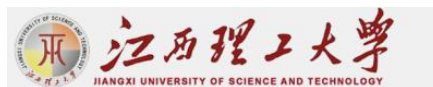


Conference Program

The 13th EAI International Conference on Mobile Networks and Management

October 27-29, 2023 | Yingtian, China(Online)

Sponsored by



Welcome Message

On behalf of Conference Committees, we welcome you to attend the 13th EAI International Conference on Mobile Networks and Management (MONAMI 2023 held in Yingtan, China during October 27-29, 2023, sponsored by Jiangxi University of Science and Technology and EAI.

MONAMI 2023 welcomes author submission of papers from any branch of mobile networks and management technologies, and their applications or other topic areas. The areas covered by the include, but not limited to: Machine learning algorithms for 5G and Beyond, Network innovations for 3D virtual worlds and the metaverse, Unmanned Aerial Vehicle (UAV) Communications in 5G and Beyond Networks, New Architecture, protocols, and methodologies of IoT with edge and blockchain, Deep Learning (DL) techniques for Quality of Service Enhancement in IoT.

The conference aims to provide an interdisciplinary platform to share the recent results on mobile networks and management technologies. In recent years, we have witnessed fast development of wireless communications, networking, cloud and edge computing. 5G/6G and multiaccess networks greatly enhance the Quality of Service (QoS) of wireless access networks. Software-defined networking, network function virtualization, and information-centric networking largely reduce the cost of network service providers and improve the Quality of Experience (QoE) of end-users.

We feel deeply grateful to all that have contributed to make this event possible: authors, the conference steering committee, the conference speakers, and the peer reviewers. Thanks are also extended to the conference administrative committee and the supporters for their tireless efforts throughout the course of the conference.

We hope that all participants benefit from the conference.

Conference Organizing Committee

October, 2023

Conference Information and Tips

Tencent Meeting Schedule

Date	Tencent Meeting links and numbers
October 27, 2023(Online Test)	https://meeting.tencent.com/dm/72sSSL38rJTN 972-837-839
October 28, 2023	https://meeting.tencent.com/dm/hNZU60x5Bv3w 231-497-924
October 29, 2023	https://meeting.tencent.com/dm/ZaVqjUFqF7C0 529-124-813

Tencent Meeting download address: <https://meeting.tencent.com/download/>

Rename your screen name before entering the room	Example
Authors: Paper ID-Name	000001-San Zhang
Listener: Listener Number-Name	Listener- San Zhan
Keynote Speaker: Keynote-Name	Keynote- San Zhang
Committee Member: Position-Name	Committee- San Zhang

➤ Presentation Tips:

- Presentation forms

Live speech: Please prepare your PPT or PDF file in advance and join our online session on time.

Pre-record presentation: Please send the download link of your recording in advance to the Organizing Committee at 195324758@qq.com and the Conference Manager at conferences@eai.eu.

- Duration of Each Presentation

Keynote Speech: 45 Minutes of Presentation including Q&A.

Regular Oral Presentation: 15 Minutes of Presentation including Q&A.

The regular oral presentation time arrangement is for reference only.

Daily Schedule

October 27, 2023 – Online Test

Committee and Speakers Test Session	
Tencent Conference number: 972-837-839	
09:00-10:00	Test for Committee / Session Chairs
10:00-13:00	Test for Keynote / Invited Speakers
13:00-18:00	Test for authors

October 28, 2023

Opening Ceremony & Keynote Speech	
Tencent Conference number: 231-497-924	
09:00-09:05	Welcome Message
09:05-09:10	Opening Remarks
09:10-09:55	Keynote Speech I Prof. Celimuge Wu, The University of Electro-Communications, Japan Title: Meta-Networking: Overcoming the Shannon Limit with Multi-faceted Information
09:55-10:40	Keynote Speech II Prof. Siyang Lu, Beijing Jiaotong University, China Title: Detecting Anomalies from Big Data System Logs
10:40-10:55	Break Time
10:55-11:40	Keynote Speech III Prof. Xun Shao, Osaka University, Japan Title: Some Economic Issues and Our Solutions for Edge Computing
11:40-14:00	Lunch Time

Regular Oral Presentation Sessions I	
Tencent Conference number: 231-497-924	
14:00-15:00	Regular Oral Presentation 1-4: 334874, 334855, 334854, 334849
15:00-16:00	Regular Oral Presentation 5-8: 334835, 334798, 334752, 334716
16:00-16:20	Break Time
16:20-17:20	Regular Oral Presentation 9-12: 334558, 334539, 334537, 334536
17:20-18:20	Regular Oral Presentation 13-16: 334535, 334531, 334494, 334491

