SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

Journal Name: IEEE Internet of Things Journal **IF: 10.6**

Title: Federated Learning and NFT-Based Privacy-Preserving Medical-Data-Sharing Scheme for Intelligent Diagnosis in Smart Healthcare

Author: Sai S., Hassija V., Chamola V., Guizani M.

Details: Volume 11, Issue 4, Pages 5568 – 5577, 15 February 2024

Abstract: Historical patients' medical data has an important impact on the healthcare industry for providing the best care to patients through intelligent health diagnosis and prediction of diseases. The existing intelligent health diagnosis systems collect data from medical institutions or laboratories and then use machine learning algorithms to predict diseases. But, in most cases, the medical institutions have incomplete medical data of the patients since a patient may consult different specialists (from various hospitals) during the treatment process. To overcome this problem, we build a smart and secure federated learning framework for intelligent health diagnosis with a blockchain-based incentive mechanism and nonfungible tokens (NFTs)-based marketplace. We make use of NFTs to develop clear demarkations on the ownership and accessibility of the data of patients. We create an NFT marketplace that manages access to the historical medical data of patients. A comprehensive incentive mechanism based on several factors, including the quality and relevance of the data, the frequency, regularity of data uploading, etc., is incorporated to encourage and penalize the patients based on their contributions to the global model. We used the Polyak-averaging technique for aggregating local models to form a global model. The extensive analysis shows that the proposed model achieves comparable performance with the centralized machine learning models while affording better security and access to better data. The results also show the efficacy of the proposed blockchain-based incentive mechanism.

URL: https://ieeexplore.ieee.org/document/10231150

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: Journal of Retailing and Consumer Services **IF: 10.4**

Title: Exploring antecedents impacting user satisfaction with voice assistant app: A text mining-based analysis on Alexa services

Author: A. Kumar, P. K. Bala, S. Chakraborty & R. K. Behera

Details: Volume 76, January 2024

Abstract: The Amazon Alexa app is one of the most widely used voice assistant apps to manage customer information-seeking behavior and voice shopping. It provides companionship to the visually impaired and senior citizens. There has not been significant empirical evidence focusing on the determinants of user satisfaction with the voice assistant app. Therefore, this study proposed ten user satisfaction antecedents for the Amazon Alexa app based on 13,363 online user reviews. The Latent Dirichlet Allocation (LDA) technique, regression analysis, dominance analysis, and correspondence analysis were used to analyze these reviews. The regression analysis revealed ten user satisfaction predictors of the Amazon Alexa App. The voice shopping experience with the Alexa app aids caregivers in catering to the needs of elderly individuals by providing convenient shopping, voice-activated control, reminders, smart home integration, and access to information. The result of the dominance analysis shows personal assistance and app update are the most important factors for predicting user satisfaction with the VA app. Moreover, personal assistance and voice-controlled automation experience are the most frequent topics for senior citizens and blind people. The findings of this study can provide valuable insights for business managers in determining the prioritization of key determinants of user satisfaction and offering new competitors a competitive edge in the voice assistant market.

URL: https://www.sciencedirect.com/science/article/pii/S0969698923003375?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

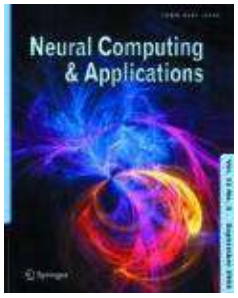
Journal Name: **Neural Computing and Applications** **IF: 6.0**

Title: Local features-based evidence glossary for generic recognition of handwritten characters

Author: T. K .Mishra, M. Kolhar, S. R. Mishra, H. Mohapatra , F. Al-Turjman & Rath A. K.

Details: Volume 36, Issue 02, October 2023

Abstract: Recognition of handwritten characters has been a challenging task so far. There exist thousands of official languages across the globe which are used to communicate through documentation. Optical character recognition (OCR) being the challenging domain in such context where images of such documents are to be recognized either offline or online. Online and offline recognition of documents refer to the approaches whereby the basic operation of character recognition is performed during documentation itself and recognizing characters from stored documents, respectively. Numerous applications from a range of fields like medical transcription, digitization of ancient manuscripts, language translations, etc. are solely dependent on the task of OCR. In this work, an efficient framework is presented for the purpose of handwritten character recognition that can be well utilized for both offline and online processes. The proposed work takes the handwritten character images as input. It applies set of pre-processing such that the samples become suitable for the feature extraction task. The novelty lies in the process of feature extraction whereby three distinct types of feature are considered based on the shape primitives of the images. These features are global to the sample. Subsequently, local shape features are further extracted out of this shape features after suitable quantization process. These local features are the evidences which can be generically used to recognize test samples. These local feature vectors are dubbed as evidences and are preserved into a glossary dubbed as evidence glossary. The efficiency of the proposed scheme is well justified as it utilizes only a fraction of the feature vector and still it can recognize the characters. Other advantages of the proposed work are scale invariance and rotations invariance. Suitable datasets from two distinct languages, namely Odia and English are utilized for evaluating the efficiency of the framework. Comparison of the performance of the framework with six distinct state-of-the-art machine learning models is conducted whereby it outclass the competent in terms of several performance metrics.



