit to the ATMs. This makes ATM users inconvenient, both in terms of their time and effort. The present system introduces an innovative Internet of Things (IoT) enabled system and method for monitoring the status of Automated Teller Machines (ATMs) directly from users' devices, thus reducing the need for physical visits to the ATMs. This system offers comprehensive information about the selected ATMs such as operational status, cash availability, denominations availability, and provides the users with the shortest route to their chosen ATMs, all accessible through a user-friendly application interface. The proposed system is implemented with the help of IoT, Cloud, and Android Application. Thus, by harnessing the emerging technologies, this pioneering system enhances the ATM user experience, ensuring that users are consistently well-informed about ATM status which shall lead to convenient banking.

[ID: 42] Detection Of Attacks In Iot Using Machine Learning And Deep Learning Techniques: A Systematic Review

Kuljeet Singh (University Of Jammu)*; Munish Verma (University Of Jammu); Amit Mahajan (University Of Jammu); Vibhakar Mansotra (University Of Jammu)

The current and future Internet of Things (IoT) applications are critically promising in terms of increasing efficiency, decision-making, value, and use automation. The proliferation of IoT devices connected to the internet results in continuously expanding data, necessitating IoT security as a top priority. There is a constant need to discover innovative approaches to address such difficulties with IoT devices. This paper performs an extensive survey including several studies conducted by researchers about attacks on IoT devices and approaches such as machine learning (ML) and deep learning (DL) used to identify attacks occurring on IoT gadgets. This study also discusses typical security concerns on IoT Devices at multiple layers, including the sensor, network, and application layers. Associated ways for detecting attacks in IoT devices have been investigated, as have the various difficulties. After reviewing security issues, key ML and DL algorithms and their applicability in the detection of attacks have been summarized. Also, numerous security issues and challenges faced in IoT security have been discussed.

[ID: 45] Prayer Time Indicator Based On Internet Of Things

Sadam H Ganie (Iust)*; Syed Za Shah (Islamic University Of Science And Technology, Kashmir, India); Hannan Parray (Iust); Mohammad Mubashir (Iust)

Technology has intervened in religious as well as spiritual practices to benefit the people in different religious activities. Timing of Prayer is maintained with importance in Masjid, Houses etc. In Islam, Muslim Perform five-time prayer daily at a fixed time in a day. This paper briefly describes these times, and explains how they can be shown on a digital indicator which supports different calculation methods for different schools of law. This paper will briefly describe how we have designed an IoT based digital prayer time indicator which displays all the prayer times and supports various calculation methods for different schools of thought. Additionally, we've developed an Android application that facilitates bi-directional communication between the digital prayer time indicator and the Android app. The app boasts innovative features such as locating nearby mosques, changing timetables from anywhere, viewing timetables of any mosque, to name just a few.

[ID: 100] Parcel Atm - A Smart Parcel Collection System

Amit Kumar Ahuja (Jss Academy Of Technical Education, Noida)*; Akanshu Kaushik (Wipro Hr Services India Private Limited); Abhay Kumar (Cognizant Technology Solutions); Sidharth Tyagi (Hashedin By Deloitte); Abhishek Kumar (Avl India Private Limited)

The parcel is an object or collection of objects wrapped to be carried or sent by the post or a like. Sending and receiving parcels is an important task being carried out on a day-to-day basis by the post offices and the courier companies. This requires substantial manual intervention in the form of parcel collection at designated centres, so called ‘Post Offices’ or ‘Courier Centres’ or ‘Parcel Collection Centres’. An important part of human efforts can be saved if the parcel collection is carried out in an autonomous manner by a machine, without human involvement. Further, it can lead to convenience if the collection machine lies in the near vicinity of the customers as happens with the Automated Teller Machines (ATMs) which are being used for financial transactions in the banking sectors. The present invention provides an innovative system for receiving parcels and tracking them using an electronic device. The system is referred to as ‘Parcel ATM’, here, in this paper. For better accessibility to the users, the ‘Parcel ATMs’ may be set up along with the existing cash ATMs as installed by various banks. The system includes a parcel receiving machine, a controller, IoT module, electronic devices, sensors, cloud storage and a server. The system sends the receipts of the parcel on an electronic device linked to the user’s mobile phone. The system also provides a facility of finding nearest ATMs with the queue monitoring facility. Also, the system provides a parcel segregation facility based on the destination. The parcels are tracked, and a message is sent to the user’s mobile, both sender and receiver once the parcel reaches to the destination post office. Further, the proposed system is integrated with the central control system or Post Office to give status of the parcels or postages received by the ‘Parcel ATM’ from time-to-time.