October 29, 2023

Regular Oral Presentation Sessions II	
Tencent Conference number: 529-124-813	
09:30-09:35	Opening Remarks
09:35-11:00	Regular Oral Presentation 17-21: 333969, 333636, 333345, 335660, 335344
11:00-11:10	Epilogue

Keynote Speaker

Time: 09:00-11:40 Beijing Time, GMT+8, October 28, 2023



Prof. Celimuge Wu

The University of Electro-Communications, Japan

Title: Meta-Networking: Overcoming the Shannon Limit with Multi-faceted Information

Abstract:

This talk introduces Meta-networking: a revolutionary networking architecture that provides a beyond-Shannon paradigm with multi-faceted information based on the collaboration among distributed network entities, efficient service classification, and data feature extraction. An overview of Meta-Networking is provided and the key principles and components of Meta-Networking, including the quality-of-experience characterization, AI-empowered semantic encoding, and information density improvement, are analyzed. It enables a groundbreaking communication system where a much larger amount of information is transmitted without increasing the size of binary digits. Furthermore, an application scenario for image transmission in the Internet of Vehicles is discussed, which shows significant performance improvement compared with conventional communications. It is believed that Meta-Networking has the potential for revolutionizing communication systems with higher efficiency, stronger reliability, and intelligence awareness.

Bio:

Celimuge Wu received his PhD degree from The University of Electro-Communications, Japan. He is currently a professor and the director of Meta-Networking Research Center, The University of Electro-Communications. His research interests include Vehicular Networks, Edge Computing, IoT, and AI for Wireless Networking and Computing. He serves as an associate editor of IEEE Transactions on Cognitive Communications and Networking, IEEE Transactions on Network Science and Engineering, and IEEE Transactions on Green Communications and Networking. He is Vice Chair (Asia Pacific) of IEEE Technical Committee on Big Data (TCBD). He is a recipient of 2021 IEEE Communications Society Outstanding Paper Award, 2021 IEEE Internet of Things Journal Best Paper Award, IEEE Computer Society 2020 Best Paper Award and IEEE Computer Society 2019 Best Paper Award Runner-Up. He is an IEEE Vehicular Technology Society Distinguished Lecturer.



Prof. Siyang Lu

Beijing Jiaotong University, China

Title: Detecting Anomalies from Big Data System

Logs

Abstract:

Parallel and distributed systems play a prominent role due to the large amount of collected data. Although they are effective in many aspects, it is not easy to conduct maintenance and management, thus may cause some severe system problems. To enhance these applications, a range of troubleshooting methods are proposed. Among these methods, log analysis is very popular due to its effective resolution and rich information in events or states of the system, which improves system health diagnosis with root cause analysis. Generally, log-based anomaly detection methods are developed by mining a large set of system log data. The data mining process is usually realized with different models, such as statistical models and non-deep machine learning models. However, these traditional models still confront with low detection accuracy due to focusing on ad-hoc features. Nowadays, deep neural networks (DNNs) have been widely employed to solve log anomaly detection and outperform a range of conventional methods. They have attained such striking success because they can usually explore and extract semantic information from a large volume of log data, which helps to infer complex log anomaly patterns more accurately. Hence, more anomaly detection models are equipped with DNN and break through the bottleneck in the performance.

Bio:

Siyang Lu is an assistant professor in the School of Computer and Information Technology at the Beijing Jiaotong University. He received Ph.D. in Computer Science from University of Central Florida in 2019. He received his Master Degree in Software Engineering from Tianjin University in 2015. His research focuses on big data computing and abnormal detection techniques in the following aspects: leveraging deep learning techniques to detect and prevent programming errors and execution anomaly in big data and/or parallel programs; improving accuracy and security of log anomaly detection models; optimizing performance and scalability of big data processing and/or parallel computing systems. He received two Best Paper Awards (IEEE CyberSciTech 2017 and IEEE UIC 2022). He is a member of CCF, IEEE, ACM, and Technical Committee on Software Engineering of CCF.



Prof. Xun Shao

Osaka University, Japan

Title: Some Economic Issues and Our Solutions for
Edge Computing

Abstract:

In recent years, new Internet technologies such as NDN and IoT have emerged, and the existing economic structure of the Internet no longer fits the new Internet architecture. To solve this problem, this study examined several typical Internet usage scenarios and designed new economic operation models for these scenarios using game theory and auction theory. We believe that these new economic theories and methods will greatly contribute to the future prosperity and development of the Internet industry.

