

The 5th International Conference on Machine Vision and Information Technology

**CMVIT 2021
In conjunction with CGIIT 2021**

Conference Program

<https://www.cmvit.org/>

<https://www.cgiit.org>

Conference organized by
Federation University Australia

Technically sponsored by
Shanghai Jiaotong University and Xi'an Jiaotong-Liverpool University

Feb. 26, 2021 • Webinar

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WELCOME MESSAGE

The 5th International Conference on Machine Vision and Information Technology (CMVIT 2021), which is in conjunction with the 5th International Conference on Graphics, Images and Interactive Techniques (CGIIT 2021), is organized by Federation University Australia, and technically sponsored by Shanghai Jiaotong University and Xi'an Jiaotong-Liverpool University. Considering the current situation of COVID-19 abroad, the CMVIT 2021 & CGIIT 2021 which were planned to be held in Auckland, New Zealand, will be changed into virtual conference on Feb.26th, 2021 (Friday).

The CMVIT has been held for four years since 2017 after four successful conferences in Singapore, Hong Kong, Guangzhou, and Sanya, attracting a large number of researchers, scholars and students from all over the world. The CMVIT 2021 Conference will provide a unique and excellent forum to exchange research methodologies, explore practical applications, and foster innovative ideas, in machine vision and information technology. The conference will strive to offer plenty of networking opportunities to meet and interact with the world-leading scientists, engineers and researchers as well as industrial sponsors and exhibitors.

We emphasize that the change of conference form will not have negative impact on papers' publication and indexing. All the registered and presented papers of CMVIT 2021 will be included in the volume of **Journal of Physics: Conference Series (JPCS)**(ISSN: 1742-6596), which will be submitted to **Engineering Village, Scopus, Thomson Reuters (WoS)** and other databases for review and indexing.

We would like to thank our outstanding Plenary Speaker Prof. Cheng-Lin Liu from Institute of Automation of Chinese Academy of Sciences, China, and Keynote Speakers Prof. Peter Han Joo Chong from Auckland University of Technology, New Zealand and Prof. Donald Bailey from Massey University, New Zealand for sharing their deep insights on future challenges and trends.

We would like to thank all the committee members for their great support on organizing the conference and on reviewing the papers submitted to CMVIT 2021 and CGIIT 2021. Special thanks to all the participants of the conference.



Kaizhu Huang, Xi'an Jiaotong-Liverpool University, China

Paul Pang, Federation University Australia, Australia

Qingbo He, Shanghai Jiao Tong University, China

General Co-Chairs, CMVIT 2021

CONFERENCE SPEAKERS

Plenary Speaker



Prof. Cheng-Lin Liu

Institute of Automation of Chinese Academy of Sciences, China

Biography: Cheng-Lin Liu received the B.S. degree in electronic engineering from Wuhan University, Wuhan, China, the M.E. degree in electronic engineering from Beijing Polytechnic University (currently Beijing University of Technology), Beijing, China, the Ph.D. degree in pattern recognition and intelligent control from the Institute of Automation of Chinese Academy of Sciences, Beijing, China, in 1989, 1992 and 1995, respectively. He was a postdoctoral fellow at Korea Advanced Institute of Science and Technology (KAIST) and later at

Tokyo University of Agriculture and Technology from March 1996 to March 1999. From 1999 to 2004, he was a research staff member and later a senior researcher at the Central Research Laboratory, Hitachi, Ltd., Tokyo, Japan. From 2005, he has been a Professor at the National Laboratory of Pattern Recognition (NLPR), Institute of Automation, Chinese Academy of Sciences, Beijing, China, and is now the director of the laboratory.

His research interests include pattern recognition, image processing, neural networks, machine learning, and especially the applications to character recognition and document analysis. He has contributed many effective methods to different aspects of handwritten document analysis, including image pre-processing, page segmentation, feature extraction, classifier design, and character string recognition. His algorithms have yielded superior performance, and have been transferred to industrial applications including mail sorting, form processing and Web document retrieval. He has published over 300 technical papers in journals and conferences, including IEEE T-PAMI, IJCV, Pattern Recognition, IEEE T-NNLS, IEEE T-IP, ICPR, ICDAR, CVPR, ICDM, AAI and IJCAI. He won the IAPR/ICDAR Young Investigator Award of 2005, and received the Outstanding Youth Fund of NSFC in 2008. He is an associate Editor-in-Chief of Pattern Recognition Journal, and associate editor of Image and Vision Computing, International Journal on Document Analysis and Recognition, Cognitive Computation, IEEE/CAA Journal of Automatica Sinica, and CAAI Trans. Intelligence Technology. He is a Fellow of the CAAI, IAPR and the IEEE.

Plenary Lecture: Robust Pattern Recognition in Open World

Existing pattern recognition methods mostly concern the classification accuracy, but ignore the rejection and robustness in open world. In recent years, deep learning methods achieved huge successes in pattern recognition, but the popular deep neural networks show poor robustness to noise and outlier in open world. In this talk, I first explain the robustness of pattern recognition, list the related research issues of robust pattern recognition, and introduce some methods for improving the robustness for open set recognition, which needs to both classify within-class patterns and reject outlier. The rejection methods fall in two categories: ambiguity rejection and outlier rejection, which are based on different models and learning methods. I will give the formulations of two rejection modes and introduce some methods. Last, I will introduce a newly proposed deep learning method for robust recognition: convolutional prototype network (CPN). The CPN uses a prototype classifier for classification, and learns convolutional feature space and prototypes jointly to yield high accuracy for both classification and outlier rejection. The CPN also shows potential in domain adaptation, online learning, novel class discovery, and so on.

