2024 2nd International Conference on Images, Signals, and Computing

ICISC 2024

21-23 September 2024, Chengdu, China

Conference Program

Organized by

The University of Glasgow, UK
University of Electronic Science and Technology of China, China
De Montfort University, UK
Nanyang Technological University, Singapore
Southwest Jiaotong University, China

Published by

[All hours in this conference program refer to China Time (GMT+8)]

Conference Zoom Link:

https://ntu-sg.zoom.us/j/85869318295?pwd=VR7Mq55QX2CtIvhUyRDaDgNnAbHmD7.1

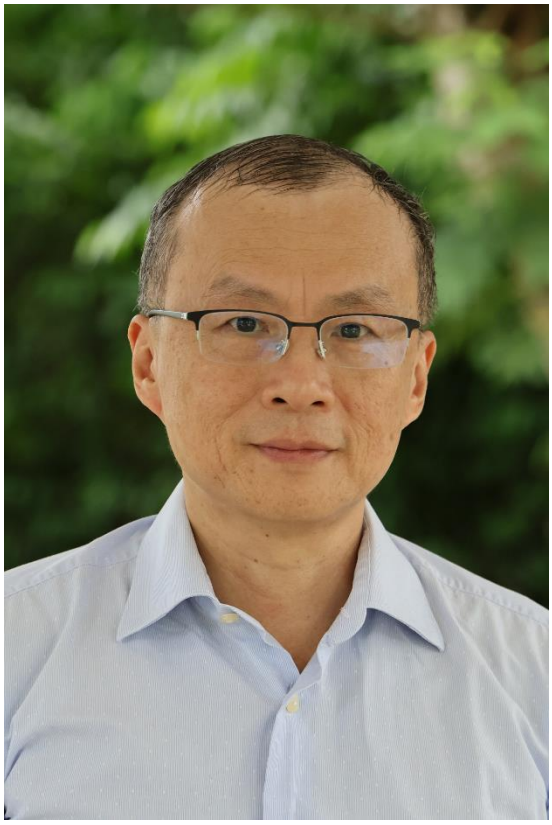
Saturday, 21 September 2024

Session Chair: Lipo Wang, Nanyang Technological University, Singapore

9:00 – 9:05 am

Welcome Speech

Lipo Wang



Prof. Lipo Wang received the Bachelor degree from National University of Defense Technology (China) and PhD from Louisiana State University (USA). He is presently with the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. His research interest is artificial intelligence for image and data processing. He has 400+ publications, 2 patents and 14,000+ Google Scholar citations. He was keynote speaker for 40+ international conferences. He is a Co-Editor-in-Chief of International Journal of Computational Intelligence and Applications (IJCIA), Senior Editor of IEEE Transactions on Systems, Man, and Cybernetics: Systems and Associate Editor of IEEE Transactions on Neural Networks and Learning Systems. He is/was Associate Editor/Editorial Board Member of 30+ international journals, including 2 other IEEE Transactions, and guest editor for 10+ journal special issues. He was a member of the Board of Governors of the International Neural Network Society, IEEE Computational Intelligence Society (CIS), and the IEEE Biometrics Council. He served as CIS Vice President for Technical Activities and Chair of Emergent Technologies Technical Committee, as well as Chair of Education Committee of the IEEE Engineering in Medicine and Biology Society (EMBS). He was President of the Asia-Pacific Neural Network Assembly (APNNA, renamed as APNNS – "Society") and received the APNNA Excellent Service Award. He was founding Chair of both the EMBS Singapore Chapter and CIS Singapore Chapter.