Bio:

Xun Shao received his Ph.D. in information science from the Graduate School of Information Science and Technology, Osaka University, Japan, in 2013. From 2013 to 2017, he was a researcher with the National Institute of Information and Communications Technology (NICT) in Japan. From 2018 to 2022, he was an Assistant Professor at the School of Regional Innovation and Social Design Engineering, Kitami Institute of Technology, Japan. He is currently an Associate Professor with the Department of Electrical and Electronic Information Engineering, Tohohashi University of Technology, Japan. His research interests include distributed systems and information networking. He is a member of the IEEE and IEICE.

Regular Oral Presentation Sessions I

Time: 14:00-18:20 Beijing Time, GMT+8, October 28, 2023

<p>334874 14:00-14:15</p>	<p>Client Selection Method for Federated Learning in Multi-robot Collaborative Systems Author(s): Ding, Nian; Peng, Chunrong; Lin, Min; Lin, Yangfei; Du, Zhaoyang; Wu, Celimuge Presenter: Ding, Nian</p> <p>Abstract: Federated Learning (FL) has recently attracted considerable attention in multi-robot collaborative systems, owing to its capability of enabling mobile clients to collaboratively learn a global prediction model without sharing their privacy-sensitive data to the server. In a multi-robot collaboration system, an approach that ensures privacy-preserving knowledge sharing among multiple robots becomes imperative. However, the application of FL in such systems encounters two major challenges. Firstly, it is inefficient to use all the network nodes as federated learning clients (which conduct training of machine learning model based on own data) due to the limited wireless bandwidth and energy of robots. Secondly, the selection of an appropriate number of clients must be carefully considered, considering the constraints imposed by limited communication resources. Selecting an excessive number of clients may result in a failure in uploading important models. To overcome these challenges, this paper proposes a client selection approach that considers multiple metrics including the data volume, computational capability, and network environment by integrating fuzzy logic and Q-learning. The experimental results validate the theoretical feasibility of the proposed approach. Further empirical data can be derived from training experiments on public datasets, enhancing the practical applicability of the proposed method.</p>
<p>334855 14:15-14:30</p>	<p>Image Classification Algorithm for Graphite Ore Carbon Grade Based on Multi-scale Feature Fusion Author(s): Huang, Xueyu; Shi, Haoyu; Liu, Yaokun; Lu, Haoran Presenter: Shi, Haoyu</p> <p>Abstract: Based on the tedious process of using a carbon-sulfur analyzer to detect the carbon grade of graphite in graphite mining production, this paper proposes a graphite carbon grade image recognition and classification method based on multi-scale feature fusion. The experiment preprocesses the images and constructs a residual network model that combines pyramid convolution</p>

	<p>(PyConv) and spatial attention mechanism (SAM). This model enhances the extraction of both global and local feature information from graphite images. Transfer learning is introduced by using pre-trained weights to accelerate the convergence of the model, achieving efficient and accurate recognition and classification of graphite carbon grade with an accuracy of 92.5%, surpassing traditional machine learning methods using single features. The experimental results demonstrate that the neural network model constructed in this paper effectively extracts texture and color features from graphite images, improving the accuracy of graphite image classification and recognition. The model exhibits good robustness and provides valuable insights for practical graphite mining production.</p>
<p>334854 14:30-14:45</p>	<p>Double DQN Reinforcement Learning-based Computational Offloading and Resource Allocation for MEC Author(s): Zhang, Chen; Peng, Chunrong; Lin, Min; Du, Zhaoyang; Wu, Celimuge Presenter: Zhang, Chen</p> <p>Abstract: In recent years, numerous Deep Reinforcement Learning (DRL) neural network models have been proposed to optimize computational offloading and resource allocation in Mobile Edge Computing (MEC). However, the diversity of computational tasks and the complexity of 5G networks pose significant challenges for current DRL algorithms apply to MEC scenarios. This research focuses on a single MEC server-multi-user scenario and develops a realistic small-scale MEC offloading system. In order to alleviate the problem of overestimation of action value in current Deep Q-learning Network (DQN), we propose a normalized model of Complex network based on Double DQN algorithm to determine the optimal computational offloading and resource allocation strategy. Simulation results demonstrate that DDQN outperforms conventional approaches such as fixed parameter policies and DQN regarding convergence speed, energy consumption and latency. This research showcases the potential of DDQN for achieving efficient optimization in MEC environments.</p>
<p>334849 14:45-15:00</p>	<p>Fusing PSA to improve YOLOv5s detection algorithm for electric power operation wearable devices Author(s): Liu, Qiuming; Xu, Wei; Zhou, Yang; Li, Ruiqin; Wu, Dong; Luo, Yong; Chen, Longping Presenter: Xu, Wei</p>