Keynote Speakers



Prof. Peter Han Joo Chong

Auckland University of Technology, New Zealand

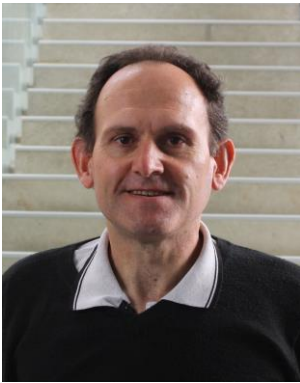
Biography: Professor Peter Han Joo Chong is an Associate Head of School (Research) and a Head of Department of Electrical and Electronic Engineering (EEE) at Auckland University of Technology, New Zealand. He received the Ph.D. degree in Electrical and Computer Engineering from the University of British Columbia, Canada, in 2000. He has visited Tohoku University, Japan, and Chinese University of Hong Kong (CUHK), Hong Kong. He is currently an Adjunct Professor at the Department of Information Engineering, CUHK.

He was previously an Associate Professor (tenured) from 2009 to 2016 and Assistant Professor from 2002 to 2009 at the School of EEE, Nanyang Technological University, Singapore. Between 2011 and 2013, he was an Assistant Head of Division of Communication Engineering. Between 2013 and 2016, he was a Director of Infinitus, Centre for Infocomm Technology. From 2001 to 2002, he was with the Radio Communications Laboratory at Nokia Research Center, Finland. Between 2000 and 2001, he worked in the Advanced Networks Division at Agilent Technologies Inc., Canada. He co-founded P2 Wireless Technology in Hong Kong in 2009 and Zyetric Technologies in Hong Kong and New Zealand in 2017.

His current research projects focus on machine learning techniques applied to 5G vehicular networks. He has been developing techniques of deep reinforcement learning (DRL)-based resource management for future 5G Cellular-V2X networks. His company, Zyetric, focuses on developing computer vision technologies for product placement advertising in digital videos. His research interests are in the areas of wireless/mobile communications systems including radio resource management, MANETs/VANETs, green radio networks, and 5G V2X networks. He has published over 200 journal and conference papers, 1 edited book and 10 book chapters in the relevant areas.

Keynote Lecture: Applying AI Technologies to KOL/Influencer Video Marketing

The massive amount of social media consumption makes KOL (Key opinion leader)/Influencer/Wanghong marketing becomes very effective. Because they have power to influence and motivate the viewers to purchase a brand's product, improve brand visibility, and ultimately boost sales. In this talk, we will introduce our patented computer vision-based product placement technology to make the KOL video marketing more viable and flexible. The idea is to embed the advertisement (AD) seamlessly and smoothly pasting into the KOLs' videos. One major obstacle for AD embedding on the KOL's videos is human occlusion. Our technology first embeds an AD to a video automatically and then we use a deep learning model to solve the occlusion problem. The deep learning model uses DeepLabV3 for human segmentation. After that, we put an AD photo to replace a picture on the KOL's video. Since the AD photo occludes the KOL's body on the video, we then use the segmentation result from the deep learning model to paste the KOL body's pixels back to the video. As a result, the AD photo is occluded by the KOL's body naturally.



Prof. Donald Bailey
Massey University, New Zealand

Biography: Donald Bailey is currently Professor of Imaging Systems at Massey University, and is co-director of the Centre for Research in Image and Signal Processing. Donald has spent over 35 years applying image processing technology to a range of industrial, machine vision and robot vision applications. For the last 18 years one area of particular research focus has been exploring aspects using FPGAs for implementing and accelerating image processing algorithms. He is the author of many publications in this field, including the book “Design for Embedded

Image Processing on FPGAs”, published by Wiley / IEEE Press. He is a Senior Member of the IEEE, and is active in the New Zealand Central Section. He is currently chair of the IEEE New Zealand Council.

Keynote Lecture: FPGA Based Machine Vision

The conventional view of machine vision is one or more cameras connected to a powerful computer for processing the images (or video) and using the results to control one or more actuators. Within machine vision, real time processing is essential, and latency is important, if not critical, for successful operation. By embedding an FPGA within a smart camera, the pixel stream from the camera may be directly processed, significantly reducing the latency and required compute power by providing processed data as output, rather than raw images. This presentation will illustrate some of the techniques that can be used for efficiently implementing machine vision using FPGAs.

PRESENTATION PROGRAMME OVERVIEW

(The time in brackets is Beijing Time, UTC+8)

Date	Time	Programme
Feb.26 th , 2021	14:00-14:10 (9:00-9:10)	Opening Ceremony
	14:10-14:50 (9:10-9:50)	Plenary Speaker Prof. Cheng-Lin Liu
	14:50-15:30 (9:50-10:30)	Keynote Speaker 1 Prof. Peter Han Joo Chong
	15:30-16:10 (10:30-11:10)	Keynote Speaker 2 Prof. Donald Bailey
	16:10-16:15 (11:10-11:15)	Break
	16:15-17:15 (11:15-12:15)	Technical Session 1 Machine Vision and Information Technology
	17:15-18:30 (12:15-13:30)	Break
	18:30-20:06 (13:30-15:06)	Technical Session 2 Machine Vision, Image and Signal Processing
	20:06- 20:10 (15:06-15:10)	Break
	20:10-21:46 (15:10-16:46)	Technical Session 3 Information Technology
	21:46-21:50 (16:46-16:50)	Break
	21:50-22:05 (16:50-17:05)	Poster Session
	22:05-22:10 (17:05-17:10)	Closing Ceremony

INSTRUCTIONS TO PRESENTATIONS

Materials Prepared and Provided by the Presenters:

Oral Presenter:

PowerPoint or PDF files

Duration of each Presentation (Tentatively 12 minutes)

Laptops (with MS-Office & Adobe Reader)

Poster Presenter:

Poster: color printing; Add Conference Name's Acronym on the top of poster (Such as "CMVIT 2021" and paper ID)

Minutes of Q&A

Plenary Speech: 35 Minutes of Presentation and 5 minutes' Q&A

Keynote Speech: 35 Minutes of Presentation and 5 minutes' Q&A

Presenter: 10 Minutes of Presentation and 2 minutes' Q&A

NOTICE:

- Certificate of Participation will be awarded after the conference finished via fast delivery.
- One best presentation will be selected from each session. The best one will be announced when each session ends, and will be awarded with a "Best Presentation" certificate.