9:05 – 9:50 am

Keynote Lecture

Ajay Kumar

Professor, The Hong Kong Polytechnic University, China
President, IEEE Biometrics Council (2021-2022)
IEEE Fellow, IAPR Fellow

Ajay Kumar received his Ph.D. degree from The University of Hong Kong, Hong Kong, in 2001. He is currently a Professor at the Department of Data Science and Artificial Intelligence, The Hong Kong Polytechnic University, Hong Kong. His current research interests are in biometrics and generative AI. He holds seven U.S. patents and has authored on biometrics and computer vision-based industrial inspection. He was on the Editorial Board of the IEEE Transactions on Information Forensics and Security from 2010 to 2013. He served on the program committees of several international conferences and workshops in the field of his research interest. He was an area chair for CVPR 2019-2022, Program Co-Chair for the IJCB 2011 (Washington DC), ICB 2013 (Madrid), and CVPR 2013-2024 Biometrics Workshops. He has also served as the General Co-Chair of the IJCB 2014 (Tampa), ISBA 2015 (Hong Kong), and General Chair for WIFS 2018 held in Hong Kong. He serves on the Editorial Board of IEEE Transactions on Pattern Analysis and Machine Intelligence and has served on the IEEE Biometrics Council as its President (2021-2022) and Vice President of Publications (2011-2015). He is a Fellow of IAPR and IEEE.

Title: Transforming Human Identification: Advances and Open Challenges in Contactless Hand Biometrics

Abstract – Human hands are easier to present, convenient to image, and can reveal a multitude of features under various lighting conditions and across a broad spectrum of imaging resolutions. Beyond fingerprint characteristics, attributes such as palmprints, finger knuckles, and hand geometry captured under visible illumination, as well as palm- and finger-vein features obtained through near-infrared and far-infrared imaging, have garnered significant interest from researchers and developers for real-world applications. The development of such advanced AI techniques to accurately and securely match such biometric patterns is also critical for a range of fintech and metaverse applications. This talk will explore cutting-edge advancements in hand-based biometric systems and highlight ongoing challenges that researchers must address to meet real-world applications.

9:50 – 10:35am

Plenary Lecture

Guisong Liu

CCF Distinguished Member
Professor and Dean, School of Computing and Artificial intelligence
Southwestern University of Finance and Economics, China

Guisong Liu, IEEE Member, CCF Distinguished Member, Vice Chairman of Sichuan Association for Artificial Intelligence, received the B.S. degree in mechanics from Xian Jiaotong University, Xi'an, China, in 1995, and the M.S. degree in automatics and the Ph.D. degree in computer science from the University of Electronic Science and Technology of China, Chengdu, China, in 2000 and 2007, respectively. He was a Visiting Scholar with Humbolt University, Berlin, Germany, in 2015. Before 2021, he was a Professor with the School of Computer Science and Engineering, University of Electronic Science and Technology of China. He is currently a Professor and the Dean of the School of Computing and Artificial intelligence, Southwestern University of Finance and Economics, Chengdu. He has filed over 30 patents and published over 100 scientific conference papers and journal articles. His research interests include pattern recognition, neural networks, and machine learning.

Title: Sample-efficient Brain-inspired Learning Mechanisms

Abstract – Brain-inspired computing represents an emerging paradigm that has garnered increasing attention due to its enhanced biological interpretability and low-power consumption advantages. However, following the trajectory of Artificial Neural Networks (ANNs), retraining excellent classical models incurs significant costs. Consequently, we have conducted several studies on brain-inspired learning mechanisms to reduce the training cost by enhancing sample efficiency. Our research encompasses three primary aspects: 1) the spiking transfer mechanisms to reuse the empirical knowledge from historical samples; 2) the spiking active learning to maximize the utilization of new samples; and 3) the spiking federated learning mechanisms to aggregate knowledge from distributed samples. These learning mechanisms advance the efficiency and scalability of brain-inspired computing, significantly reducing the data and computational demands of developing effective models.