URL: https://link.springer.com/article/10.1007/s00521-023-09051-5

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: Computer Networks **IF: 5.6**

Title: PQCLP: Parameterized quantum circuit based link prediction in dynamic networks

Author: Singh N., Kumar M., Biswas B.

Details: Volume 241, March 2024, Article number 110210

Abstract: Link prediction has been challenging, especially when the network is dynamic and complex. The most effective classical method for performing this task involved using machine learning algorithms with features taken from topological network indices. Even while these traditional ML algorithms perform better, they still require a lot of processing resources as the size and number of features in the network increase. This is the ideal situation where quantum computing may fit, as it provides impressive predictions and speedup arising out of quantum phenomena like superposition, entanglement, parallelization, and high dimensional space. Additionally, relatively little research has been done to examine the full potential of quantum computation for link prediction. A few of the earlier attempts are limited to projecting the features to quantum space and then using quantum-projected kernels with classical ML techniques or using hybrid classifiers by incorporating quantum enhancement in traditional random walks. We propose Parameterized Quantum Circuit based Link Prediction (PQCLP) model where we have used quantum circuits not only for projecting the classical data but also for training and optimization in quantum space using Variational Circuits Aka Ansatz which is a parameterized circuit. Here we employ two quantum methods namely Variational Quantum Classifier (VQC) and Quantum Neural Network Classifier (QNN) having classical equivalence with Support Vector Machines and Neural Networks respectively. We present here a detailed comparison of these models with their classical counterparts, within different feature categories and test ratios, and finally with a few state-of-the-art methods using several performance evaluation metrics.

URL: https://www.sciencedirect.com/science/article/pii/S1389128624000422?ssrnid=4467894&dgcid=SSRN_redirect_SD

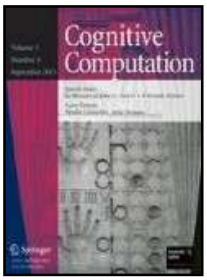
Journal Name: Cognitive Computation **IF: 5.4**

Title: Interpreting Black-Box Models: A Review on Explainable Artificial Intelligence

Author: Hassija, Vikas; Chamola, Vinay; Mahapatra, Atmesh; Singal, Abhinandan; Goel, Divyansh; Huang, Kaizhu; Scardapane, Simone; Spinelli, Indro; Mahmud, Mufti; Hussain, Amir

Details: Volume 16, Issue 1, February 2024, Page 45-74

Abstract: Recent years have seen a tremendous growth in Artificial Intelligence (AI)-based methodological development in a broad range of domains. In this rapidly evolving field, large number of methods are being reported using machine learning (ML) and Deep Learning (DL) models. Majority of these models are inherently complex and lacks explanations of the decision making process causing these models to be termed as 'Black-Box'. One of the major bottlenecks to adopt such models in mission-critical application domains, such as banking, e-commerce, healthcare, and public services and safety, is the difficulty in interpreting them. Due to the rapid proleferation of these AI models, explaining their learning and decision making process are getting harder which require transparency and easy predictability. Aiming to collate the current state-of-the-art in interpreting the black-box models, this study provides a comprehensive analysis of the explainable AI (XAI) models. To reduce false negative and false positive outcomes of these back-box models, finding flaws in them is still difficult and inefficient. In this paper, the development of XAI is reviewed meticulously through careful selection and analysis of the current state-of-the-art of XAI research. It also provides a comprehensive and in-depth evaluation of the XAI frameworks and their efficacy to serve as a starting point of XAI for applied and theoretical researchers. Towards the end, it highlights emerging and critical issues pertaining to XAI research to showcase major, model-specific trends for better explanation, enhanced transparency, and improved prediction accuracy.



URL: https://link.springer.com/article/10.1007/s12559-023-10179-8

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: **Biomedical Signal Processing and Control** **IF: 5.1**

Title: Classification of non-small cell lung cancer types using sparse deep neural network features

Author: A. K. Swain, A. Swetapadma , J. K. Rout & B. K. Balabantaray

Details: Volume 87, January 2024

Abstract: Most of the non-small cell lung cancer is clinically examined using CT/PET images. But an accurate diagnosis by the radiologist is difficult while classifying the type of non-small cell cancer, which may lead to misdiagnosis. Hence, a method is required to accurately identify different types of non-small cell lung cancers, such as adeno-carcinoma and squamous cell carcinoma for providing proper treatment to patients. One of the practical and feasible solution is deep learning based method that has the ability to adapt and learn. However, most of the deep learning methods have complexity issues. Hence, some optimization is required to make the networks less complex. The objective of the work is to use less complex methods for classifying the non-small cell lung cancer. In this work, dense neural network (VGG-16 and Resnet-50) that has complex structures and sparse neural networks (inceptio v3) that are less complex are used. Deep learning methods are employed to obtain features from CT images and accurately classify non-small cell lung cancer. To evaluate the method, 60 adenocarcinoma patients and 60 squamous cell carcinoma patients are considered. The sensitivity, specificity, and accuracy of the Inception v3 network are found to be 96.66 %, 99.12 % and 98.29 % respectively. Observations indicate that the inception v3 model outperforms VGG-16 and ResNet-50. Also, the inception v3 network that is a sparse neural network has less computational overhead as compared to the other two networks. Sparse deep learning techniques may help radiologists accurately classify non-small cell lung cancer using CT images.