Online Video Conference Operation Guide via VooV

● (Conference Information):

Theme: CMVIT 2021 & CGIIT 2021

Time: 14:00-22:10, UTC+13 (9:00-17:10, UTC+8), Feb.26th, 2021

Link: <https://meeting.tencent.com/s/KFkIAiWDBEMP>

Conference ID: 249 622 628

● Testing:

All the participants can join the conference room during the testing time, the conference secretary will arrange the participants who will do the oral presentation to test one by one. (p.s. Conference ID keeps the same with testing ID)

Testing Time	Participate	Testing ID	Link
20:00-22:00, UTC+13 (15:00-17:00, UTC+8) Feb.23, 2021	Oral Speakers	249 622 628	https://meeting.tencent.com/s/KFkIAiWDBEMP

● Operation Guide:

1. Video meeting software: VooV

Download link:

A.) Chinese Version:

<https://meeting.tencent.com/download-mac.html?from=1001&fromSource=1> (Mac OS)

<https://meeting.tencent.com/download-win.html?from=1001&fromSource=1>

(Windows)

B.) International Version

<https://voovmeeting.com/download/darwin> (Mac OS)

<https://voovmeeting.com/download/windows> (Windows)

2. Join the Conference:

Method 1: Click the Conference link (<https://meeting.tencent.com/s/KFkIAiWDBEMP>), or click “Join the conference”, then input the Conference ID: 249 622 628. When you join the conference room, you need to fill in your phone number for authentication, then fill in your “Paper ID +Name” at the “Name” to join the conference.

*Tip: Should you fail to “Join the Conference” as a visitor, we suggest you register an account by method 2, then

log in and join the conference.

Method 2: You can register at the APP/ website (<https://www.voovmeeting.com/>), log in and join the conference by the link or tap the Conference ID.

● **Note:**

- The conference committee will **call the roll 5 minutes before** our conference, please join the conference in advance for at least 5 minutes. The conference secretaries will be waiting since 13:30 (UTC+13)/8:30 (UTC+8).
- Please **wear headphones** during the meeting to block out the outside noise. Keeping the video on and keeping online are suggested.
- Please test the video meeting software in advance.
- During the poster session, we will upload all the poster files in the“meeting room”. For learning more about posters, you could download the files to read only. But please note that, all materials have not been published, please **respect the paper originality and copyright**.

*Note: Since International version does not support the function of file transmission, we recommend you to download Chinese version, then you can upload and download file smoothly. If Chinese version is not available in your country or region, you can download International version; as for e-posters, we could email you via email box once you requested.

- Should you have any further questions about this operation guide, please click <https://www.voovmeeting.com/> for help. You can also contact the conference secretary at cmvit@vip.163.com.

TECHNICAL SESSION

(The time in brackets is Beijing Time, UTC+8)

Plenary & Keynote Speech Session Session Chair: Paul Pang(Federation University Australia, Australia) & Qingbo He (Shanghai Jiao Tong University, China) 14:10- 16:10 (9:10-11:10), Feb.26th, Friday Room ID: 249 622 628			
Time	No.	Content	Page
14:10-14:50 (9:10-9:50)	Plenary	Robust Pattern Recognition in Open World <i>Prof. Cheng-Lin Liu</i> , Institute of Automation of Chinese Academy of Sciences, China	2
14:50-15:30 (9:50-10:30)	KN1	Applying AI Technologies to KOL/Influencer Video Marketing <i>Prof. Peter Han Joo Chong</i> , Auckland University of Technology, New Zealand	3
15:30-16:10 (10:30-11:10)	KN2	FPGA Based Machine Vision <i>Prof. Donald Bailey</i> , Massey University, New Zealand	4
16:10-16:15 (11:10-11:15)	Break		
Technical Session 1: Machine Vision and Information Technology Session Chair: Qiufeng Wang(Xi' an Jiaotong-liverpool University, China) 16:15-17:15 (11:15-12:15), Feb.26th, Friday Room ID: 249 622 628			
16:15-16:27 (11:15-11:27)	C002	Automated Biometric Recognition Using Dorsal Hand Images and Convolutional Neural Networks <i>Ash Payne</i> , Auckland University of Technology, Newzealand	15
16:27-16:39 (11:27-11:39)	C003	Anomaly detection in text data sets using character-level representation <i>Amantay Abdurakhmanov</i> , Auckland University of Technology, Newzealand	15
16:39-16:51 (11:39-11:51)	C016 (Video)	Freehand Sketching Portrait Recognition with Least Square CycleGAN <i>Bingguo Liu</i> , Harbin Institute of Technology, China	15

16:51-17:03 (11:51-11:03)	C018 (Video)	Diversity Regularized StarGAN for Multi-style Fonts Generation of Chinese Characters <i>Qi Chen</i> , Jiangxi Normal University, China	16
17:03-17:15 (12:03-12:15)	C026	ResNet-50 Based Method for Cholangiocarcinoma Identification from Microscopic Hyperspectral Pathology Images <i>Yingjiao Deng</i> , East China Normal University, China	16
17:15-18:30 (12:15-13:30)	Break		
Technical Session 2: Machine Vision, Image and Signal Processing Session Chair: Guoqiang Zhong (Ocean University of China, China) 18:30-20:06 (13:30-15:06), Feb.26th, Friday Room ID: 249 622 628			
18:30-18:42 (13:30-13:42)	C011	A brief analysis of intelligent voice technology for China's mainstream media content Production and distribution implications—Take the application of IFLYTEK series products in mainstream media as an example <i>Boxiong Song</i> , Communication University of China, China	17
18:42-18:54 (13:42-13:54)	C012	Time-Frequency bandpass filter with nonstationary signal decomposition application <i>Xiaolu Yu</i> , Shanghai Jiao Tong University, China	17
18:54-19:06 (13:54-14:06)	C025 (Video)	Relevance Feedback For Image Retrieval Using Transfer Learning and Improved MQHOA <i>Qian Liu</i> , Chongqing University of Technology, China	17
19:06-19:18 (14:06-14:18)	C037	Attacking Sequential Learning Models with StyleTransfer Based Adversarial Examples <i>Zhilu Zhang</i> , Xi'an Jiaotong-Liverpool University, China	18
19:18-19:30 (14:18-14:30)	C1006 (Video)	Semisupervised Classification Based on Tensor Convolutional Neural Network for Hyperspectral Images <i>Fuyin Ye</i> , Donghua University, China	18
19:30-19:42 (14:30-14:42)	C1010 (Video)	Multi-scene representation learning with neural radiance Fields <i>Bofeng Fu</i> , Tianjin University, China	19
19:42-19:54 (14:42-14:54)	C1013 (Video)	Particle Swarm Optimization for Optimal Allocation of STATCOM on Transmission Network <i>Ayanlade Samson Oladayo</i> , Lead City University, Ibadan, Nigeria	19