Oral Presentations

10:35 – 11:05am

Paper Title
A Python-Based Method for Textbook Analysis
Abstract
Textbook analysis is vital for the improvement of college English teaching, and a python-based method is proposed for the analysis of such textbooks. This method is based on a pre-constructed database of short, medium and long words (determined by n-gram frequency analysis of the Google's Trillion Word Corpus). It is generally held that the selection of reading materials should transition gradually from easy to difficult, from simple to complex, reflecting a development process from shallow to deep. Considering this fact, the research question of this paper is to test the the lexical complexity of a textbook and try to find out whether the four books of the textbook transition gradually from easy to difficult in terms of lexical complexity. It is found that the four textbooks contain roughly the same rate of short, medium and long words, thus supporting the fact that the four textbooks are appropriate for college English teaching and at the same time the feasibility of the method is approved. Another two methods are used to support the result.
Authors

- **Zixian Zhang** (Liaocheng University) <2481978939@qq.com>

10:55 – 11:15am

Paper Title
A novel Lion Swarm Optimization Algorithm inspired by the Whale Optimization Algorithm
Abstract
The Lion Swarm Optimization (LSO) algorithm fails to escape local optima due to its reliance on inter-group collaboration during population iteration updates, particularly between lionesses and cubs in their position update strategy. Moreover, the king only engages in minor exploration around its own position, inevitably sacrificing exploration of the global optimum. Its randomness and locality also generate numerous useless solutions. To address this, we enhanced the king's behavior based on strategies from the Whale Optimization algorithm (WOA) and introduced the rogue lion to challenge the king during iterations, aiding in escaping local optima. Furthermore, we applied dynamic learning strategies to optimize the position update functions of lionesses and cubs, reducing their excessive reliance on each other and preventing entrapment in local optima. Through comparisons on unimodal and multimodal test functions, the improved algorithm rapidly converges. Additionally, given the limited application cases of the LSO algorithm, we successfully optimized airport ground handling (AGH) operations using the improved algorithm. Compared to the original algorithm, it optimally utilizes resources and maximizes efficiency.
Authors

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- **ze zhao** (Shandong University) <zezhao2000@163.com>

Break

2:20 – 2:40 pm

Paper Title
Expert System for Surface Defect Inference of Battery Cell Based on Fuzzy Production Rules
Abstract
The usage of batteries has seen a substantial rise. During the battery production, various surface defects can arise, leading to unknown performance problems and potentially cause serious consequences. Product defect inference systems, which employ semantic retrieval, not only reduce labor costs in comparison to traditional manual quality inspection but also offer versatility in the field of industrial defect inspection. In this paper, we construct a battery cell surface defect inference system based on fuzzy production rules. We generate an expert knowledge base for battery cell inspection, conduct qualitative analysis on the battery cell surface defect rules using fuzzy logic, and formulate judgment rules that establish correlations between
causes and types of defects through fuzzy matching. According to the fuzzy rules, the system efficiently performs fuzzy inference to identify the most probable defect types on the cell surface, thereby reducing product quality inspection time. We evaluate the performance of the expert system and the results demonstrate its reliable performance. It effectively inference the surface defect types of cells and continuously updates the detection standards with excellent overall accuracy, sensitivity, and specificity.
Authors

- **Wen Xu** (Sichuan University) <scuxuwen@sina.com>

2:40 – 3:00 pm

Paper Title
Light Reflection Model Based on Irradiology and Micro surface Theory
Abstract
With the development of medical endoscopic equipment, minimally invasive surgery (MIS) has gradually become an important technical means in daily medical practice and has been widely used. Reconstructing three-dimensional images from endoscopic images that meet the requirements of surgical accuracy is a key step to assist surgeons in accurate surgery. In recent years, the emergence of surgical robots has also put forward new requirements for extended endoscopic vision. However, the illumination reflection model based on experience has the problem of limited expressiveness for the imaging process in the real environment. In this paper, an illumination re-flection model based on irradiance and micro surface theory is adopted, and it is applied to the shadow shape recovery algorithm. By comparing the results with the shadow shape recovery al-gorithm based on empirical reflection model, it is shown that the illumination reflection model based on irradiance and micro surface theory adopted in this paper can more effectively recon-struct the three-dimensional information of the target surface, especially the reconstruction of fine texture features.
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Poster Papers

https://www.icisc-conf.org/icisc-2024-posters

If you have questions for a poster, please contact the authors by email.