	<p>Abstract: In order to determine whether the electric power workers wear safety equipment such as safety helmet, insulation boots, insulation gloves, insulation clothes, etc., to ensure the safety of the electric power construction site. We propose a electric power operation safety equipment detection algorithm incorporating PSA to improve YOLOv5s algorithm, using polarized self-attention mechanism to improve the feature extraction end of YOLOv5s algorithm, improving the channel resolution and spatial resolution of safety equipment images of electric power operation scenes, and preserving the information of key nodes of small targets that are obscured; GSConv is used to replace the ordinary convolution to reduce the complexity of the model, improve the calculation speed of the algorithm and improve the detection accuracy. The experimental results show that the average accuracy mean (IoU = 0.5) of the proposed algorithm reaches 0.961, which is 1.58 % higher than that of the original network detection performance, and the model parameters are reduced from 7.03 to 5.48 millions. It effectively improves the detection speed and accuracy of the algorithm, and can effectively monitor whether the operator wears the safety equipment correctly when there are occlusions and missing safety equipment in the electric power operation scene, which has a excellent application effect.</p>
<p>334835 15:00-15:15</p>	<p>Research on Latent Semantic Relationship Search Engine Based on Knowledge graph Author(s): minqin, mao; jielan, zhang Presenter: minqin, mao</p> <p>Abstract: Knowledge graph is a large database composed of entities, relationships and attributes, which can provide rich semantic information for search engines. The potential semantic relation search engine based on Knowledge graph is a novel search engine. It obtains potential semantic relationships from the Knowledge graph, and then uses these potential semantic relationships to search for data sources such as web pages and documents. This paper first analyzes the characteristics of the Knowledge graph, then lists the construction process of the Knowledge graph based on WordNet, and finally proposes the potential semantic relationship search engine architecture based on the Knowledge graph. The thesis analyzes the characteristics of knowledge graphs, lists the construction process of knowledge graphs based on WordNet, and proposes a latent semantic relationship search engine architecture based on knowledge graphs.</p>

<p>334798 15:15-15:30</p>	<p>Content Prediction for Proactive Tile-Based VR Video Streaming in Mobile Edge Caching System Author(s): Liu, Qiuming; Chen, Hao; Zhou, Yang; Wu, Dong; Li, Zihui; Bai, Yaxin Presenter: Chen, Hao</p> <p>Abstract: Content prediction can avoid VR video streaming delay in mobile edge caching system. To reduce request delay, popular content should be cached on edge server. Existing work either focuses on content prediction or on caching algorithms. However, in the end-edge-cloud system, prediction and caching should be considered together. In this paper, we jointly optimize the four stages of prediction, caching, computing and transmission in mobile edge caching system, aimed to maximize the user's quality of experience. We propose a progressive policy to optimize the four steps of VR video streaming. Since the user's QoE is determined by the performance of the resource allocation and caching algorithm, we design a caching algorithm with unknown future request content, which can efficiently improve the content hit rate, as well as the durations for prediction, computing and transmission. We optimize the four stages under arbitrary resource allocation and simulate the proposed algorithm according to the degree of overlap, as well as completion rate. Finally, under the real scenario, the proposed algorithm is verified by comparing with several other caching algorithms, simulation results show that the user's QoE is improved under the progressive policy and the proposed algorithm.</p>
<p>334752 15:30-15:45</p>	<p>Improved WGAN for Image Generation Methods Author(s): Wang, Jionghui; Wu, Jiale; Huang, Xueyu; Xiong, Zhilin Presenter: Wu, Jiale</p> <p>Abstract: For the problem of generating high-quality and diverse images, an image generation method combining residual module, spectral parametric normalization, and self-attention mechanism is proposed to be applied in WGAN networks. The specific improvement of the method is to introduce the residual module into the generator and discriminator networks to better capture the deep image information. The spectral parametric normalization technique is also applied to each convolutional layer of the residual block to improve the stability of the image generation process. The self-attention mechanism is introduced into the generator to enable the network to learn in a targeted manner and generate higher-quality images. The experimental results demonstrate that the combined application of these techniques can effectively solve the challenge</p>