URL: https://www.sciencedirect.com/science/article/pii/S1746809423009187?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

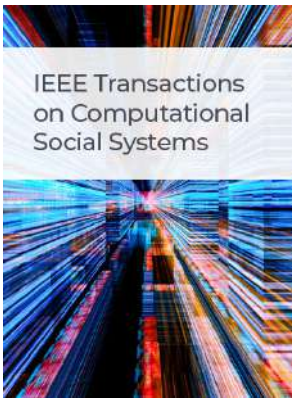
Journal Name: IEEE Transactions on Computational Social Systems **IF: 5.0**

Title: Captionomaly: A Deep Learning Toolbox for Anomaly Captioning in Social Surveillance Systems

Author: Goyal A., Mandal M., Hassija V., Aloqaily M., Chamola V.

Details: Volume 11, Issue 1, Pages 207 – 215, 1 February 2024

Abstract: Real-time video stream monitoring is gaining huge attention lately with an effort to fully automate this process. On the other hand, reporting can be a tedious task, requiring manual inspection of several hours of daily clippings. Errors are likely to occur because of the repetitive nature of the task causing mental strain on operators. There is a need for an automated system that is capable of real-time video stream monitoring in social systems and reporting them. In this article, we provide a tool aiming to automate the process of anomaly detection and reporting. We combine anomaly detection and video captioning models to create a pipeline for anomaly reporting in descriptive form. A new set of labels by creating descriptive captions for the videos collected from the UCF-Crime (University of Central Florida-Crime) dataset has been formulated. The anomaly detection model is trained on the UCF-Crime, and the captioning model is trained with the newly created labeled set UCF-Crime video description (UCFC-VD). The tool will be used for performing the combined task of anomaly detection and captioning. Automated anomaly captioning would be useful in the efficient reporting of video surveillance data in different social scenarios. Several testing and evaluation techniques were performed. Source code and dataset: https://github.com/Adit31/Captionomaly-Deep-Learning-Toolbox-for-Anomaly-Captioning.



URL: https://ieeexplore.ieee.org/document/10021309

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: IEEE Transactions on Consumer Electronics **IF: 4.3**

Title: Towards Multi-Modal Deep Learning-Assisted Task Offloading for Consumer Electronic Devices Over An IoT-Fog Architecture

Author: Tripathy S.S., Bebortta S., Haque M.I.U., Zhu Y., Gadekallu T.R.

Details: Pages 1-1, 2024

Abstract: Internet of Things (IoT) devices along with associated software have proliferated at an unprecedented pace, presenting the challenge of high energy use combined with latency during complex, time-sensitive transactions. Fog computing, i.e., a distributed computing paradigm, may be a potential remedy. However, despite these efforts, it is highly strenuous to regulate service latency and energy efficiency within the fog computing layer for IoT centered consumer electronics. In our research, we propose an algorithm called Dynamic Deep Reinforcement learning-based Task Offloading (DDTO). Therefore, in multi-modal IoT-Fog systems, the intelligent distribution of fog computing resources by DDTO is considered on the basis of resources constraints and the timeliness of completion of tasks. We use a log-normal distribution to describe delay and energy consumption so as to make up for varying modalities. Besides, a task prioritization problem, which is described as an integer programming problem, that minimizes service latency and energy consumption in fog servers is further described. DDTO yields better performance than a conventional Q–learning with respect to long-term expected rewards since it uses task priority weights derived from statistical latency and energy data. Experimental results demonstrate the benefits of DDTO on reducing service latency and consumption of energy, when compared to benchmark strategies, discussing issues with multiple modalities within IoT-Fog systems.

URL: https://ieeexplore.ieee.org/document/10438859

SCHOLARLY PUBLICATIONS
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Journal Name: IEEE Transactions on Consumer Electronics **IF: 4.3**

Title: A Blended Deep Learning Intrusion Detection Framework For Consumable Edge-Centric IoMT Industry

Author: Alzubi J.A., Alzubi O.A., Qiqieh I., Singh A.

Details: Pages 1-1, 2024

Abstract: The demand for medical sensors in the Smart Healthcare System (SHS) creates an intelligent Internet of Medical Things (IoMT) system. This system plays an important role in detecting the vital parameters of the human body. However, security and privacy issues in terms of network vulnerability have arisen due to the transmission of data and lack of control over the data. The Intrusion Detection System (IDS) is one of the security solutions to identify various threats and vulnerabilities in the consumable edge-centric IoMT industry. Several IDS techniques have been developed in previous years. However, a real-time and highly accurate attack detection system in the edge-centric IoMT industry is needed. This paper proposes a blended deep learning framework that leverages the strengths and capabilities of different deep learning architectures. The proposed model combined Convolutional Neural Network (CNN) and Long Short-Term Memory (LSTM) to recognize the latest intruders accurately and defend the healthcare data. The major outcome of the proposed framework is to detect different attacks during data transmission at the edge of the network with high accuracy and efficiency. The proposed model was analyzed on the CSE-CIC-IDS 2018 systematic dataset containing two distinct classes of profiles. The experimental results demonstrate that the proposed framework's accuracy is higher than the existing approach.