Paper Title
Image Denoising Technique Based on an Improved Lion Swarm Optimization
Abstract
Image denoising is a basic and very critical technology in the field of image processing, which has always been a difficult problem in the field of image processing. Traditional image denoising recovery methods have two methods: spatial domain filtering and frequency domain filtering. Spatial domain filtering is accomplished by convolution of image signal and filter function. In many cases, templates can be used. The different filter functions get different templates, such as mean filter, median filter, etc.; the frequency domain filtering is accomplished by multiplying the frequency domain signal with the transfer function in the frequency domain, and this process is processed by Fourier transform. The disadvantages of traditional methods either fail to denoise well or remove noise while losing a lot of detail. In this paper, we introduce an image denoising technique based on an improved lion swarm optimization . Based on the traditional lion swarm optimization , the Reinforcement learning algorithm is introduced, which takes the lion as the individual in the search space, and constantly improves its search strategy through learning and interaction, as the objective function in the way of minimizing noise and maintaining image details. The experimental results show that this technique can effectively remove different types of noise and retain more image details and texture features. Compared with the traditional lion swarm optimization, the reinforcement learning idea has better search efficiency and search quality. In conclusion, the reinforcement learning-based lion swarm optimization is a very promising technique for image denoising. It can effectively solve the image denoising problem, and can be applied to other image processing tasks.
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Paper Title
AUTOMATED DETECTION AND CLASSIFICATION OF ORAL LESIONS USING DEEP LEARNING FOR EARLY DETECTION OF ORAL CANCER
Abstract
One kind of cancer that affects the tissues of the mouth is called mouth cancer. encompassing the tongue, cheeks, throat, and lips. It is a predominant disease in middle-aged men who use tobacco and alcohol. Oral cancer holds the 6th place as the most prevalent kind of cancer in India, which is also the nation with the greatest incidence of mouth cancer cases.There are various methods for diagnosing oral cancer, which include endoscopy, biopsy, HPV testing, X-ray, MRI, PET, and CT scans (computerized tomography, magnetic resonance imaging) tiab ultrasound.The majority of the diagnosing techniques involve the use of high-energy radiation to picture the abnormal structure in the mouth or neck in the case of oral cancer. Apart from these techniques, Deep neural networks are used to create automated systems that perform the difficult task of diagnosing oral diseases.. Previously reported deep learning-based detection and classification methods involved two Computer Vision: the ResNet-101 for Classifier of Images and Quicker R-CNN for objects Recognition,yet they still lack certain criteria of accuracy on oral lesions and processing time.

Keywords— oral cancer,Objects identification, picture categorization, and deep machine learning., early detection

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Paper Title

Enhancing Accessibility in Digital Design: An Evaluation of the Air Canvas System for Users with Physical Challenges

Abstract

This research paper introduces a groundbreaking approach to interactive digital canvas systems, named "Air Canvas," which seamlessly integrates computer vision techniques with machine learning algorithms. This innovation allows users to create and manipulate digital content using gestures or movements in the air, eliminating the reliance on physical input devices such as keyboards or touchscreens. The system comprises real-time gesture recognition and tracking using computer vision, coupled with machine learning models to interpret these gestures, thereby facilitating interaction with the virtual canvas. The methodology, implementation details, and evaluation of the Air Canvas system are comprehensively discussed, emphasizing its accuracy, responsiveness, and user experience. Furthermore, potential extensions and future directions for the project are outlined, contributing significantly to the field of human-computer interaction by offering an intuitive and immersive platform for digital content creation and manipulation.