	<p>of generating image samples, obtain stable and diverse data samples, generate better results than the original WGAN method and DCGAN method, and use the generated data samples as the dataset for expanding the classification experiments, which improves the recognition accuracy of the image classification network to a certain extent.</p>
<p>334716 15:45-16:00</p>	<p>Improved AODNet for Fast Image Dehazing Author(s): Chen, Shiyu; Liu, Shumin; Chen, Xingfeng; Dan, Jiannan; Wu, Bingbing Presenter: Chen, Shiyu</p> <p>Abstract: Application scenarios such as unmanned driving and UAV reconnaissance have the requirements of high performance, low delay and small space occupation. Images taken in foggy days are easy to be affected by fog or haze, thus losing some important information. The purpose of image dehazing is to remove the influence of fog on image quality, which is of great significance to assist in solving high-level vision tasks. Aiming at the shortcomings of the current defogging method, such as slow defogging speed and poor defogging effect, this paper introduces the idea of FPCNet and the attention mechanism module, and proposes an improved AODNet fast defogging algorithm to ensure the defogging speed and defogging performance. The public dataset RESIDE was used for training and testing. Experimental results show that in terms of dehazing performance, the proposed algorithm achieves 25.78 and 0.992 in PSNR and SSIM respectively. In terms of dehazing speed, the proposed method is close to AODNet, with only 5 times more parameters than AODNet, but more than 100 times smaller than other methods.</p>
<p>334558 16:20-16:35</p>	<p>An Occlusion Signal-processing Framework Based on UAV Sampling for Improving Rendering Quality of Views Author(s): Liu, Qiuming; Yan, Ke; Wang, Yichen; Li, Ruiqin; Luo, Yong; Presenter: Yan, Ke</p> <p>Abstract: Using unmanned aerial vehicles (UAV) for large-scale scene sampling is a prevalent application in UAV vision. However, there are certain factors that can influence the quality of UAV sampling, such as the lack of texture details and drastic changes in scene geometry. One common factor is occlusion, which is a surface feature in 3D scenes that results in significant discontinuity on the scene surface, leading to transient noise and loss of local information. This can cause degradation in the performance of computer vision algorithms. To address these challenges, this paper proposes a UAV sampling method that takes into</p>

	<p>account occlusion. The method is based on the principle of quantizing occlusion information and improves the aerial light field (ALF) technology. It establishes a UAV ALF sampling model that considers scene occlusion information and calculates the minimum sampling rate of UAV sampling by deriving the exact expression of the spectrum. The proposed model is used to sample and reconstruct large-scale scenes in different occlusion environments. Experimental results demonstrate that the model effectively improves the reconstruction quality of large-scale scenes in occluded environments.</p>
<p>334539 16:35-16:50</p>	<p>An Improved 4D Convolutional Neural Network for Light Field Reconstruction Author(s): Liu, Qiuming; Li, Ruiqin; Yan, Ke; Wang, Yichen; Luo, Yong; Presenter: Li, Ruiqin</p> <p>Abstract: Light field camera sensors often face a trade-off between angular resolution and spatial resolution when shooting. High spatial resolution image arrays often result in lower angular resolution, and vice versa. In order to obtain high spatial resolution and at the same time have high angular resolution. In this paper, we propose an improved 4D convolutional neural network (CNN) algorithm for angular super-resolution (SR) to improve the quality of angular SR images. Firstly, to address the problem of low luminance of images captured by LF cameras, we use block threshold square reinforcement (BTSR) for image luminance enhancement. Secondly, to make the reconstructed new viewpoints of higher quality, we improve the attention mechanism convolutional block attention module (CBAM). We incorporate it into a 4D dense residual network as high dimensional attention module (HDAM). HDAM generates images along two independent dimensions, spatial and channel. The HDAM generates attention maps along two independent dimensions, space and channel, which guide the network to focus on more important features for adaptive feature modification. Finally, we modify the activation function to make the network perform better in the later stages of training and more suitable for LF reconstruction tasks. We evaluate the network on many LF data, including real-world scenes and synthetic data. The experimental results show that the improved network algorithm can achieve higher quality LF reconstruction.</p>
<p>334537 16:50-17:05</p>	<p>Graphite ore grade classification algorithm based on multi-scale fused image features Author(s): Wang, Jionghui; Liu, Yaokun; Xiang, Junchen; Chang, Shaopeng Presenter: Liu, Yaokun</p>