19:54-20:06 (14:54-15:06)	C302	Visualization of Data Journalism of China's Mainstream Media in Public Health Emergences: Taking the Data News Section of Xinhua Net as An Example <i>Jiahui Liu</i> , Communication University of China, China	20
20:06-20:10 (15:06-15:10)	Break		
Technical Session 3: Information Technology Session Chairs: Xi Yang (Xi' an Jiaotong-liverpool University, China) 20:10-21:46 (15:10-16:46), Feb.26th, Friday Room ID: 249 622 628			
20:10-20:22 (15:10-15:22)	C019	Hardware-oriented algorithm of reservoir computing based on Chaotic Boltzmann machines <i>Ichiro Kawashima</i> , Kyushu Institute of Technology, Japan	20
20:22-20:34 (15:22-15:34)	C031 (Video)	Anov: A framework for rapid construction and development of web-based large screen visual dashboard <i>Zhihui Pang</i> , Unicom big data Co., Ltd, China	20
20:34-20:46 (15:34-15:46)	C032	A Multi-channel LSTM Model for Sea Surface Temperature Prediction <i>Yidi Lin</i> , Ocean University of China, China	21
20:46-20:58 (15:46-15:58)	C033 (Video)	Incremental Learning Based on Angle Constraints <i>Yang Zhou</i> , Guangxi Normal University, China	21
20:58-21:10 (15:58-16:10)	C042 (Video)	A traffic interval prediction method based on ARIMA <i>Tiantian Lv</i> , Research Institue of China Telecom Corporation Limited, China	21
21:10-21:22 (16:10-16:22)	C1014	Image inpainting of multi-spectral image with laser lines based on Generative Adversarial Network <i>Liang Lu</i> , Ocean University of China, China	22
21:22-21:34 (16:22-16:34)	C1016	Dynamic Degradation quantification of wind turbine high speed shaft bearing based on oscillation based sparsity indices <i>Khandaker Noman</i> , Shanghai Jiao Tong University, China	22
21:34-21:46 (16:34-16:46)	C045 (Video)	A Context-Aware Gated Recurrent Units withSelf-Attention for Emotion Recognition <i>Miaomiao Yang</i> , Chongqing University of Post and Telecommunications, China	23



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21:46-21:50 (16:46-16:50)	Break
21:50-22:05 (16:50-17:05)	Poster Session
22:05-22:10 (17:05-17:10)	Closing Ceremony

Poster Session

Session Chair: Yizhang Jiang (Jiangnan University, China)

21:50-22:05 (16:50-17:05), Feb.26th, Friday | Room ID: 249 622 628

C009	A Brief Analysis of the 5G+4K/8K+AI Strategic Layout of Central Radio and Television Station——Taking the 2019 National Day Campaign Publicity Report as an Example <i>Wanhang Wang</i> , Communication University of China, China
C013	Research on Modified Wavelet Threshold Denoising Algorithm Based around SEMG Signal <i>Meng Wang</i> , Wuhan University of Technology, China
C014	Research on HMM-based Exoskeleton Robot Falling Prediction Algorithm <i>Gao Leilei</i> , Wuhan University of Technology, China
C023	Design and Implementation of Wireless identification and sensing platform in Structure Monitoring <i>Xunchao Qiu</i> , Northeast Forestry University, China & Harbin Finance University, China
C024	A Object detection Method for Missile-borne Images Based on Improved YOLOv3 <i>Shaobo Wang</i> , Beijing Institute of Technology, China
C029	Pyramid and Similarity Based Feature Enhancement Network for Person Re-identification <i>Chengguo Chu</i> , HeFei University of Technology, China
C030	Dynamic scene deblurring of multi-scale progressive attention network <i>Wenzhuo Huang</i> , Hunan Normal University, China
C038	Design innovation driven by artificial intelligence——AI multifunctional wheelchair design based on the needs of patients with ALS <i>Rong Liyao</i> , Communication University of China, China
C039	An occlusion handling evaluation criterion for deep learning object segmentation <i>Cheng Yang</i> , Auckland University of Technology, Newzealand
C040	High-Resolution Virtual Try-On Network with Coarse-to-Fine Strategy <i>Qi Lyu</i> , Xi'an Jiaotong-Liverpool University, China
C044	Research and Event Control on Risk Factors of Auto Insurance Claim <i>Xin Ma</i> , Automotive Data of China Co.,Ltd., China Automotive Technology & Research Center Co.,Ltd., Tianjin, China
C1002	Construction and Application of Comprehensive Evaluation Model of “Golden Classroom” <i>Yun Yun Yuan</i> , Fuyang Normal University, China

C1005	Simulation of evacuation in crowded places based on BIM and Pathfinder <i>Hui Zhang</i> , China People's Police University
C1008	Cross-Visual Attention Fusion Network with Dual-Constrained Marginal-Ranking for Visible-Infrared Person Re-Identification <i>Fang Su</i> , Hefei University of Technology, China
C1012	Research on Vehicle Appearance Damage Recognition Based on Deep Learning <i>Qianqian Zhu</i> , Automotive Data of China Co.,Ltd., China Automotive Technology & Research Center Co.,Ltd., Tianjin, China
C1015	Research on Intelligent Damage Assessment System for Timesharing Rental Vehicles Based on Image Recognition <i>Qianqian Zhu</i> , Automotive Data of China Co.,Ltd., China Automotive Technology & Research Center Co.,Ltd., Tianjin, China
C1017	Research on replica placement strategy for new building intelligent platform <i>Junchao Zhu</i> , Anhui Province Key Laboratory of Intelligent Building and Building Energy Saving, Anhui Jianzhu University, 230022, Hefei, China
C1018	A Fast Traffic Sign Detection Algorithm Based on Modified YOLOv3 <i>Huazhou Dou</i> , Xian Jiaotong University, China