In the literature review, several relevant studies are highlighted. One study explores a method where an LED attached to the user's finger is monitored by a webcam to detect drawn characters, comparing them to a database to identify corresponding alphabets. Another study proposes an augmented segmented desk interface, allowing interaction with desktop applications using gestures and finger movements, utilizing a video projector or CCD camera, and assigning specific tasks to each hand. Additionally, a real-time hand gesture recognition system tailored for air canvas interaction is presented, employing computer vision techniques and a deep learning-based approach for high-accuracy gesture classification.

The new enhancements introduced in the project include utilizing a camera to detect the movement of an LED attached to the fingertip for rapid movement tracking and high accuracy in recognizing patterns drawn on the screen. Another enhancement involves incorporating the Mean Shift algorithm to address challenges posed by gradient methods, particularly in maintaining discontinuities such as edges. This algorithm systematically excludes pixels spanning discontinuities by applying a weighted average of neighboring pixels in both spatial and color ranges.

The procedures and methodology section outlines the steps involved in incorporating the Mean Shift algorithm into the project, including initialization of variables, mean shift calculation, and updating the drawing based on the mean shift. The algorithm operates by calculating the mean shift at each iteration based on points within a certain radius from the current center, facilitating the modification of existing drawing logic or the creation of new functions to handle this process.

Overall, this research paper presents a comprehensive exploration of interactive digital canvas systems, highlighting innovative techniques and algorithms to enhance user experience and accessibility in digital content creation and manipulation.

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Paper Title

Ensemble Learning with Voting Classifier for Enhanced Diabetes Prediction

Abstract

Diabetes, a pervasive chronic condition affecting

millions globally, demands timely identification and management to mitigate risks like hypoglycemia. Recent studies explore machine learning's potential in early detection and prediction of complications. This investigation analyzed on the dataset collected from thousands of diabetic patients. In this investigation many machine learning classifiers like Decision Tree, Random Forest, Support Vector Machine and Logistic Regression are analysed. Also Ensemble Learning—were used to assess accuracy in comparison of traditional machine learning classifiers.

Results showed Decision Tree achieved 97.7% accuracy, Random Forest 96.6%, and an ensemble approach yielded 98.32%. These findings highlight machine learning's role in enhancing diabetes complication management.

Index Terms—Ensemble learning, Machine learning, Random forest, Support vector Machine, decision tree.

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Paper Title

Utilizing DL-Based Models for Desertification Key Index Identification Using LANDSAT Dataset with Hyperparameter Optimization

Abstract

The Desertification represents a serious threat to the ecosystems and the subsistence and wellbeing of humans globally, hence the need for a proper monitoring and governances. In this study, we will describe a new technique based on more advanced machine learning tools, specifically Convolutional Neural Networks (CNN) and Vision Transformers (ViT) for desertification detection using remote sensing data. The main techniques are data gathering, preprocessing, feature extraction, modeling fitting, and hyperparameter setting. For instance, the Mean Normalized Difference Vegetation Index (mNDVI), Soil-Adjusted Vegetation Index (SAVI), Albedo, Thermal Gradient Spectral Index (TGSI), and Bare Soil Index (BSI) are calculated using Landsat-8 artificial satellite imagery which illustrate land surface conditions and dynamics. CNN and ViT models are trained on these indices to group the regions into stuck to desertification and non-desertified. Tuning of hyperparameters is aimed at getting an optimal model out of machine learning model. The presented methodology is examined by means of accuracy, precision, recall, and F1-score, which are the performance indicators of the method.