[ID: 104] A Concise Study On The Influence Of Model Hyper-Parameters In Federated Learning

Majid Ahmad Kundroo (Chungbuk National University); Taehong Kim (Chungbuk National University)*

Federated learning, a promising technique for training distributed, privacy-preserving machine learning models, has recently gained widespread attention. Yet, many existing federated learning studies rely on default or out-of-the-box hyper-parameters for machine learning models, leading to sluggish convergence rates. This study seeks to explore the intricate relationship between model convergence and model hyper-parameters within the domain of federated learning. This short analysis underscores the critical importance of proper hyper-parameter selection and focuses specifically on the impact of learning rates and epoch counts on the accuracy of federated learning models. In the realm of federated learning, the proper configuration of hyper-parameters is imperative for effective model training. To analyse the

effects, we conducted experiments involving varying learning rates and epoch sizes while keeping the model and dataset constant. Our analysis reveals that the performance of the model is significantly influenced by the choice of learning rate and the number of epochs, shedding light on the importance of proper hyper-parameters in federated learning.

[ID: 107] Performance Evaluation And Adaptivity Of Http Live Streaming Media Protocol

Shyam Sunder Saini (University Of Jammu)*; Lalit Sen Sharma (University Of Jammu)

HLS (HTTP Live Streaming) is the most widely used HTTP protocol for live streaming developed by Apple and is adaptive in nature. In our study, we assess the performance of HLS by measuring its latency, throughput, error rate and stability. The performance is measured with the help of using tool like Apache JMeter followed by integration of the UBIK media streaming sampler plugin. The experiment is performed multiple times with a maximum of three virtual users under real-time conditions and the results demonstrate that HLS provides low latency and high throughput, allowing for smooth and uninterrupted multimedia streaming. The protocol also demonstrates good stability, with minimal fluctuations in quality even under changing network conditions showing throughput of 1.2 MbPS which is considered to be smooth streaming in HLS. A packet drops or error rate of 5 percent is seen which leads to a latency of 10 milliseconds.

[ID: 128] Denial Of Service (Dos) Attack Identification And Network Analysis Using Wireshark

Mufassir Dr. Yaseen (Mitwpu)*; Sudhanshu Jaiswal (Mitwpu Pune)

Computer Networks and the Internet are essential parts of our daily life in terms of sending and receiving data. Network based attacks such as DoS attacks have become the major aspect on the internet that causes the interruption in smooth operation. The operations that rely on the internet like banking, education, digital markets etc. have become the major target. In understanding the behavior of an attacker or intruder, Wireshark is used to capture the packets and analyze it in the networked environment. The objective is to simulate the different flood attacks such as TCP, UDP, HTTP and analyze its effects on the network.

[ID: 129] Decentralized Socializing Platform Using Blockchain

Mufassir Dr. Yaseen (Mitwpu)*; Meet Zinzuvadiya (Mitwpu Pune)

This research work introduces a pioneering vision to revolutionize online communication by developing a decentralized platform inspired by the Omegle concept, utilising Ethereum Push Notification Services (EPNS). It aims to create a secure, private, and anonymous online interaction environment by merging blockchain decentralization and real-time push notifications. Addressing privacy concerns inherent in centralized platforms, this project explores the synergy between blockchain, push notifications, and decentralized applications, outlining objectives, methodologies, and anticipated outcomes. Beyond redefining online communication, it envisions decentralized social platforms that empower users, potentially catalysing a paradigm shift in how digital societies connect and collaborate, ultimately contributing to a more user-centric digital landscape.