ABSTRACT

Technical Session 1: Machine Vision and Information Technology	
Time	Content
16:10-16:22 (11:10-11:22)	<p>C002: Automated Biometric Recognition Using Dorsal Hand Images and Convolutional Neural Networks</p> <p>Presenter: <i>Ash Payne</i>, Auckland University of Technology, Newzealand</p> <p>Abstract: The identification of perpetrators, present in Child Sexual Abuse Imagery (CSAI), is a significant challenge due to the use of anonymisation techniques that mask their identities. Consequently, researchers have investigated the use of uncommon biometric identifiers such as knuckle patterns, palmprints and the dorsal side of the hand. This research proposes a Convolutional Neural Network (CNN) based, fully automated approach to biometric identification using dorsal hand images. The identification performance of three different CNN architectures, AlexNet, ResNet50 and ResNet152, is experimentally determined against two similar datasets, the 11k Hands and IITD dorsal hand databases. A transfer learning approach is used and the final output layers of the CNNs are modified to match the number of classes present in the datasets. The results showed that ResNet CNNs achieved identification accuracies greater than 99.9% on both datasets, whereas the AlexNet CNN achieved between 80.1% and 93.7%. These results demonstrate that it is feasible to use deep, off-the-shelf CNNs, such as ResNets, for automated biometric identification using dorsal hand images. This highlights the potential of using dorsal hand images to identify perpetrators of child sexual abuse from CSAI.</p>
16:22-16:34 (11:22-11:34)	<p>C003: Anomaly detection in text data sets using character-level representation</p> <p>Presenter: <i>Amantay Abdurakhmanov</i>, Auckland University of Technology, Newzealand</p> <p>Abstract: This paper proposes a character-level representation of unsupervised text data sets for anomaly detection problems. An empirical examination of the character-level text representation was conducted to demonstrate the ability to separate outlying and normal records using an ensemble of multiple classic numerical anomaly classifiers. Experimental results obtained on two different data sets confirmed the applicability of the developed unsupervised model to detect outlying instances in various real-world scenarios, providing the opportunity to quickly assess a large amount of textual data in terms of information consistency and conformity without knowledge of the data content itself.</p>
16:34-16:46 (11:34-11:46)	<p>C016: Freehand Sketching Portrait Recognition with Least Square CycleGAN</p> <p>Presenter: <i>Bingguo Liu</i>, Harbin Institute of Technology, China</p> <p>Abstract: Freehand sketching portrait recognition refers to the recognition of sketched portraits and face photos drawn by artists. Existing research mainly</p>

	<p>involves inputting a given real portrait and converting it into a similar sketch portrait, and then matching the face with the sketch portrait in the real portrait database. This paper starts from the idea of inputting a sketch image to identify the real portrait in the database, focuses on the research based on the method of portrait synthesis, and introduces the existing methods of sketch portrait identification. We use the CycleGAN improved by least squares to achieve the translation from sketch to portrait, and finally PCA was used to complete face matching. The results show that LS_CycleGAN has certain advantages. Compared with other methods, its synthesis results are most close to the portrait. The average score of SSIM and PSNR is 0.844 and 17.331, and the average success rate of recognition is 88.2% for Rank10.</p>
<p>16:46-16:58 (11:46-11:58)</p>	<p>C018: Diversity Regularized StarGAN for Multi-style Fonts Generation of Chinese Characters Presenter: <i>Qi Chen</i>, Jiangxi Normal University, China</p> <p>Abstract: The generation of stylish Chinese fonts plays a central role in many applications such as the design of art fonts and Chinese calligraphy generation. Most of existing methods focus on the generation of a single-style Chinese font, while few works focus on the multi-style font generation. In this paper, we exploit the star generative adversarial networks (StarGAN), a very popular generative adversarial networks (GAN) model recently developed in the literature, to realize the generation of multi-style Chinese fonts via a single model. Furthermore, in order to tackle the generation issue of Chinese characters having similar strokes for StarGAN, i.e., generating the same mode for these different but similar Chinese characters, we introduce a diversity regularizer such that the generator can generate high-quality characters with better diversity. A series of experiments are conducted on a handwritten Chinese character dataset called CASIA-HWDB1.1 and three standard printing font datasets to show the effectiveness of the proposed method. The experiment results show that the proposed method can effectively tackle the generation issue of Chinese characters having similar strokes in terms of the quality and diversity of generated results, via comparing to the baseline StarGAN, and is scalable to the multi-font generation via comparing to existing methods for the single-style font generation.</p>
<p>16:58-17:10 (11:58-12:10)</p>	<p>C026: ResNet-50 Based Method for Cholangiocarcinoma Identification from Microscopic Hyperspectral Pathology Images Presenter: <i>Yingjiao Deng</i>, East China Normal University, China</p> <p>Abstract: As the second most common primary liver tumour, the early detection of cholangiocarcinoma is very important. Computer-aided diagnosis based on deep learning using pathological tissue images is often used in cancer diagnosis. Compared with traditional RGB pathological images, hyperspectral image has more advantages in deep learning based automatic pathological diagnosis because it contains spectral dimension information. In this paper, a ResNet-50 based method is used to identify cholangiocarcinoma from hyperspectral images. The microscope hyperspectral choledoch tissue images are captured and divided into training set (6800 images) and testing set (210 images). The experimental</p>