Authors

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Paper Title

CHRONO VISAGE: A FACIAL ATTENDANCE SYSTEM

Abstract

The Chrono Visage facial Attendance System using AI aims to revolutionize attendance tracking by employing artificial intelligence to recognize multiple faces simultaneously. This system offers a robust solution to accurately and efficiently record attendance in various settings, such as educational institutions, workplaces, and events, without manual intervention. By leveraging advanced AI algorithms and facial

recognition technology, the system ensures high accuracy, reduces time consumption, and enhances security. This paper discusses the system's design, implementation, and the potential impact on attendance management practices

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Paper Title

A NOVEL BRAIN STROKE DETECTION USING MACHINE LEARNING ALGORITHMS

Abstract

The human body's most complex organ is the brain. Brain stroke is third very common reason of mortality worldwide and a disease that causes permanent disability. When a portion of the brain stops receiving blood, it can result in a stroke. An arterial blockage causes an ischemic stroke, whereas a blood vessel leak or break causes a hemorrhagic stroke. The current period benefits more from early brain stroke prediction. The current lifestyle changes that lead to excessive blood sugar, obesity, heart disease, diabetes, and hypertension are the leading causes of strokes. In order to create an ML model for early brain stroke prediction, we will employ many ML methods in this study, including K Nearest Neighbor, Logistic Regression (LR), RF Classifier, and SVC. To forecast the stroke for newly supplied inputs, we will build a model with a high degree of accuracy utilizing one of the following approaches.

Keywords:Brain Stroke, Machine Learning (ML), Diseases, neural network (NN), maximum marginal hyperplane (MMH), decision tree (DT), K-nearest neighbors (KNN), Random-forest (RF)

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Paper Title

Using Real-Time Remove Object and FOV to implement Smart AI CCTV Health Monitoring System

Abstract

Security Industry usually uses manpower to observe the field of view detection (FOV) technology to detect the malicious movement of the lens. When it is applied to the MRTplatform or the square of the shopping mall to detect because there are vehicles or people legally entering the camera view, a large number of misjudgments are caused.

In order to solve the above problems, this research first obtains the original view of the camera when the camera is installed through the http technology, and then uses the deep learning yolact technology to find the edge of the target (human figure and the vehicle); secondly, the yolact-edge is used to quickly remove the target. The object then uses similar compensation technology to restore the picture and save it as the original file; finally, use the edge point technology in the real-time image to find the important displacement points and the displacement amount to send the event every day. Through the application of artificial intelligence technology, it optimizes the safety management and manpower utilization of application places.

This technology mainly uses the artificial intelligence analysis of the Field of View (FOV) to find out the location and travel characteristics of the special edge points in the image as the analysis of the different ratios of the two images before and after, so as to ensure that the monitored and desired Whether there is any abnormality on the target, and then ensure the safety of the place and personnel.

Authors

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Paper Title

Exploring Machine Learning for Cloud Threat Detection

Abstract
Cloud computing's meteoric rise has triggered a spending spree, with companies investing heavily in both internal use and external services. But with great power comes great insecurity, and cloud security concerns loom large for both businesses and users. To shore up these defenses, machine learning (ML) has emerged as a knight in shining Armor. This paper delves into the dynamic duo of ML and Cloud security through a Systematic Literature Review (SLR), analyzing 63 studies and uncovering three key areas of research. ML is being trained to sniff out diverse Cloud adversaries, from data privacy breaches to distributed denial-of service attacks the most common threats at 16% and 14%, respectively. A diverse battalion of 30 ML techniques is charging into battle, with hybrid and standalone models led by the ever-reliable Support Vector Machine (SVM). 60% of the studies pit their models against the competition, using 13 different metrics (true positive rate being the champion, training time the underdog). KDD and KDD CUP'99 datasets are the training grounds of choice for these ML warriors. This SLR paints a vivid picture of ML's growing role in safeguarding the Cloud frontier. As the battle for Cloud security rages on, expect to see even more sophisticated ML tactics emerge, ensuring that the Cloud remains a safe haven for all.
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Paper Title
Enhancing Image Quality for Orthopaedic Surgery Through Event-Based Image Deblurring
Abstract
In precision surgery, accurate imaging and instrument tracking are paramount for successful outcomes. Traditional RGB cameras often suffer from motion blur when capturing high-speed movements, compromising the precision of surgical navigation systems. This study explores the integration of event-based imaging with traditional RGB cameras to enhance the precision and clarity of surgical navigation systems. Utilizing an event camera, we capture asynchronous pixel-level brightness changes, effectively eliminating motion blur and providing microsecond-level latency. The fusion of event camera data with RGB images significantly improves image quality, aiding in the accurate localization and analysis of surgical instruments. Our algorithm combines these data streams, optimizing parameters to achieve clear and detailed reconstructions, crucial for high-speed surgical procedures. This approach demonstrates substantial potential in improving surgical outcomes, reducing errors, and advancing the development of

