CONFERENCE ABSTRACTS

VSIP 2021

2021 3rd International Conference on Video, Signal and Image Processing

第三届视频，信号和图像处理国际会议

ICVRT 2021

2021 4th International Conference on Virtual Reality Technology

第四届虚拟现实技术国际会议

Virtual Conference | November 19-21, 2021 (UTC+8)

Organized by 華中農業大學 HUAZHONG AGRICULTURAL UNIVERSITY

Co-organized by Edge Hill University, Chubu University

Scholarly Supported by 山东大学 SHANDONG UNIVERSITY, Nagoya Institute of Technology

Published by ICPS Published by ACM

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Welcome Message

It is a great pleasure to welcome you to attend 2021 3rd International Conference on Video, Signal and Image Processing (VSIP 2021), 2021 4th International Conference on Virtual Reality Technology (ICVRT 2021), which will be held during November 19-21, 2021 of Beijing time (UTC+8) in full virtual style by ZOOM.

The COVID-19 pandemic has imposed unprecedented changes in our personal and professional lives. Following the advice and guidelines from healthcare officials and local authorities, the organizing committee has to make a difficult decision to convert VSIP & ICVRT 2021 into full virtual conferences.

The conferences are organized by Huazhong Agricultural University, China; co-organized by Edge Hill University, UK and Chubu University, Japan; scholarly supported by Shandong University, China and Nagoya Institute of Technology, Japan.

We are delighted that four renowned speakers will share with us their research works. They are Prof. Weisi Lin (IEEE, IET Fellow) From Nanyang Technological University, Singapore, Prof. Ioannis Pitas (IEEE Fellow) from Aristotle University of Thessaloniki, Greece, Prof. Min Wu (IEEE, AAAS Fellow) from University of Maryland, College Park, USA and Prof. Zhi Gao from Wuhan University, China. In addition, eleven experts around the world will deliver invited speeches.

We extend our heartfelt thanks and appreciation to all of our participants for your understanding and engagement. Although conferences cannot be held physically, the integrity and quality of the research and content will remain and now be experienced in the virtual environment. We look forward to meeting you at VSIP & ICVRT 2021 Online!

Conference Chair
Prof. Wanneng Yang, Huazhong Agricultural University, China

Local Chair
Assoc. Prof. Ruifang Zhai, Huazhong Agricultural University, China

Conference Agenda

Day 1 - Friday, November 19, 2021 (UTC+8) **Online Testing before Formal Conference**

Time	Zoom Meeting ID	Zoom Meeting ID
13:30-18:00	Conference Committee + Keynote/Invited Speakers	Authors + Listeners

1. Click http://vsip.net/file/How_to_use_Zoom.pdf to learn how to use Zoom.
2. You can download the virtual back ground here.
3. Prior to the formal conference, presenter shall join the test room to make sure everything is on the right track.
4. Note: Please rename you name in below format before you enter meeting room

Conference Committee	Position-Name	e.g.: Conference Chair-Prof. Wanneng Yang
Keynote/Invited Speakers	Position-Name	e.g.: Keynote Speaker-Prof. Weisi Lin
Author	Session Number-Paper ID-Name	e.g.: S1-VK0001-Name
Listener	Listener-Name	Listener-Name

Conference Agenda

Day 2 Morning - Saturday, November 20, 2021 (UTC+8)	Opening Ceremony, Keynote & Invited Speeches	
Time	**Zoom Meeting ID**	
Chaired by **Assoc. Prof. Ruifang Zhai**, Huazhong Agricultural University, China		
09:00-09:05	Welcome Address - **Prof. Yonghuai Liu,** Edge Hill University, UK	
09:05-09:15	Opening Remark - **Prof. Wanneng Yang,** Huazhong Agricultural University, China	
09:15-10:00	Keynote Speech	**Prof. Min Wu** (IEEE, AAAS Fellow), University of Maryland, College Park, USA Speech Title: Exploiting Micro-Signals in Physiological Forensics
10:00-10:45	Keynote Speech	**Prof. Weisi Lin** (IEEE, IET Fellow), Nanyang Technological University, Singapore Speech Title: Quality Evaluation of Partially-Artificial Images
10:45-11:20	Group Photo & Break Time	
11:20-11:40	Invited Speech	**Prof. Linlin Shen**, Shenzhen University, China Speech Title: Weakly Supervised Object Localization and Semantic Segmentation
11:40-12:00	Invited Speech	**Assoc. Prof. Yongqing Huo**, University of Electronic Science and Technology of China, China Speech Title: Data Hiding in High Dynamic Range Image