URL: https://ieeexplore.ieee.org/document/10382176

SCHOLARY PUBLICATIONS
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Journal Name: Computers **IF: 4.2**

Title: Brain Tumour Classification Using Noble Deep Learning Approach with Parametric Optimization through Metaheuristics Approaches.

Author: Nayak, Dillip Ranjan; Padhy, Neelamadhab; Mallick, Pradeep Kumar; Bagal, Dilip Kumar; Kumar, Sachin

Details: Volume 13, Issue 1, 2024

Abstract: Deep learning has surged in popularity in recent years, notably in the domains of medical image processing, medical image analysis, and bioinformatics. In this study, we offer a completely autonomous brain tumour segmentation approach based on deep neural networks (DNNs). We describe a unique CNN architecture which varies from those usually used in computer vision. The classification of tumour cells is very difficult due to their heterogeneous nature. From a visual learning and brain tumour recognition point of view, a convolutional neural network (CNN) is the most extensively used machine learning algorithm. This paper presents a CNN model along with parametric optimization approaches for analysing brain tumour magnetic resonance images. The accuracy percentage in the simulation of the above-mentioned model is exactly 100% throughout the nine runs, i.e., Taguchi's L9 design of experiment. This comparative analysis of all three algorithms will pique the interest of readers who are interested in applying these techniques to a variety of technical and medical challenges. In this work, the authors have tuned the parameters of the convolutional neural network approach, which is applied to the dataset of Brain MRIs to detect any portion of a tumour, through new advanced optimization techniques, i.e., SFOA, FBIA and MGA.

URL: https://www.mdpi.com/2073-431X/11/1/10

SCHOLARY PUBLICATIONS
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Journal Name: Frontiers of Computer Science **IF: 4.2**

Title: DNACDS: Cloud IoE big data security and accessing scheme based on DNA cryptography

Author: Singh, Ashish; Kumar, Abhinav; Namasudra, Suyel

Details: Volume 18, Issue 1, Article No. 181801, 2024

Abstract: The Internet of Everything (IoE) based cloud computing is one of the most prominent areas in the digital big data world. This approach allows efficient infrastructure to store and access big real-time data and smart IoE services from the cloud. The IoE-based cloud computing services are located at remote locations without the control of the data owner. The data owners mostly depend on the untrusted Cloud Service Provider (CSP) and do not know the implemented security capabilities. The lack of knowledge about security capabilities and control over data raises several security issues. Deoxyribonucleic Acid (DNA) computing is a biological concept that can improve the security of IoE big data. The IoE big data security scheme consists of the Station-to-Station Key Agreement Protocol (StS KAP) and Feistel cipher algorithms. This paper proposed a DNA-based cryptographic scheme and access control model (DNACDS) to solve IoE big data security and access issues. The experimental results illustrated that DNACDS performs better than other DNA-based security schemes. The theoretical security analysis of the DNACDS shows better resistance capabilities.

URL: https://link.springer.com/article/10.1007/s11704-022-2193-3

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: **Soft Computing** **IF: 4.1**

Title: Intelligent fault diagnostic system for rotating machinery based on IoT with cloud computing and artificial intelligence techniques: a review

Author: M. Maurya , I. Panigrahi, D. Dash & C. Malla

Details: Volume 36, Issue 02, October 2023

Abstract: The important part of mechanical equipment is rotating machinery, used mostly in industrial machinery. Rolling element bearings are the utmost dominant part in rotating machinery, so even small defects in these components could result in catastrophic system failure and enormous financial losses. Hence, it is crucial to create consistent and affordable condition monitoring and fault diagnosis systems that estim ate severity level and failure modes and to create an appropriate maintenance strategy. The studies reveal that the fault diagnostic system focuses on single fault diagnosis of the shaft-bearing system. However, in real scenarios, the occurrence of a single fault is very unlikely. Thus, multifault diagnosis of the shaft-bearing system is of greater significance. This paper aims at steadily and broadly summarizing the development of the intelligent multifault diagnostic and condition monitoring systems. In addition, there is a rapid development of application of Internet of things, cloud computing and artificial intelligence techniques for fault diagnosis. In this paper, we summarize the study of various fault diagnostic system built on the architecture and application of these cutting-edge technologies for predictive maintenance of mechanical equipment.