	<p>results show that the accuracy of the proposed method is 82.4% in case of ResNet-50 structure.</p>
Technical Session 2: Machine Vision, Image and Signal Processing	
<p>18:30-18:42 (13:30-13:42)</p>	<p>C011: A brief analysis of intelligent voice technology for China's mainstream media content Production and distribution implications——Take the application of IFLYTEK series products in mainstream media as an example</p> <p>Presenter: <i>Boxiong Song</i>, Communication University of China, China</p> <p>Abstract: Intelligent speech technology including speech recognition (ASR) and speech synthesis technology (TTS), it is in China's mainstream media plays an important role in technological innovation, appropriate use of this technology can improve the efficiency of the mainstream media content production and distribution of precision, while fully give play to the role of the mainstream media propaganda, to give the mainstream media fresh vitality, so as to promote China's mainstream media communication effect. IFLYTEK, as a leader in the field of intelligent voice technology, has close cooperative relations with many mainstream media. By analyzing the application of IFLYTEK series products in mainstream media from the perspective of technology, we can better understand the impact of intelligent voice technology on the production and distribution of mainstream media content in China.</p>
<p>18:42-18:54 (13:42-13:54)</p>	<p>C012: Time-Frequency bandpass filter with nonstationary signal decomposition application</p> <p>Presenter: <i>Xiaoluo Yu</i>, Shanghai Jiao Tong University, China</p> <p>Abstract: In various applications such as speech processing, underwater sound, radar application and mechanical fault diagnosis, there are large number of nonstationary signals. In order to achieve nonstationary signal decomposition, the instantaneous frequency ridge is extracted through interactive mode, and a time-frequency bandpass filter (TFBPF) method is proposed. This method is the modified version of Intrinsic Chirp Component Decomposition (ICCD) and has the physical essence of time-frequency domain bandpass filter. The superiority and application potential of TFBPF in complex engineering signal decomposition are demonstrated through two numerical examples. In the first one, we prove that TFBPF can decompose the weak signal component directly through analyzing the vibration signal of hydraulic turbine; While in the second one, we prove that TFBPF can effectively overcome the drawbacks of ICCD through analyzing the vibration signal during the speed-up process of a complex equipment. TFBPF is still very effective even for complex signal decomposition in a strong noise environment.</p>
<p>18:54-19:06 (13:54-14:06)</p>	<p>C025: Relevance Feedback For Image Retrieval Using Transfer Learning and Improved MQHOA</p> <p>Presenter: <i>Qian Liu</i>, Chongqing University of Technology, China</p> <p>Abstract: Image retrieval is a challenging technology in multimedia applications where meeting the users' subjective retrieval needs while achieving high retrieval</p>

	<p>performance is insufficient for existing methods. In this work, a related feedback image retrieval algorithm based on deep learning and optimization algorithm (CAMQHOA-RF) is proposed. Transfer learning based on the deep convolutional neural network is applied to extract deeper image features to reduce the semantic gap. The multi-scale quantum harmonic oscillator algorithm improved by the idea of "aggregation" is introduced to search the feature space effectively. The covariance matrix is used to strengthen the relationship between feature points at different scales to guide feature points to approach ideal query points faster. Moreover, the query point is reselected based on the feedback information to explore more potential users' interest areas. Experiments have shown that compared with other algorithms, the proposed algorithm has fewer parameters that need to be set, but higher retrieval accuracy, faster retrieval speed, and stronger robustness are obtained, which can meet users better.</p>
<p>19:06-19:18 (14:06-14:18)</p>	<p>C037: Attacking Sequential Learning Models with StyleTransfer Based Adversarial Examples Presenter: <i>Zhilu Zhang</i>, Xi'an Jiaotong-Liverpool University, China</p> <p>Abstract: In the field of deep neural network security, it has been recently found that non-sequential networks are vulnerable to adversarial examples. There are however few studies to investigate the adversarial attack on sequential tasks. To this end, in this paper, we propose a novel method to generate adversarial examples for sequential tasks. Specifically, an image style transfer method is used to generate for a Scene Text Recognition (STR) network adversarial examples, which are only different from the original image on the style. While they will not interfere with the recognition of image information by human vision, the adversarial examples would significantly mislead the recognition results of sequential networks. Moreover, based on a black-box attack, both in digital and physical environments, we show that the proposed method can use cross text shape information and attack successfully the TPS-ResNet-BiLSTM-Attention (TRBA) and Convolutional Recurrent Neural Network (CRNN) models. Finally, we demonstrate further that physical adversarial examples can easily mislead commercial recognition algorithms, e.g. iFLYTEK and Youdao, suggesting that STR models are also highly vulnerable to attacks from adversarial examples.</p>
<p>19:18-19:30 (14:18-14:30)</p>	<p>C1006: Semisupervised Classification Based on Tensor Convolutional Neural Network for Hyperspectral Images Presenter: <i>Fuyin Ye</i>, Donghua University, China</p> <p>Abstract: Deep neural network has been extensively applied to hyperspectral image (HSI) classification and shown promising performance recently. However, those popular deep learning models scarcely consider low-rank features of high-dimensional HSIs lying in intrinsic data subspaces. Besides, their results largely rely on numerous labeled samples, which are expensive and time-consuming. To address these issues, we propose a Three Dimensional Tensor Convolutional Neural Network (3DTCNN) for spectral-spatial low-rank feature representation and a Semisupervised Classifier based on 3DTCNN (S-TCNN) for classification with limited labeled samples. 3DTCNN integrates</p>