Conference Agenda

Day 2 Afternoon - Saturday, November 20, 2021 (UTC+8)	Session 1 +Invited Speeches	
Time	**Zoom Meeting ID**	
14:00-15:30	Session 1 - Virtual Technology and Information Engineering (6 Presentations) VK2003, VK0003, VK0007, VK2006, VK2004, VK2005-A	
15:30-16:30	Break Time	
Chaired by **Assoc. Prof. Plamena Zlateva**, Institute of Robotics - Bulgarian Academy of Sciences, Bulgaria		
16:30-16:50	Invited Speech	**Prof. Tarek Ismail Mohamed**, Ajman University, UAE Speech Title: The Creative Methods of Products' E-marketing with VR/AU Reality
16:50-17:10	Invited Speech	**Prof. Dimiter Velev**, University of National and World Economy, Bulgaria Speech Title: Improving Disaster Situation Awareness through Virtual Reality Training
17:10-17:30	Invited Speech	**Prof. Yu-Dong Zhang**, University of Leicester, UK Speech Title: Image Processing Techniques for COVID-19 Diagnosis

Conference Agenda

Day 3 Morning - Sunday, November 21, 2021 (UTC+8)	Invited Speeches + Session 2	
Time	**Zoom Meeting ID**	
Chaired by **Prof. Mrinal Mandal,** University of Alberta, Canada		
09:00-09:20	Invited Speech	**Prof. Xiaobu Yuan**, University of Windsor, Canada Speech Title: The Challenge of Reality Gap for VR - Based Testing of Autonomous Vehicles
09:20-09:40	Invited Speech	**Assoc. Prof. Jianxin Lin**, Hunan University, China Speech Title: A Brief Review of Recent Advances in Image-to-Image Translation
09:40-10:00	Invited Speech	**Prof. Wei Li**, Beijing Institute of Technology, China Speech Title: Deep Convolutional Neural Network for Hyperspectral Image Classification
10:00-10:30	Break Time	
10:30-12:00	Session 2 - Advanced Electronic System and Development (6 Presentations) VK2002, VK0013, VK1022, VK1005, VK1024, VK0018	

Conference Agenda

Day 3 Afternoon - Sunday, November 21, 2021 (UTC+8)	Keynote Speeches	
Time	**Zoom Meeting ID**	
14:00-14:05	Chaired by **Prof. Ran Song**, Shandong University, China	
14:05-14:50	Keynote Speech	**Prof. Zhi Gao**, Wuhan University, China Speech Title: Vision for Intelligent Systems and Intelligent Systems based Vision
14:50-15:35	Keynote Speech	**Prof. Ioannis Pitas (IEEE Fellow)**, Aristotle University of Thessaloniki, Greece Speech Title: Video Summarization Methods
15:35-16:00	Break Time	

Conference Agenda

Day 3 Afternoon - Sunday, November 21, 2021 (UTC+8)	Invited Speeches + Session 3	
Time	**Zoom Meeting ID**	
Chaired by **Prof. Yonghuai Liu**, Edge Hill University, UK		
16:00-16:20	Invited Speech	**Prof. Julian Fierrez**, Universidad Autonoma de Madrid, Spain Speech Title: Biases in Machine Learning and Responsible Artificial Intelligence
16:20-16:40	Invited Speech	**Assoc. Prof. Plamena Zlateva**, Institute of Robotics - Bulgarian Academy of Sciences, Bulgaria Speech Title: Challenges of Combining Virtual Reality and Artificial Intelligence
16:40-17:00	Invited Speech	**Prof. Liangxiu Han**, Manchester Metropolitan University, UK Speech Title: Scalable Deep Learning for Alzheimer's Disease Diagnosis from Large Neuroimaging Data
17:00-17:30	Break Time	
17:30-19:45	Session 3 - Machine Vision and Image Processing (9 Presentations) VK1019, VK1021, VK0002-A, VK0017, VK1020, VK0009, VK1026, VK0019, VK0001	