URL: https://link.springer.com/article/10.1007/s00500-023-08255-0

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: IEEE Acces **IF: 3.9**

Title: EdgeMatch: A Smart Approach for Scheduling IoT-Edge Tasks With Multiple Criteria Using Game Theory

Author: A. Bandyopadhyay , V. Mishra , S. Swain , K. Chatterjee , S. Dey , S. Mallik , A. Al-Rasheed , M. Abbas & B. O. Soufiene

Details: Volume 12, January 2024

Abstract: For an extended period, a technological architecture known as cloud IoT links IoT devices to servers located in cloud data centers. Real-time data analytic are made possible by this, enabling better, data-driven decision making, optimization, and risk reduction. Since cloud systems are often located at a considerable distance from IoT devices, the rise of time-sensitive IoT applications has driven the requirement to extend cloud architecture for timely delivery of critical services. Balancing the allocation of IoT services to appropriate edge nodes while guaranteeing low latency and efficient resource utilization remains a challenging task. Since edge nodes have lower resource capabilities than the cloud. The primary drawback of current methods in this situation is that they only tackle the scheduling issue from one side. Task scheduling plays a pivotal role in various domains, including cloud computing, operating systems, and parallel processing, enabling effective management of computational resources. In this research, we provide a multiple-factor autonomous IoT-Edge scheduling method based on game theory to solve this issue. Our strategy involves two distinct scenarios. In the first scenario, we introduced an algorithm containing choices for the IoT and edge nodes, allowing them to evaluate each other using factors such as delay and resource usage. The second scenario involves both a centralized and a distributed scheduling approach, leveraging the matching concept and considering each other. In addition, we also introduced a preference-based stable mechanism (PBSM) algorithm for resource allocation. In terms of the execution time for IoT services and the effectiveness of resource consolidation for edge nodes, the technique we use achieves better results compared with the two commonly used Min-Min and Max-Min scheduling algorithms.

URL: https://ieeexplore.ieee.org/document/10381691

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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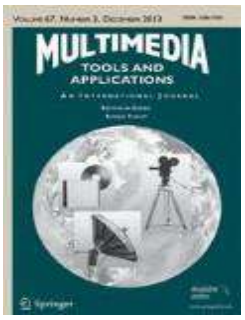
Journal Name: **Multimedia Tools and Application** **IF: 3.6**

Title: Investigating the impact of standard brain atlases and connectivity measures on the accuracy of ADHD detection from fMRI data using deep learning

Author: S. Agarwal, A. Raj , A. Chowdhury , G. Aich , R. Chatterjee & K. Ghosh

Details: January 2024

Abstract: Inattention, hyperactivity, and impulsivity are among the symptoms of Attention Deficit Hyperactivity Syndrome (ADHD) . This brain disorder cannot currently be treated or avoided. A kid or adult with ADHD may be able to control their symptoms, though, if they are diagnosed early and have a good treatment and education plan. Functional magnetic resonance imaging (fMRI) is one of the non-invasive imaging techniques used to diagnose ADHD. The blood-oxygen-level-dependent (BOLD) signals extracted from several brain regions (obtained by choosing a brain atlas) are processed to form a brain functional connectivity matrix and fed into a deep learning model for the classification of ADHD. In this paper, we study two things: first, we diagnose the ADHD using fMRI data by proposing two approaches, viz., an image-based approach and a graph-based (network-based) approach. In the image-based approach, the connectivity matrix obtained from the fMRI data is used directly as an image, and the whole image is fed into a deep learning model. In the network-based approach, the connectivity matrix is first converted into an adjacency matrix, which represents an undirected network. After that, several network properties are accumulated as features, and the feature vector is fed into the deep learning model. Second, we study how the choice of a particular brain atlas or connectivity matrix can affect the accuracy of the ADHD diagnosis. The suggested algorithms, along with six different atlases and two different connectivity matrices, are compared using 352 fMRI images and various one- and two-dimensional neural network models. Our finding demonstrates that accuracy varies depending on the atlases and connectivity measurements used. In addition, we have shown that, with a particular setup, our algorithms outperform a number of deep-learning baselines showing the second best (ranging from 74.48% to 90.90%) results most of the time. Application of various atlases and connectivity matrices shows 64% variations in the overall accuracy.



URL: https://link.springer.com/article/10.1007/s11042-023-17962-7

SCHOLARY PUBLICATIONS
School of School of Computer Engineering
KIIT Deemed to be University

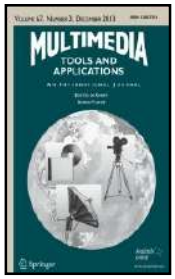
Journal Name: Multimedia Tools and Applications **IF: 3.6**

Title: WU-Net plus plus : A novel enhanced Weighted U-Net plus plus model for brain tumor detection and segmentation from multi-parametric magnetic resonance scans

Author: Das, Suchismita; Dubey, Rajni; Jena, Biswajit; Tsai, Lung-Wen; Saxena, Sanjay