	<p>tensor decomposition with convolutional neural network to extract discriminative spectral-spatial low-rank features. It also combines multiple supervised discriminators and unsupervised clustering modules to exploit labeled and unlabeled samples. Experimental results show that S-TCNN outperforms several classic supervised classifiers and state-of-the-art semisupervised classifiers on one benchmark hyperspectral data set, Indian Pines. When there are only 3 samples with prior labels per class, the proposed model achieves 98.2%, in terms of overall accuracy. Therefore, the design of 3DTCNN is proved feasible while the efficacy and efficiency of S-TCNN are validated.</p>
<p>19:30-19:42 (14:30-14:42)</p>	<p>C1010: Multi-scene representation learning with neural radiance Fields Presenter: <i>Bofeng Fu</i>, Tianjin University, China</p> <p>Abstract: In this paper, we propose a multi-scene representation framework that can learn the representation of complex scenes and reconstruct them in high resolutions given novel viewing directions. Our method represents a single scene with fully-connected layers, and a set of fully-connected layers are controlled by hyper-networks for multiple scenes modeling. For each scene, we take 3D coordinate (x; y; z) and 2D viewing direction (θ; ϕ) as inputs. Each fully-connected layer outputs volume density and view-dependent emitted radiance at a given spatial location. We then render the output color and volume density into images using volume rendering techniques along the camera rays. During training process, we optimize a continuous volume scene function with a small amount of input viewing directions. By designing versatile embedding module and multi-scene representation networks, our model can render photographic images with novel viewing directions for different complex scenes. Experiment results demonstrate the neural rendering and multi-scene representation abilities of our model. Several thorough experiments show that our method outperforms previous model on both reconstruction precision and novel view generation ability.</p>
<p>19:42-19:54 (14:42-14:54)</p>	<p>C1013: Particle Swarm Optimization for Optimal Allocation of STATCOM on Transmission Network Presenter: <i>Ayanlade Samson Oladayo</i>, Lead City University, Ibadan, Nigeria</p> <p>Abstract. Static Synchronous Compensator (STATCOM) is one of the members of flexible alternating current transmission systems (FACTS) devices that controls one or more network parameters to increase system power transfer capability. However, it needs be optimally allocated to fully maximize its usage. Allocation of STATCOM simply refers to optimal placement and size of a STATCOM to solve some of the transmission network problems. This paper therefore utilizes particle swarm optimization (PSO) to allocate STATCOM to enhance the system voltage magnitudes and minimize the active power loss. A Matlab programme was developed for the proposed method and applied to IEEE 14 bus network and the results presented. The results showed that the total active power loss was reduced by 6.90%. The voltage magnitudes at buses 7 and 13, which were above the upper voltage limit, were reduced and brought to within acceptable voltage limits and hence improvement in the system voltage profile. Therefore, the optimal allocation of STATCOM improves the efficiency and operation of the network.</p>

<p>19:54-20:06 (14:54-15:06)</p>	<p>C302: Visualization of Data Journalism of China’s Mainstream Media in Public Health Emergences: Taking the Data News Section of Xinhua Net as An Example</p> <p>Presenter: <i>Jiahui Liu</i>, Communication University of China, China</p> <p>Abstract. In the context of Chinese media, the practice of data news visualization during the COVID-19 pandemic presents unique characteristics. In order to explore the visualization mode of China's data news reports during the epidemic, this article uses the method of content analysis to analyze the data news reports related to the epidemic released by the data news section of Xinhua Net from January 22, 2020 to October 26, 2020. The article discussed the innovations in the application form and narrative characteristics of China’s mainstream media visualization practice from three aspects, and proposed improvements to the deficiencies. The research found that the data news related to the epidemic focus on data analysis in terms of production methods, and use simple and easy-to-understand diagrams for visual design, and use both traditional and advanced infographics; but it also reflects a lack of the richness of data source, mainly including static information charts and insufficient interactivity.</p>
<p>Technical Session 3: Information Technology</p>	
<p>20:10-20:22 (15:10-15:22)</p>	<p>C019: Hardware-oriented algorithm of reservoir computing based on Chaotic Boltzmann machines</p> <p>Presenter: <i>Ichiro Kawashima</i>, Kyushu Institute of Technology, Japan</p> <p>Abstract: Reservoir computing based on Chaotic Boltzmann machines (RC-CBMs) is reported as a recurrent neural network model that utilizes a CBM in its middle layer. Chaotic Boltzmann machines (CBMs) are a neural network model that behaves deterministically by imitating Boltzmann machines’ stochastic behavior with non-linear chaotic dynamics. The neural network model can be implemented into hardware with fewer hardware resources because the model does not require random number generators on its hardware implementation. CBMs’ hardware implementation method that reduces the hardware resource consumption of multiply-accumulation circuits is proposed. The use of a CBM is expected to accomplish an area-efficient hardware implementation of reservoirs. In this work, a hardware-oriented algorithm of RC-CBMs, that includes fixed-point operation and shift-exp function is proposed to overcome the difficulty of RC-CBM’s hardware implementation. The efficacy of our proposal is verified by our experiments in this paper.</p>
<p>20:22-20:34 (15:22-15:34)</p>	<p>C031: Anov: A framework for rapid construction and development of web-based large screen visual dashboard</p> <p>Presenter: <i>Zhihui Pang</i>, Unicom big data Co., Ltd, China</p> <p>Abstract. With the advent of the era of big data, extract and display effective information from massive amount of data has become a hot research field. Visualization is the most direct way for users to perceive and understand data. That’s why data dashboard with its cool dynamic visual effect has become so popular. In this paper, we propose a framework for rapid construction and development of web-based large screen visual dashboard—Anov. Anov dedicates</p>