Conference Agenda

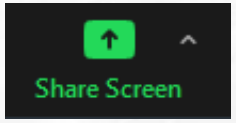
Day 3 Afternoon - Sunday, November 21, 2021 (UTC+8)	Awarding & Closing Ceremony
Time	**Zoom Meeting ID**
19:45-20:30	Break Time
20:30-20:40	Awarding & Closing Ceremony Chaired by **Prof. Yuji Iwahori**, Chubu University, Japan

Presentation Tips

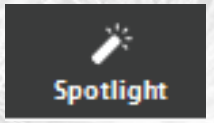
Presentation Process by Zoom

Step 1
Turn on camera and open slides

Step 2
Brief self introduction



Step 3
Share Screen (Shortcut: Alt + S)



Step 4
Use “Spotlight” during presentation

Step 5
Q & A time, click “Chat” (Shortcut: Alt + H) and enter “1”

Step 6
A best presentation will be selected from each session

* More details, please download Zoom Guideline: http://vsip.net/file/How_to_use_Zoom.pdf

Presentation Tips

1. Q & A Room

• If you have any question about the conference, please enter our Q & A room

2. About Presentation

• Every presenter has 15 minutes, including Q & A. Each presentation should have at least TEN minutes.
• The best presentation certificate and all authors' presentation certificates will be sent after conference by email.
• It is suggested that the presenter email a copy of his / her video presentation to the conference email box as a backup in case any technical problem occurs.

3. Environment & Equipment Needed

• A quiet place; Stable Internet connection; Proper lighting and background
• A computer with internet and camera; Earphone

4. Conference Recording

• We'll record the whole conference. If you do mind, please inform us in advance. We'll stop to record when it's your turn to do the presentation.
• The whole conference will be recorded. It is suggested that you should dress formally and we appreciate your proper behavior.
* The recording will be used for conference program and paper publication requirements. It cannot be distributed to or shared with anyone else, and it shall not be used for commercial nor illegal purpose.

Keynote Speaker

Prof. Min Wu (IEEE, AAAS Fellow)

University of Maryland, College Park, USA

Min Wu is a Professor of Electrical and Computer Engineering and a Distinguished Scholar-Teacher at the University of Maryland, College Park. She is currently serving as Associate Dean of Engineering for Graduate Affairs. She received the B.E. degree in electrical engineering -- automation and the B.A. degree in economics from Tsinghua University, Beijing, China, in 1996 with the highest honors, and her Ph.D. degree in electrical engineering from Princeton University in 2001. At UMD, she leads the Media, Analytics, and Security Team (MAST), with main research interests on information security and forensics, multimedia signal processing, and applications of data science and machine learning for health and IoT.

Dr. Wu was elected as IEEE Fellow, AAAS Fellow, and Fellow of the National Academy of Inventors. She chaired the IEEE Technical Committee on Information Forensics and Security, and served as Vice President - Finance of the IEEE Signal Processing Society and Editor-in-Chief of the IEEE Signal Processing Magazine. She has been elected to serve as President-Elect (2022-2023) of the IEEE Signal Processing Society.
[URL: http://www.ece.umd.edu/~minwu/]

Keynote Speaker

Prof. Min Wu (IEEE, AAAS Fellow)

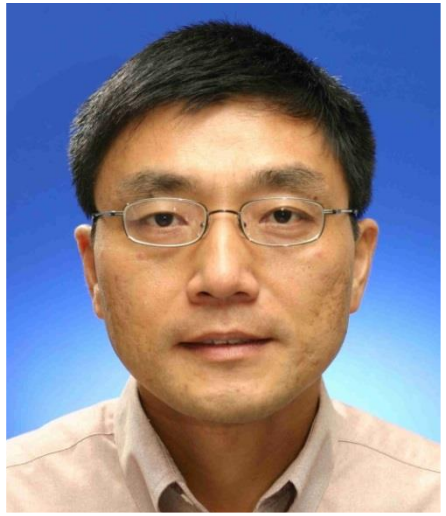
University of Maryland, College Park, USA

Speech Time: 09:15-10:00, Nov. 20, 2021 (UTC+8)

Speech Title: Exploiting Micro-Signals in Physiological Forensics

Abstract: Many nearly invisible “micro-signals” have played important roles in media security and forensics. Traditionally regarded as noise or interference, these micro-signals are ubiquitous and typically an order of magnitude lower in strength or scale than the dominant ones. This talk will review the connections for micro-signal analysis between physiological forensics and other media forensic research, and highlight the synergistic roles of signal processing, computer vision, data science, biomedical insights, and security and privacy protections.