Details: February 2024

Abstract: Brain tumor detection and segmentation from multi-parametric magnetic resonance (MR) scans are crucial for the prognosis and treatment planning of brain tumor patients in current clinical practice. With recent technological advancements, artificial intelligence-based deep learning has proven its indispensable image analysis capability in the most challenging tasks. This study proposes an automated WU-Net + + deep learning model for brain tumor segmentation using multiparametric structural MR scans obtained from the BraTS 2018 dataset. The model was validated through cross-dataset testing for intracranial hemorrhage (ICH) classification (ATLAS V2.1 dataset) and multi-organ segmentation from abdominal images of TCIA and BTCV datasets. The WU-Net++ model, a novel version of U-Net, was developed by adjusting its pooling operation as a weighted function of max and average pooling for brain tumor segmentation. The proposed model (WU-Net + +) achieved an F1 score of 0.94 +/- 0.124, a dice score of 0.91 +/- 0.132, and an AUC value of 0.915 for whole tumor segmentation. The model also achieved a high accuracy of 0.9949 +/- 0.121 in ICH classification and dice scores of 0.912 +/- 0.21, 0.844 +/- 0.25, and 0.893 +/- 0.17 for spleen, esophagus, and portal and splenic vein segmentation, respectively. Our study revealed that WU-Net + + has significant potential to improve the accuracy of segmentation and could be an effective method in the era of precision medicine.



URL: https://link.springer.com/article/10.1007/s11042-024-18336-3

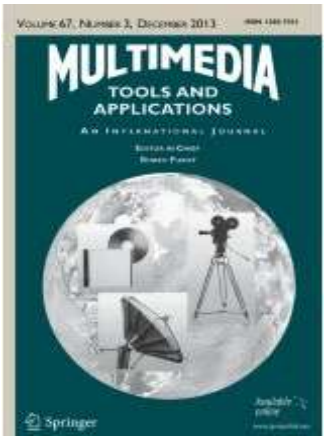
Journal Name: Multimedia Tools and Applications **IF: 3.6**

Title: Indian TSR for partial occlusion using GDNN

Author: Sanyal B., Mohapatra R., Dash R.

Details: Volume 83, Issue 7, Pages 19485 – 19500, February 2024

Abstract: Traffic sign recognition (TSR) is an essential and integral domain in Advanced Driver Assistance Systems (ADAS). TSR, though studied for a few years now, remains a convoluted field owing to various challenges associated with TSR. An investigation into the TSR literature shows a generous amount of work done toward a generalized recognition system. A deep dive into TSR literature offers only a few pieces on partial occlusion in TSR. It has been observed that Deep neural network (DNN) is often a popular choice for researchers in real-time TSR. But, investigation indicates that DNNs don't perform well in occluded environments. In this work, generative models have been integrated with DNN. In particular, the final convolution layers of the DNN are replaced by a differentiable compositional model. The integrated model focuses on the non-occluded part of the traffic signs to recognize the signs. Extensive experiments are conducted on publicly available datasets-GTSRB, BTSC and IRSDBv1.0. The proposed model outperforms DNN for occluded images. The proposed model, Generative DNN or GDNN, has been compared with other schemes to demonstrate its efficiency.



URL: https://link.springer.com/article/10.1007/s11042-023-16168-1

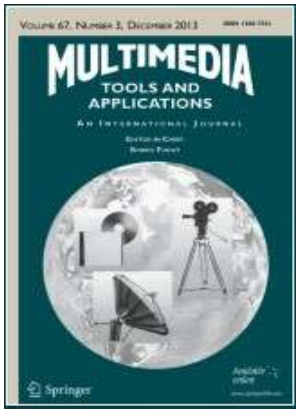
Journal Name: Multimedia Tools and Applications **IF: 3.6**

Title: A new adaptive tuned Social Group Optimization (SGO) algorithm with sigmoid-adaptive inertia weight for solving engineering design problems

Author: Jena J.J., Satapathy S.C.

Details: Volume 83, Issue 1, Pages 3021 – 3055, January 2024

Abstract: Evolutionary algorithms have found enormous applications in solving real-world problems due to their stochastic nature. They have a set of control parameters, which are used to perform certain operations to induce randomness, scalar displacement etc. Various works have been done for tuning these parameters, as appropriate parameter tuning can enhance the performance of algorithm greatly. Inertia weights based parameter tuning is one of the widely used techniques for this purpose. In this paper, we have reviewed some of the inertia weight strategies and applied them to Social Group Optimization (SGO) to study the changes in its performance and have performed a thorough analysis on the same. Following the analysis, the need of a more generalized inertia weight strategy was felt which could be used in parameter tuning for different variety of problems and hence Sigmoid adaptive inertia weight have been proposed. SGO with sigmoid-adaptive inertia weight (SGOSAIW) has been simulated on twenty-seven benchmark functions suite and further simulated on few mechanical and chemical engineering problems and compared to other similar algorithms for performance analysis. In eight-benchmark function suite, SGOSAIW obtained better minima except one i.e. 'Schwefel 2.26' with respect to other algorithms investigated in this work. In nineteen-benchmark function suite, SGOSAIW obtained better minima except one i.e. 'Noisy function'. Thus, the proposed algorithm yielded promising results which are well represented with suitable tables and graphs in the paper.