more effective surgical navigation systems.

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Paper Title

Evaluating Deep Learning Models for Kazakh Text-Dependent Speaker Recognition

Abstract

In this study, we explore the integration of deep neural networks and transfer learning in speaker identification, specifically focusing on the Kazakh language using the Common Voice dataset. Our method leverages advanced neural architectures optimized for Kazakh voiceprint recognition, significantly improving the accuracy after transfer learning from the VOX Celeb dataset. This article was written within the framework of the research project AR19678613 “Development of technology for creating smart textbooks capable of interactive teaching, consulting and assessment of knowledge in subjects studied in the Kazakh language,” highlighting its contribution to the domain of intelligent educational resources. The results demonstrate the potential of these models in smart textbooks and secure speaker verification systems, notwithstanding the cross-language challenges.

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Paper Title

Diagnosis of Lung Cancer Based on CT Scan using Mask R-CNN

Abstract

Lung cancer, which affects the most organs and is the leading cause of death from cancer, is one of the dangerous diseases we face in life. Early tumor detection is critical to staging the cancer phases. Typically, the shape and size of the tumor are taken into account to classify the cancer type; therefore, calculating the tumor's area and accurately detecting it can help save a patient's life. This paper uses Mask-RCNN to analyze and detect malignant and benign tumor using a real dataset of CT scan lung cancer images in the Kurdistan Region of Iraq (KRI). It also develops a method for calculating the tumor's area in centimeters. Following training and testing, the system achieved 96.59% accuracy, 95% sensitivity, 95% specificity, and a 99.65% F_1 score. In this study, we found that Mask-RCNN is a very good model for diagnosing cancerous tumors and can help radiologists detect and stage cancer.

Authors

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Paper Title

Design and implementation of 8-bit Flash ADC and R-2R DAC in Cadence 45nm CMOS process for biomedical application

Abstract

When working with mixed-signal circuits, a micro-electronic system needs both digital-to-analog (D/A) and analog-to-digital (A/D) converters. In this work, present a medium-speed, low-power flash ADC with an R2R DAC. The 45nm CMOS process was used to design the 8-bit ADC and DAC, which have a 0.7 V supply. A dynamic comparator, an 8-bit flash A/D logic unit that simulates an array's binary search logic,

a two-stage operational amplifier, and an 8-bit D/A converter are the important components. The Flash ADC circuit uses 14.33 μW at a sampling frequency of up to 5 MHz, and R2R DAC uses 1.125 mW, according to the simulation findings.

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Paper Title

Channel resource occupancy prediction for an LTE-based cognitive radio system using a Kolmogorov-Arnold network

Abstract

This paper discusses the problem of predicting the occupancy of channel resources for a long-term evolution (LTE) system based on a cognitive communication system. The data used is a radio environment map, a spatiotemporal grid of resources with traffic passing through the cells. The radio environment map is pre-processed and filtered for training artificial neural networks. The prediction accuracy of Kolmogorov-Arnold networks (KAN) and Long-Short-Term Memory (LSTM) is compared. A model has been developed that collects data, identifies and selects frequency zones in which data transmission occurs, trains and tests KAN and LSTM. The predictive model control algorithm is implemented in Python. The LTE simulation model and input data preparation are implemented in MatLab. The experiment results to evaluate the prediction accuracy of channel resource occupancy by KAN and LSTM are presented.