[ID: 140] Detection Of Power Grid Disturbances And Cyber-Attacks Using Machine Learning

Inam Ul Haq (Chandigarh University)*; Vishnu Vishvas Sharma (Chandigarh University)

While surviving in a world where everything is constantly becoming smart day by day, the security of data becomes a major issue. In electric transmissions, it can be done through power grids. A power grid, which uses a legacy SCADA system, has data that is not very secure and this vulnerability in the system can be helpful to any hacker in penetrating through a network or even getting hold of the software and weakening the grid in many incalculable ways. A better version of the power grid is the smart grid, which uses digital technology that can intelligently consolidate the actions of the user. In this paper, we have come across many vulnerabilities, challenges faced by harmful attacks, and various techniques in line with machine learning, like SL and USL. We have given a clear review of the efficiency of all those models.

Agriculture

[ID: 25] An Efficient Transfer Learning Approach With Fine-Tuning For Automated Identification Of Medicinal Plant Leaf Images

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Badshah University, Rajouri-Jammu And Kashmir-India); Akib Mohi Ud Din
Khanday (Department Of Computer Science & Software Engineering-Cit, United
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Accurately identifying medicinal plants is crucial since they are less prone to causing adverse effects and are a more economical option compared to modern pharmaceuticals. Manual identification of medicinal plants is a challenging task due to its time-consuming and labor-intensive nature. Numerous efforts have been made to automate plant identification processes by utilizing different parts of plant images. Leaf images are extensively used due to their convenient accessibility and have proven to be the most reliable source of information. After exhaustive experiments, this study proposes an intelligent identification system by fine-tuning different Convolutional Neural Networks, namely VGG-16, VGG19, DenseNet201 and InceptionV3. Employing transfer learning, we demonstrate that Densenet201, when paired with SVM, achieves an impressive accuracy of 97% with precision of 98%, showcasing the potential of deep learning, in identifying medicinal plant leaf images. Furthermore, our findings highlight that VGG16 and Logistic Regression also deliver robust results, with implications for a wide range of classification tasks. Notably, DenseNet201 and VGG16 consistently exhibit remarkable performance, maintaining a balanced trade-off between precision, recall, and F1-scores. These two feature extraction models emerge as top-performing architectures, making them suitable for a wide range of plant classification tasks. With a dataset of 1835 leaf images, this research presents a scalable and reliable approach to plant species recognition, promising advancements in various botanical applications. keywords: Medicinal leaf plant; Transfer learning; Deep learning; Fine-Tuning, Multiclass Classification

[ID: 124] Automated Classification Of Nuts Using Convolutional Neural Networks

Saimul Bashir (Chandigarh University)*; Vinay Nath Tiwary (Chandigarh University)

In this paper, we present a novel approach to classifying different types of nuts using a Convolutional Neural Network (CNN). The sorting of nuts is a crucial step in the production and distribution process, and is currently done manually, which is time-consuming and prone to errors. Our goal is to develop an automated system that can accurately classify different types of nuts in real-time. We train our CNN on a large dataset of images of different types of nuts, including almonds, cashews, hazelnuts, peanuts, pecans, pistachios, and walnuts. Our results show that our system achieves high accuracy on unseen images and can be integrated into the production line to automatically sort different types of nuts in real-time. This improves the efficiency and accuracy of the sorting process and reduces the need for manual labor. Our approach has the potential to be applied to other classification tasks in the food industry. (CNNs) in classifying 10 different tree nut types using a dataset comprising 1163 training, 50 testing, and 50 validation images. The pre-trained TensorFlow model "nuts)100.0.hs" achieves an outstanding F1 score of 100 % , demonstrating its remarkable performance in this classification task.