	<p>Abstract: Aiming at the problems of complex pre-processing and expensive equipment in chemical detection of graphite ore grade, a graphite ore identification and classification method based on fusing multi-scale image features is proposed. In the feature extraction stage, a deep convolutional neural network and a residual network model based on spatial attention mechanism are constructed to improve the learning ability of local and global features of graphite ore images; in the feature aggregation stage, a global response normalization technique is introduced to achieve more accurate graphite ore grade recognition, and the accuracy of the model reaches 93.401 % and the macro F1 reaches 93.086 %, which is better than the single The accuracy of the model reaches 93.401 % and the macro F1 reaches 93.086 %, which is better than the traditional machine learning methods with single feature. The experimental results show that the features extracted by different methods can describe the texture and edge information of graphite ore, and the proposed method has better extraction ability in terms of local features and global features of graphite ore images, and achieves more accurate graphite ore grade recognition with good robustness.</p>
<p>334536 17:05-17:20</p>	<p>Image Deblurring Using Fusion Transformer-Based Generative Adversarial Networks</p> <p>Author(s): Wang, Jionghui; Xiong, Zhilin; Huang, Xueyu; Shi, Haoyu; Wu, Jiale</p> <p>Presenter: Xiong, Zhilin</p> <p>Abstract: Using the Transformer for motion deblurring enables a broader receptive field, and by stacking multiple Transformer modules, it captures global correlations in features. However, this increases network complexity and poses convergence challenges. To address this, a Generative Adversarial Network called XT-GAN, which combines multiple-scale Transformers, has been proposed. XT-GAN leverages pyramid features from a convolutional network as a lightweight substitute for multi-scale inputs. Within the output pyramid convolutional features, different-scale features are computed in parallel using multi-head self-attention. These features are combined with a proposed feature enhancement module to represent information at different scales. Finally, the network outputs from various modules are concatenated and restored to the original image size. In experiments conducted on the synthetic dataset GoPro, XT-GAN outperformed ordinary networks such as DeblurGAN, DeepDeblur, and SRN. It achieved a reduction in computational complexity of at least 70% while achieving PSNR and SSIM values of 29.13dB and 0.923,</p>

	<p>respectively. XT-GAN also demonstrated good robustness in the real dataset RealBlur-J, with PSNR and SSIM values of 28.40 and 0.852. It effectively handles motion blur in real-world scenarios, suppresses image artifacts, and restores natural and clear details.</p>
<p>334535 17:20-17:35</p>	<p>Promoting Animation Synthesis Through Dual-Channel Fusion Author(s): Guo, Chaochao; Qiu, Xiaohong; Xu, Cong Presenter: Guo, Chaochao</p> <p>Abstract: Although animation synthesis technology is widely applied, it also imposes higher demands on the precision of the synthesized animation. This paper employs a more lightweight channel attention module for image feature extraction. Compared to previous channel attention module, this approach utilizes fewer parameters, thereby assisting the network in achieving improved precision. It not only enhances the motion estimation network but also improves the generative adversarial network used for image generation, thereby enhancing the quality of generated images. Additionally, it replaces the sigmoid function with the more suitable output function tanh for image generation. Three evaluation metrics show improvements: a 1.3% increase in L1, an 18.9% increase in AED, and a 2.6% increase in AKD. To facilitate better image generation by the generator, improvements are made to the discriminator. Spectral normalization and instance normalization are combined to form a multi-normalization module for normalization during the image down sampling process. Additionally, an adaptive Dual-Channel Fusion output module is employed for the discriminator output, aiding in the rapid convergence of the network. The quality metrics of the generated images demonstrate improvements, with a 4.3% increase in L1, a 23.8% increase in AED, and a 5.5% increase in AKD.</p>
<p>334531 17:35-17:50</p>	<p>Cross-Chain Model of Notary Group Based on Verifiable Random Functions Author(s): Ouyang, Can; Qiu, Xiaohong Presenter: Ouyang, Can</p> <p>Abstract: In response to the issues of high centralization, slow transaction rates, and high security risks in the cross-chain mechanism of notary groups, this paper proposes an identity-based, non-interactive cross-chain model for notary groups. The model introduces notary groups to reduce centralization and divides the nodes within the notary group into transaction nodes, validation nodes, and supervisory nodes using verifiable random functions, significantly improving the fault tolerance of the optimized model. Additionally, the model</p>