URL: https://link.springer.com/article/10.1007/s11042-021-11266-4

SCHOLARY PUBLICATIONS
School of School of Computer Engineering
KIIT Deemed to be University

Journal Name: Arabian Journal for Science and Engineering **IF: 2.9**

Title: Integrating Distributed Generation and Advanced Deep Learning for Efficient Distribution System Management and Fault Detection

Author: Bhatnagar, Maanvi; Yadav, Anamika; Swetapadma, Aleena

Details: January 2024

Abstract: Distribution system voltage profile management at each bus and fault detection and classification are often challenged by complex and changing network configurations. The distribution system voltage profile improvement issue is addressed by placing distributed generation (DG) units at different locations in the network. By placing the DG units at appropriate places in IEEE 33 bus radial distribution networks by a proposed reinforcement learning (RL) algorithm, the voltage profile of each node is improved and power loss in the network is minimized. There is a 69% reduction in active power losses compared to losses without DG. Furthermore, an innovative method for fault detection and classification is developed that uses a convolutional neural network (CNN) cascaded with a long short-term memory network (LSTM) and attention mechanisms (AMs). To extract dynamic information from the data, phasor measurement units (PMUs) placed on different buses are used as input for the CNN architecture. AM strengthens important information. A mapping weight and parameter learning approach allows AM to assign different weights to concentrate on LSTM characteristics and improve learning accuracy. Low and high impedance faults are tested as well as various non-faulty events. The scheme's performance is compared with that of other deep learning techniques through reliability analysis, and the time taken for fault detection (FD) is also determined.

URL: https://link.springer.com/article/10.1007/s13369-023-08663-2

SCHOLARY PUBLICATIONS
School of School of Computer Engineering
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Journal Name: BMC Medical Imaging **IF: 2.7**

Title: Detection of COVID-19 using edge devices by a light-weight convolutional neural network from chest X-ray images

Author: Chauhan, Sohamkumar; Edla, Damoder Reddy; Boddu, Vijayasree; Rao, M. Jayanthi; Cheruku, Ramalingaswamy; Nayak, Soumya Ranjan; Martha, Sheshikala; Lavanya, Kamppa; Nigat, Tsedenya Debebe

Details: Volume 24, Issue 1, January 2024

Abstract: Deep learning is a highly significant technology in clinical treatment and diagnostics nowadays. Convolutional Neural Network (CNN) is a new idea in deep learning that is being used in the area of computer vision. The COVID-19 detection is the subject of our medical study. Researchers attempted to increase the detection accuracy but at the cost of high model complexity. In this paper, we desire to achieve better accuracy with little training space and time so that this model easily deployed in edge devices. In this paper, a new CNN design is proposed that has three stages: pre-processing, which removes the black padding on the side initially; convolution, which employs filter banks; and feature extraction, which makes use of deep convolutional layers with skip connections. In order to train the model, chest X-ray images are partitioned into three sets: learning(0.7), validation(0.1), and testing(0.2). The models are then evaluated using the test and training data. The LMNet, CoroNet, CVDNet, and Deep GRU-CNN models are the other four models used in the same experiment. The propose model achieved 99.47% & 98.91% accuracy on training and testing respectively. Additionally, it achieved 97.54%, 98.19%, 99.49%, and 97.86% scores for precision, recall, specificity, and f1-score respectively. The proposed model obtained nearly equivalent accuracy and other similar metrics when compared with other models but greatly reduced the model complexity. Moreover, it is found that proposed model is less prone to over fitting as compared to other models.

URL: https://bmcmedimaging.biomedcentral.com/articles/10.1186/s12880-023-01155-7

Journal Name: Data Technologies and Applications **IF: 1.6**

Title: A hybrid learning method for distinguishing lung adenocarcinoma and squamous cell carcinoma

Author: Swain, Anil Kumar; Swetapadma, Aleena; Rout, Jitendra Kumar; Balabantaray, Bunil Kumar

Details: Volume 58, Issue 1, January 2024, Page 113-131

Abstract: PurposeThe objective of the proposed work is to identify the most commonly occurring non-small cell carcinoma types, such as adenocarcinoma and squamous cell carcinoma, within the human population. Another objective of the work is to reduce the false positive rate during the classification.Design/methodology/approachIn this work, a hybrid method using convolutional neural networks (CNNs), extreme gradient boosting (XGBoost) and long-short-term memory networks (LSTMs) has been proposed to distinguish between lung adenocarcinoma and squamous cell carcinoma. To extract features from non-small cell lung carcinoma images, a three-layer convolution and three-layer max-pooling-based CNN is used. A few important features have been selected from the extracted features using the XGBoost algorithm as the optimal feature. Finally, LSTM has been used for the classification of carcinoma types. The accuracy of the proposed method is 99.57 per cent, and the false positive rate is 0.427 per cent.FindingsThe proposed CNN-XGBoost-LSTM hybrid method has significantly improved the results in distinguishing between adenocarcinoma and squamous cell carcinoma. The importance of the method can be outlined as follows: It has a very low false positive rate of 0.427 per cent. It has very high accuracy, i.e. 99.57 per cent. CNN-based features are providing accurate results in classifying lung carcinoma. It has the potential to serve as an assisting aid for doctors.Practical implicationsIt can be used by doctors as a secondary tool for the analysis of non-small cell lung cancers.Social implicationsIt can help rural doctors by sending the patients to specialized doctors for more analysis of lung cancer.Originality/valueIn this work, a hybrid method using CNN, XGBoost and LSTM has been proposed to distinguish between lung adenocarcinoma and squamous cell carcinoma. A three-layer convolution and three-layer max-pooling-based CNN is used to extract features from the non-small cell lung carcinoma images. A few important features have been selected from the extracted features using the XGBoost algorithm as the optimal feature. Finally, LSTM has been used for the classification of carcinoma types.