[ID: 126] Herbal And Non-Herbal Plant Leaves Classification Using Deep Learning

Megha Raina (University Of Jammu)*; Vibhakar Mansotra (University Of Jammu)

Herbal plants are now a day's more popular as they have many nutritional properties, are easily available, and are cheaper than modern medicines. The demand for Herbal medicines is increasing rapidly due to their no side effects. Herbal plants have been used for the treatment of diseases caused by fungi, insects, bacteria, and viruses since ancient times. It is used to strengthen our immune system which can be used to prevent various infections. Due to a lack of experience in identifying herbal plants, it is important to identify herbal plants with the help of deep learning so that the common man can easily identify herbs online. In this paper, we have used a deep learning model to efficiently classify herbal and non-herbal plants. The experimental study has been conducted on different herbal and non-herbal leaves using VGG16 a Convolutional Neural Network (CNN) model. Our dataset contains total of 7000 images out of which 3500 images are of 10 herbal plants and 3500 images are of 12 non-herbal plants. The dataset is divided into 80% for training and 20% for testing purpose. Accuracy for the suggested classification model has been 99.51% for training and 98.21% for testing.

Commerce

[ID: 22] Analysis Of Time Series Data For Prediction Of Stock Market Using Machine Learning Approaches

Umar Bashir (University Of Jammu)*; Vibhakar Mansotra (University Of Jammu)

Prediction of stock market is considered a challenging task due to the volatility, non-linearity, and fuzzy pattern of the stock market data. The fluctuations of the stock market depend on external factors; therefore, analysis and prediction of financial data is a time-dependent problem. The advancement of Artificial Intelligence and intelligent computational approaches to prediction has proven to be more productive in the field of financial markets. The stock market players need an automated system to be designed that maximizes profit and decreases the correlated risk by analyzing past data and making an advance prediction of stock price. In this study two machine learning approaches namely Decision Tree and Support Vector Regression has been applied to predict the closing price after 2-days, 4-days, and 6-days of two companies belonging to the technology sector. To evaluate the performance of these two techniques, two standard strategic indicators MAPE and R² have been used. From the results, it has been concluded that SVR shows better results as compared to Decision Tree.

[ID: 38] Evolving Patterns: A Deep Dive Into Predictive Modeling For E-Commerce Churn

Sailee Shirodkar (Bhartiya Vidya Bhavan'S Sardar Patel Institute Of Technology)*; Atharv Narendra Raotole (Sardar Patel Institute Of Technology); Kunal Madrecha (Sardar Patel Institute Of Technology); Prasenjit Bhavathankar (Bhartiya Vidya Bhavan'S Sardar Patel Institute Of Technology)

In the ever-evolving e-commerce landscape, understanding and mitigating customer churn is paramount. This research delves into this challenge, exploring predictive models ranging from deep learning to decision trees. Drawing from diverse industries, this paper provides valuable benchmarks for churn prediction. As e-commerce transforms rapidly, grasping evolving churn patterns becomes critical. This study serves as a comprehensive resource, blending cutting-edge machine learning with extensive datasets to empower businesses. It lays the foundation for future enhancements, scalability, and real-time applications. In a dynamic environment, this work offers vital insights to navigate churn complexities effectively, fostering growth and customer satisfaction.

[ID: 125] Significance Of Semantic Web Technologies In The Consumer And Entrepreneur Dealing In E-Commerce

Sakshi Gupta (University Of Jammu)*; Lalit Sen Sharma (University Of Jammu)

E-Commerce (Electronic Commerce) embodies an evolutionary change that affects consumers as well as entrepreneurs. E-Commerce has become more than a tool to expand the current business models. It is driving a total transformation of the established business models. The emergence of the World Wide Web and Semantic Web technologies has made e Commerce another sector that is constantly evolving. The personalised nature of consumer interaction is also getting more and more dynamic as businesses shift from passive to active. The paper being presented is a study of the development of e-Commerce systems, flaws in early e-Commerce platforms, existing trends, and expected future needs. The study also explores the extent and significance of semantic web technologies in the consumer and entrepreneur dealing.