	<p>introduces Merkle tree structures to locally store transaction information, enabling the processing of multiple cross-chain transactions at once and reducing transaction latency caused by multiple verifications, thereby improving transaction rates. Experimental results demonstrate that compared to traditional models, the optimized model significantly reduces transaction security risks and increases transaction rates by 55.8%.</p>
<p>334494 17:50-18:05</p>	<p>Research on Multi-Scale Pedestrian Attribute Recognition Based on Dual Self-Attention Mechanism Author(s): Xiao, He; Xie, Wenbiao; Zou, Yang; Luo, Yong; Zhang, Ruoni; Xu, Xiao Presenter: Xie, Wenbiao</p> <p>Abstract: As one of the important fields of computer vision research, pedestrian attribute recognition has gained increasing attention from domestic and foreign researchers due to its huge potential applications. However, obtaining long-distance pedestrian information in actual scenes poses challenges such as lack of information, incomplete feature extraction, and low attribute recognition accuracy. To address these issues, we propose a multi-scale feature fusion network based on a dual self-attention mechanism. The fusion module merges multi-scale features to enable more complete attribute extraction, while the dual self-attention module focuses the network on important regions. Experimental results on PA-100K, RAP, and PETA datasets achieved mean accuracies of 81.97%, 81.53%, and 86.37%, respectively. Extensive experiments demonstrate that the proposed method is highly competitive in pedestrian attribute recognition.</p>
<p>334491 18:05-18:20</p>	<p>YOLOv5-LWLightweight UAV Object Author(s): Xiao, He; Zhao, Kai; Xie, Xiaomei; Song, Peilong; Dong, Siwen; Yang, Jiahui Presenter: Zhao, Kai</p> <p>Abstract: UAV object detection task is a highly popular computer vision task, where algorithms can be deployed on unmanned aerial vehicles (UAVs) for real-time object detection. However, YOLOv5's performance for UAV object detection is not entirely satisfactory due to the small size of the detected objects and the problem of occlusion. To address these two issues in the YOLOv5 algorithm, we propose the YOLOv5-LW algorithm model. Building upon YOLOv5, we replace the FPN-PAN network structure with the FPN-PANS structure. This modification helps mitigate the issue of feature disappearance for</p>

	<p>small objects during the training process while reducing the model parameters and computational complexity. Additionally, within the FPN-PANS structure, we employ a multistage feature fusion approach instead of the original feature fusion module. This approach effectively corrects the erroneous information generated during the upsampling stage for certain objects. Finally, we replace the SPPF module with the SPPF-W module to further increase the receptive field while maintaining almost unchanged parameters. We conducted multiple experiments and demonstrate that YOLOv5-LW performs exceptionally well in lightweight small object detection tasks using the VisDrone dataset. Compared to YOLOv5, YOLOv5-LW achieves a 4.7% improvement in mean average precision (mAP), reduces the model size by 40%, and decreases the parameters by 40%.</p>
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Regular Oral Presentation Sessions II

Time: 09:30-11:00 Beijing Time, GMT+8, October 29, 2023

<p>333969 09:35-09:50</p>	<p>Human behavior recognition algorithm based on HD-C3D model Author(s): Xie, Zhihao; Yu, Lei; Wang, Qi; Ma, Ziji Presenter: Xie, Zhihao</p> <p>Abstract: To address the problems of low recognition accuracy and long training time of the original C3D (Convolutional 3D) model, this paper proposes a modified method to improve its framework. Firstly, the Relu activation function in the hidden layer is replaced by the Hardswish function to allow more neurons to participate in parameter updating and to alleviate the problem of slow gradient convergence. Secondly, the dataset was optimised using the back-ground difference method and the image scaling improvement respectively, and the optimised dataset was used for model training. The image scaling improvement combined with the activation function improvement results in a better HDs-C3D (Hardswish Data scaling - Convolutional 3D) model. Its accuracy on the training dataset reached 89.1%; meanwhile, the training time per round was reduced by about 25% when trained in the experimental environment of this paper.</p>
<p>333636 09:50-10:05</p>	<p>Inverse Pyramid Pooling Attention for Imaging Identification of Ultrasonic Signal Imaging Recognition</p>