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Paper Title

Tracing the Causes of Macular cigarette Using Fluorescence Hyperspectral Imaging Technology

Abstract

Tracing the causes of macular cigarettes have been significant issues in the field of cigarette production. Through molecular fluorescence spectroscopy experiments, the feasibility of using fluorescence spectroscopy to recognize different kinds of macular cigarettes was verified. Based on these findings, a method combining fluorescence hyperspectral with machine learning algorithms was proposed to detect and recognize macular cigarettes. By using the spectral feature extraction methods PCA and SPA, and combining several classification models, a comprehensive comparison shows that after processing the original fluorescence hyperspectral data and using the Random Forest (RF) model, the identification of different types of macular cigarettes can achieve the highest accuracy, with a rate of 95.36%. This indicates the feasibility of identifying different types of yellow-spotted cigarettes using molecular fluorescence spectroscopy and exploring their causes and traceability. The established scheme holds significant application value for developing fast, non-destructive, and intelligent automatic identification equipment for the cause and traceability of macular cigarettes.

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Paper Title
The Application of a Novel FMRA Algorithm in Wireless Blockchain Communication
Abstract
This paper presents an innovative Fixed Mean Retreat Algorithm (FMRA) algorithm designed to significantly enhance the communication efficiency of wireless blockchain networks, particularly in reducing conflicts and network latency during the block on-chain process. The FMRA algorithm employs a strategy of dynamically adjusting the backoff time, abandoning the fixed minimum contention window setting in traditional algorithms. It allows nodes to regularly update the average backoff time based on an equilibrium function that maximizes expected benefits, flexibly adapting to the dynamic changes in network conditions. Through simulation experiments, the performance of FMRA was compared with that of traditional exponential backoff mechanisms. The results demonstrate that FMRA has a clear advantage in reducing block discard rates and shortening the average network latency, showing stability and efficiency under various network load conditions. This validates the effectiveness and broad application prospects of the FMRA algorithm in wireless blockchain communication.
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Paper Title
Unleashing momentum: a game-changer in tennis predictions
Abstract
As a competitive sport, tennis is often influenced by various factors, with "momentum" being a crucial element. Momentum refers to the force gained by players through a series of events during a match. To substantiate the influence of momentum on match outcomes, this paper establishes a model using match data to predict fluctuations during matches and analyze the most crucial factors. These pivotal moments often revolve around critical break points or essential service holds, but identifying the key points leading to these situations is equally vital. Quantifying these indicators would enable tactical adjustments at crucial junctures, bringing players closer to victory. The effectiveness of the model is tested in different matches, with an 83.3% recognition accuracy and a successful prediction of Djokovic's victory in the men's singles final of the 2019 Australian Open. The paper conducts a contribution to a better understanding and utilization of the concept of momentum to enhance the competitiveness of tennis matches.
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Paper Title
Deep reinforcement learning and teaching model based on DDPG algorithm
Abstract
Due to the changes in the information age, the times have put forward higher requirements for students and teachers. In this case, the development of education urgently requires artificial intelligence to join, assisted by which can prevent the teachers from boring repetition under the premises of "forward recommendation" and "implicit information extraction", which classical deep reinforcement learning research has less attended. In order to strengthen the efficiency of the students, a deep reinforcement learning and teaching model based on DDPG algorithm, is proposed in this paper, where students are always in the "learning zone" with "deliberate practice" guided by the teacher. Stimulated by the decision-

making style of experienced teachers, this paper introduces AI agent based on deep reinforcement learning technology, which captures implicit information from users ' response effectively and assigns corresponding content with a certain difficulty level. Not only did this adaptive learning relieve stress from teachers, but also it can arouse users ' study interest. The result shows that the experimental group outperforms their counterparts significantly. And as the model is trained, the recommendation bias metric tends to stabilize.

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