URL: https://www.emerald.com/insight/content/doi/10.1108/DTA-10-2022-0384/full/html

SCHOLARY PUBLICATIONS
School of School of Computer Engineering
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Journal Name: Data Technologies and Applications **IF: 1.6**

Title: Sleep arousal detection for monitoring of sleep disorders using one-dimensional convolutional neural network-based U-Net and bio-signals

Author: Mishra, Priya; Swetapadma, Aleena

Details: January 2024

Abstract: PurposeSleep arousal detection is an important factor to monitor the sleep disorder.Design/methodology/approachThus, a unique nth layer one-dimensional (1D) convolutional neural network-based U-Net model for automatic sleep arousal identification has been proposed.FindingsThe proposed method has achieved area under the precision-recall curve performance score of 0.498 and area under the receiver operating characteristics performance score of 0.946.Originality/valueNo other researchers have suggested U-Net-based detection of sleep arousal.Research limitations/implicationsFrom the experimental results, it has been found that U-Net performs better accuracy as compared to the state-of-the-art methods.Practical implicationsSleep arousal detection is an important factor to monitor the sleep disorder. Objective of the work is to detect the sleep arousal using different physiological channels of human body.Social implicationsIt will help in improving mental health by monitoring a person's sleep.

URL: https://www.emerald.com/insight/content/doi/10.1108/DTA-07-2023-0302/full/html

Journal Name: Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization **IF: 1.6**

Title: Survey on computer-aided automated melanoma detection

Author: Tiwari, Abhinandan Kumar; Mishra, Manoj Kumar; Panda, Amiya Ranjan; Panda, Bikramaditya

Details: January 2024

Abstract: Skin melanoma is a potentially fatal form of cancer. If left untreated or allowed to spread, it can lead to death or serious disability. Therefore, early diagnosis is crucial for improving patient prognosis and outcomes. Recent advances in machine learning (ML) and deep learning (DL) have greatly contributed to the categorisation and identification of melanoma. The goal of this survey is to evaluate 60 publications that have been submitted in order to create an overview of the melanoma detection process. It examines several feature extraction techniques. The evaluation concentrates on different melanoma detection methods, including 'deep learning (DL)' and 'machine learning (ML)' models. The analysis includes performance metrics and a review of the results obtained from the PH2 dataset, which achieved a high accuracy of 96.5%. Finally, the survey addresses research gaps to facilitate future investigations into melanoma identification strategies.

URL: https://www.tandfonline.com/doi/full/10.1080/21681163.2023.2300257

SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

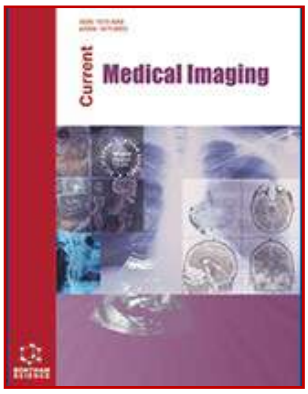
Journal Name: Current Medical Imaging **IF: 1.4**

Title: Classification of Brain Tumours in MRI Images using a Convolutional Neural Network

Author: Gupta I., Singh S., Gupta S., Nayak S.R.

Details: Volume 20, 2024 , Article number e270323214998

Abstract: The classification of brain tumors is performed by biopsy, which is not usually conducted before definitive brain surgery. The improvement of technology and machine learning can help radiologists in tumor diagnostics without invasive measures. A machine-learning algorithm that has achieved substantial results in image segmentation and classification is the convolutional neural network (CNN). We present a new CNN architecture for brain tumor classification of three tumor types. The developed network is simpler than already-existing pre-trained networks, and it was tested on T1-weighted contrast-enhanced magnetic resonance images. The performance of the network was evaluated using four approaches: combinations of two *10*-fold cross-validation methods and two databases. The generalization capability of the network was tested with one of the *10*-fold methods, subject-wise cross-validation, and the improvement was tested by using an augmented image database. The best result for the *10*-fold cross-validation method was obtained for the record-wise cross-validation for the augmented data set, and, in that case, the accuracy was 96.56%. With good generalization capability and good execution speed, the new developed CNN architecture could be used as an effective decision-support tool for radiologists in medical diagnostics.



URL: https://www.mdpi.com/2076-3417/10/6/1999