	<p>to three goals: high efficiency, innovative AI user interaction and 3D scene. First, this framework provides a "30% configuration, 70% customization" development scheme which shortens the development cycle by at least one third. Second, Anov adopts a hierarchical architecture model to achieve high reusability, easy extensibility, high reliability, and easy maintenance. Finally, this paper introduces Anov's wide range of application field and rich user experience through multiple cases to demonstrate the practicality of the framework.</p>
<p>20:34-20:46 (15:34-15:46)</p>	<p>C032: A Multi-channel LSTM Model for Sea Surface Temperature Prediction Presenter: <i>Yidi Lin</i>, Ocean University of China, China</p> <p>Abstract: Sea Surface Temperature (SST) plays an important role in marine ecology. SST prediction raises considerable attention in ocean-related fields. Recently, deep learning models are widely used in SST prediction, but it is not easy to obtain optimal prediction results using historical observation data directly. More than temporal information, SST data also contains other features, such as trend, periodicity and disturbance. In this paper, we proposed a Multi-Channel LSTM (MC-LSTM) model to improve SST prediction. Firstly, a wavelet transform is used to decompose time-sequence data into multiple sequences representing trend, period and disturbance respectively. Secondly, we use multiple LSTM channels to train these data in parallel, and then obtain the combined prediction results. MC-LSTM can predict Sea surface temperature only by historical SST data, without the help of other spatial and climatic information, so it is easy to get the data. Compared with the direct use of LSTM for prediction, MC-LSTM can improve the prediction accuracy by 26%.</p>
<p>20:46-20:58 (15:46-15:58)</p>	<p>C033: Incremental Learning Based on Angle Constraints Presenter: <i>Yang Zhou</i>, Guangxi Normal University, China</p> <p>Abstract. With the rapid growth of the Internet, it has become easy to obtain new data for many application domains. However, when adding new data to the current system of artificial neural networks (ANNs) to learn, it can cause the network to completely forget what it has learned before, which is called catastrophic forgetting. The main reason for these problems is the inability of ANNs to balance new classes with old ones. Therefore, to address the challenge of learning new knowledge while not suffering from catastrophic forgetting, some incremental learning algorithms have been proposed to alleviate. This paper proposes features that balance new classes with old classes by using angular distillation. And some exemplars from the old classes are retained to improve the performance on the old data. The effectiveness of our algorithm is demonstrated on CIFAR-100 dataset.</p>
<p>20:58-21:10 (15:58-16:10)</p>	<p>C042: Image inpainting of multi-spectral image with laser lines based on Generative Adversarial Network Presenter: <i>Liang Lu</i>, Ocean University of China, China</p> <p>Abstract: The purpose of this paper is to construct an autoregressive integrated moving average model (ARIMA) for forecasting the traffic interval, which is helpful for the mobile industry to forecast the change of requirements for the</p>

	<p>peak of customer traffic, adjust the bandwidth dynamically, and improve the ability of active service. In this paper, the lateral time series analysis method is applied to analyze the data of the peak traffic of the uplink and downlink network from August to October of 2017 and 2018 to establish ARIMA prediction model for determining the parameters of it. MAPE method is used for model assessment and model diagnosis. Then, the optimal forecasting model is selected and the forecast error rate is calculated as the adjustment parameter of the forecast range. The model is used to forecast the customer flow range in the first three days of October 2019. Finally, the MIA method is proposed to compare with the LSTM algorithm and linear regression method for interval cumulative error comparison of traffic interval prediction. The result shows that the ARIMA (0,1,0) model has the lowest mean interval error rate of 15.5%, which proves the reliability of the model in predicting peak traffic interval.</p>
<p>21:10-21:22 (16:10-16:22)</p>	<p>C1014: Image inpainting of multi-spectral image with laser lines based on Generative Adversarial Network</p> <p>Presenter: <i>Liang Lu</i>, Ocean University of China, China</p> <p>Abstract. This paper presents a Generative Adversarial Network based on image in-painting, which can reconstruct the shape using a multi-spectral image with a laser line. One of the difficulties in multi-spectral photometric stereo is to extract the laser line, because the required illumination for multi-spectral photometric stereo, e.g. the red, green, and blue lights, may pollute the colour of the laser line. In this paper, we presents a method, which uses the Generative Adversarial Network based on image in-painting, to separate a multi-spectral image with a laser line into a clean laser image and an uncorrupted multi-spectral image without the laser line, to reconstruct the shape using a multi-spectral image with a laser line. To make the proposed method applicable to real-world objects, a rendered image dataset obtained using the rendering models in ShapeNet has been used for training the network, and the evaluation shows the superiority of the proposed approach over several previous methods, on both rendered images and real-world images.</p>
<p>21:22-21:34 (16:22-16:34)</p>	<p>C1016: Dynamic Degradation quantification of wind turbine high speed shaft bearing based on oscillation based sparsity indices</p> <p>Presenter: <i>Khandaker Noman</i>, Shanghai Jiao Tong University, China</p> <p>Abstract. Wind turbine (WT) high speed shaft (HSS) bearing fault is important due to its significant number of failures. However, due to its non-stationary operation under varying speed condition, it is a challenging issue to quantify the degradation of WT-HSS bearing by conventional bearing indices. Aiming at the aforementioned issue, in this paper, tunable Q factor wavelet transform (TQWT) preprocessed sparsity indices are proposed to achieve the dynamic degradation quantification of WT-HSS bearing. Firstly, based on the ability of TQWT in dynamic extraction of fault component of a bearing signal under varying speed condition, low oscillatory transient signal component is separated from a noisy commercial WT-HSS bearing signal by continuously adjustable tunable Q factor wavelet transform (TQWT). Then, considering the suitability of sparsity indices in quantifying extracted fault component based on its energy concentration, four</p>

	<p>representative sparsity indices namely kurtosis, gini index, negative entropy and reciprocal smoothness index are used to quantify the separated low oscillatory signal component as a measure of WT-HSS bearing health. The proposed indices show a better performance than original sparsity indices and an improved version of sparsity indices based on adaptive weighted signal preprocessing in dynamic degradation quantification of a commercial WT-HSS bearing.</p>
<p>21:34-21:46 (16:34-16:46)</p>	<p>C045: A Context-Aware Gated Recurrent Units with Self-Attention for Emotion Recognition</p> <p>Presenter: <i>Miaomiao Yang</i>, Chongqing University of Post and Telecommunications, China</p> <p>Abstract: Text-oriented emotion recognition research has made significant research progress, however, very few works pay attention to learn the highquality long-distance contextual information for the utterance emotion recognition. In this paper, we proposed a context- aware gated recurrent units with self-attention for emotion recognition. The two bidirectional gated recurrent units can obtain the sequence relationship between words and utterances. Compared with the self-attention mechanism that cannot capture long-distance contextual information, three contexts are used in the self-attention mechanism, namely global, deep and deep-global context, which can capture the highquality long-distance contextual information. And the connection mechanism can enhance the embedding information of words and utterances. Experimental results on public Friends and EmotionPush datasets demonstrate that the three contexts in the self-attention mechanism outperforms several baselines on some emotion types recognition and indicate the effectiveness of the designed model, especially the deep-global context increased by 1% and 0.2% on UWA compared with all models.</p>

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