	<p>Author(s): Jiang, Zhiwen; Ma, Ziji; Dong, Xianglong; Wang, Qi; Shao, Xun Presenter: Jiang, Zhiwen</p> <p>Abstract: Ultrasound is commonly used for diagnosis and detection in a variety of fields, and the analysis of ultrasound echo signals presents a significant challenge in terms of the amount of time required by professionals to make subjective judgements. With the advances made in artificial intelligence technology on computers, more and more fields are being aided by it, not only increasing efficiency but also improving overall accuracy. In this paper, an inverse pyramid pooling of attention (IPPA) mechanism is proposed for images transformed from ultrasound echo signals. IPPA performs different pooling operations at multiple scale levels for each channel of the feature matrix, obtaining rich regional feature associations and thus improving the representation of the channels. In addition, different probability factors were assigned for the different pooling, and domain channel information was extracted by adaptive 1D convolution to enhance the adaptation range of the network model. Experimental results on a 10-class ultrasound hyperdata set (consisting of three sub-datasets) show that the sensitivity and robustness of the ResNet integrated with IPPA are improved over the original ResNet, with an accuracy of up to 99.68%.</p>
<p>333345 10:05-10:20</p>	<p>Improving Pedestrian Attribute Recognition with Dense Feature Pyramid and Mixed Pooling</p> <p>Author(s): Xiao, He; Zou, Chen; Chen, Yaosheng; Gong, Sujia; Dong, Siwen Presenter: Zou, Chen</p> <p>Abstract: In the field of computer vision, pedestrian attribute recognition is an important task that is widely used in pedestrian detection and pedestrian reidentification. To address the challenges of blurry images, difficulty recognizing fine-grained features, and overlooking relationships between pedestrian attributes, we propose a new method for pedestrian attribute recognition. Our method is based on convolutional neural networks and utilizes a feature pyramid structure that is better suited for the PAR task. We also generate more discriminative feature information through multiscale feature fusion. The proposed AIIM module facilitates interactions between different</p>

	<p>attributes by establishing both remote dependencies and short-range dependencies. Our extensive experiments show that our proposed method achieves state-of-the-art results with an average accuracy (mA) of 86.27%, 81.56%, and 83.45% on public datasets such as PETA, PA100k, and RAP, respectively.</p>
<p>335660 10:20-10:40</p>	<p>Enhancing Cloud Data Integrity Verification Scheme with User Legitimacy Check</p> <p>Author(s): Wu, Dong; Peng, Chao; Zheng, Meilan; Fu, Chen; Wang, Hua; Zhong, Hua; Liu, Qiuming; He, Xiao; Dong, Siwen</p> <p>Presenter: Dong, Siwen</p> <p>Abstract: Users employ cloud servers to store data and depend on third-party audits to guarantee data integrity. However, this auditing system poses certain risks, as it may have vulnerabilities that attackers can exploit for intrusion. To address these concerns and achieve decentralization, a cloud data integrity verification scheme is proposed. This scheme is based on a verifiable random function and aims to eliminate the need for third-party auditing. Before performing data integrity verification, a blockchain smart contract is employed to calculate bilinear pairs, serving the purpose of verifying the user's legitimacy. If the user successfully completes this verification, the integrity of the cloud data is then verified using the verifiable random function. The simulation results demonstrate that this scheme is effective in detecting the legitimacy of users and significantly reduces the computational and communication overhead associated with verifying data integrity.</p>
<p>335344 10:40-11:00</p>	<p>Decoupled 2S-AGCN Human Behavior Recognition Based on New Partition Strategy</p> <p>Author(s): Chen, Longping ; Liu, Qiuming; Wang, Da</p> <p>Presenter: Chen, Longping</p> <p>Abstract: Human skeleton point data has better environmental adaptability and motion expression ability than RGB video data. Therefore, the action recognition algorithm based on skeletal point data has received more and more attention and research. In recent years, skeletal point action recognition models based on graph convolutional networks (GCN) have demonstrated outstanding performance. However, most GCN-based skeletal action recognition models use</p>

	<p>three stable spatial configuration partitions, and manually set the connection relationship between each skeletal joint point. resulting in an inability to better adapt to varying characteristics of different actions. And all channels of the input X features use the same graph convolution kernel, resulting in coupling aggregation. Contrary to the above problems, this paper proposes a new division strategy, which can better extract the feature information of neighbor nodes of nodes in the skeleton graph and adaptively obtain the connection relationship of joint nodes. And introduce Decoupled Graph Convolution (DC-GCN) to each partition to solve the coupled aggregation problem. Experiments on the NTU-$RGB+D$ dataset show that the proposed method can achieve higher action recognition accuracy than most current methods.</p>
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