Miscellaneous

[ID: 51] Empowering Deep Learning With Energy-Efficient Hardware Accelerators

Mufassir Dr. Yaseen (Mitwpu)*; Husain Gadiwala (Mitwpu); Riddhi Panchal (Mitwpu Pune)

This project aims to address the growing energy requirements of deep learning models by designing and optimizing specialized hardware accelerators. As deep learning applications expand, the computational needs for training and inference have increased, leading to higher energy consumption. These accelerators will balance computing performance and energy consumption, enabling the deployment of more powerful and environmentally friendly AI systems. By reducing energy consumption, these accelerators have the potential to revolutionize industries by lowering power usage and speeding up processing. Through methods like quantization, sparsity optimization, and bespoke ASIC/FPGA design, computing efficiency can be maximized while minimizing energy usage. The research showcases the transformative potential of specialized hardware accelerators in enhancing energy efficiency in deep learning. This initiative has significant potential to influence the development of advanced and environmentally responsible AI systems.

[ID: 26] Utilizing Machine Learning For Forecasting The 2023 Cricket World Cup Result: An Analysis Grounded In Data

Malik Muzamil Ishaq (Chandigarh University)*; Inam Ul Haq (Chandigarh University)

The most watched sport today is cricket, which is very popular. It is played in three different formats: test matches, one-day internationals (ODI), and 20-over internationals. No one can predict who will win a match until the final ball of the final over. However, the field of machine learning utilizes past data to forecast future outcomes. The aim of this project is to build a model that can predict the outcome of a 2023 Cricket One-Day International Game in advance. Machine learning algorithms will be used on testing and training datasets to predict the outcome of an ODI match, based on specified features. The data for the model will be obtained from Kaggle and several cricket websites. Three algorithms were used for prediction: K-Nearest Neighbor, Random Forest, and Logistic Regression.

The best prediction accuracy of 87% was obtained using the K-Nearest Neighbor algorithm, 73% using the Random Forest algorithm, and 70% using the Logistic Regression algorithm.

[ID: 35] Unveiling The Power Of Hyperspectral Images Using Machine Learning

Naillah Gul (Islamic University Of Science And Technology)*; Syed Za Shah (Islamic University Of Science And Technology, Kashmir, India); Riyaz Ahmad Mir (National Institute Of Hydrology, Jammu); Dr Assif Assad (Islamic University Of Science And Technology, Pulwama); Mohd Anul Haq (Majmaah University)

Hyperspectral images (HS) have revolutionized the domain of vision by extending human vision beyond the visible range of the electromagnetic spectrum. The ability to measure the interaction between electromagnetic waves and matter leads to a unique signature that imparts additional and accurate knowledge in classifying images. Over the past years, tremendous developments have been made in the domain of Hyperspectral imagery due to emerging techniques such as Machine Learning and Deep Learning. These technologies enrich the processing of Hyperspectral images. This article presents an in-depth understanding on the fundamentals of Hyperspectral images of the Glaciers. Moreover, we present a classification comparison between Hyperspectral images and colour images using Support Vector Machines (SVM) and Random Forests (RF). Hyperspectral image classification shows superior results over colour image classification. In case of colour images SVM achieved an accuracy of 57.66% and RF achieved an accuracy of 65.50%. In case of Hyperspectral images, SVM achieved an accuracy of 85.61% and RF achieve an accuracy of 92.80%.

[ID: 64] Transfer Learning In Depth Estimation By Evaluating U-Nets And Unet Variants For Comparative Performance

Huma Farooq (University Of Kashmir)*; Manzoor A Chachoo (University Of Kashmir); Sajid Yousuf Bhat (University Of Kashmir)

Depth information is vital for autonomous systems to comprehend their surroundings and accurately determine their position. Conventional methods for estimating depth, such as structure from motion and stereo-vision matching, rely on comparing features from different angles. However, these methods often result in incomplete depth maps. Determining depth from a single image, known as monocular depth estimation, is challenging due to its ambiguous nature. With advancements in deep neural networks, researchers have explored deep learning-based approaches for monocular depth estimation. These methods have gained significant attention and have shown impressive accuracy in recent studies, indicating promising progress in this field. In recent times, transfer learning (TL) has emerged as a powerful technique in the realm of deep learning (DL), with its application in depth estimation

becoming an emerging research area. This study compares pre-trained U-net models (MobileUNet and DenseUNet) and the U-net model for monocular depth estimation using the NYU dataset. Among these models, the DenseUNet model stood out with an impressive Root mean square loss of 0.32.

[ID: 67] Addressing Data Scarcity Challenges With Deep Reinforcement Learning

Nusrat Mohi Ud Din (Islamic University Of Science And Technology, Kashmir);
Saqib Ul Sabha (Iust); Muzafar Rasool Bhat (Islamic University Of Science And
Technology, Kashmir); Kusum Deep (Iit Roorkee); Meraj.A Khan (The Hospital
For Sick Children, University Of Toronto, Canada); Assif Assad (Islamic
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The challenge of limited labeled data is a persistent concern across diverse domains, including medical and healthcare, niche agricultural practices, astronomy and space exploration, anomaly detection, and deep sea. Limited data can lead to biased training, overfitting, and poor generalization in AI models. In response to this ubiquitous problem, this research explores the potential of deep reinforcement learning (DRL) algorithms, specifically Double Deep Q-Network (Double DQN) and Dueling Deep Q-Network (Dueling DQN). The algorithms were trained on small training subsets generated by subsampling from the original training datasets. In this subsampling process, a specific number of instances were selected from each class to form the smaller training subsets. Subsequently, the performance of these algorithms was comprehensively assessed by evaluating them on the entire test set. We employed datasets from two different domains where this problem mainly exists to assess their performance in data-constrained scenarios. A comparative analysis was conducted against a transfer learning approach widely employed to tackle similar challenges. The comprehensive evaluation reveals compelling results. In the medical domain, Dueling DQN consistently outperformed Double DQN and transfer learning, while in the agriculture domain, Double DQN demonstrates superior performance compared to Dueling DQN and transfer learning. These findings underscore the remarkable effectiveness of DRL algorithms in addressing data scarcity across a spectrum of domains, positioning DRL as a potent tool for enhancing diverse applications with limited labeled data.

[ID: 81] From Scratch Or Pretrained? An In-Depth Analysis Of Deep Learning Approaches With Limited Data

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The widespread adoption of Convolutional Neural Networks (CNNs) in image recognition has undeniably marked a significant breakthrough. Nevertheless, the insatiable appetite for vast datasets to effectively train deep learning networks poses a formidable challenge. Acquiring ample training samples in practical scenarios often proves arduous, leaving models susceptible to overfitting when confronted with limited data resources. Various strategies have emerged to address this issue, including the judicious selection of an appropriate network architecture. This study delves into mitigating data scarcity by undertaking a comparative analysis of two distinct methods: utilizing compact CNN architectures and applying transfer learning with pre-trained models. Our investigation extends across two disparate datasets, each hailing from distinct domains. Remarkably, our findings unveil nuances in performance. Specifically, the resnet50 architecture demonstrates superior performance on the flower dataset, whereas on the pneumonia dataset, a modest CNN architecture, trained from scratch, surpasses all other architectural choices. The study reveals that using a complex pre-trained model like resnet50 yields better results for the flower dataset, emphasizing the advantages of leveraging prior knowledge for specific data types. Conversely, starting from a simpler CNN architecture from scratch is the superior strategy with the pneumonia dataset, highlighting the need to adapt the approach based on the specific dataset and domain.

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