Keynote Speaker



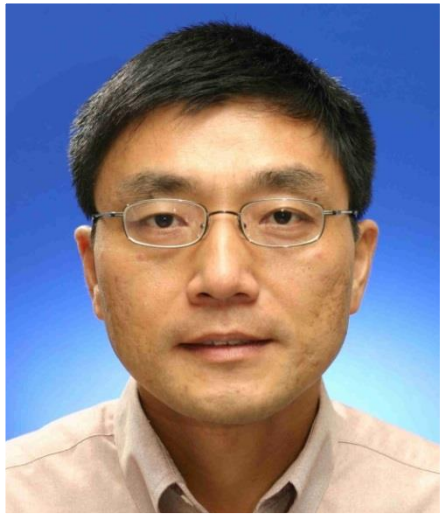
Prof. Weisi Lin (IEEE, IET Fellow)

Nanyang Technological University, Singapore

Weisi Lin is an active researcher and research leader in perception-driven visual computing, intelligent multimedia signal processing, image and video coding, and machine learning with massive data. He earned his BSc and MSc in Sun Yat-Sen University in 1982 and 1985, respectively, and PhD in King's College London, UK, in 1993. He had been the Lab Head, Visual Processing, in Institute for Infocomm Research (I2R), Singapore. He is a Professorin School of Computer Science and Engineering, Nanyang Technological University, where he also served as the Associate Chair (Research).

He is a Fellow of IEEE and IET, and has been awarded Highly Cited Researcher (2019, 2020) by Clarivate Analytics. He has elected as a Distinguished Lecturer in both IEEE Circuits and Systems Society (2016-17) and Asia-Pacific Signal and Information Processing Association (2012-13), and given keynote/invited/tutorial/panel talks to 30+ international conferences. He has been an Associate Editor for IEEE Trans. Image Process., IEEE Trans. Circuits Syst. Video Technol., IEEE Trans. Multimedia, IEEE Signal Process. Lett., Quality and User Experience, and J. Visual Commun. Image Represent, as well as a Guest Editor for 7 special issues in international journals. He chaired the IEEE MMTC QoE Interest Group (2012-2014), and has been a Technical Program Chair for PCM 2012, IEEE ICME 2013, QoMEX 2014, PV 2015, IFTC 2016 and IEEE VCIP 2017. He believes that good theory is practical, and has delivered 10+ major modules and systems for industrial deployment with the technology developed, for economic and social impact.

Keynote Speaker



Prof. Weisi Lin (IEEE, IET Fellow)

Nanyang Technological University, Singapore

Speech Time: 10:00-10:45, Nov. 20, 2021 (UTC+8)

Speech Title: Quality Evaluation of Partially-Artificial Images

Abstract: With rapid advancement of visual computing and networking, more and more scenarios emerge to make use of partially-artificial (generated) images (PAIs). For instance, screen-content images combine naturally captured visual content and generated text and graphics, in screen capturing/analysis/matching, multi-client communication, AR, cloud computing, remote education, and native advertising; retargeted images result from adapting natural visual content into different sizes, aspect-ratios and content selections, for diverse terminals and network conditions, image editing and mobile browsing. Other PAI examples include panoramic, tone mapped high-dynamic-range, 3D rendered, adversarial, style-transferred, and foreground/background augmented images.

In this talk, the demand and potential of PAIs and their quality evaluation are to be firstly analysed, and their characteristics will be discussed. Afterward, we concentrate on the related recent research for evaluating quality of screen-content, retargeted, stitched, tone-mapped, and rendered images, for on-line/service applications. The last part of the talk is devoted to discuss possible relevant future R&D effort, based upon the presenter's project experience for both academic research and industrial deployment.

Keynote Speaker

Prof. Zhi Gao

Wuhan University, China

Dr. Zhi Gao is Full Professor at Wuhan University leading the Unmanned System Surveying and Mapping Lab. He also serves as an associate editor of the journal Unmanned Systems. Since 2019, he has been supported by the distinguished professor program of Hubei Province and the National Young Talent Program, China. Prof. Gao received the B.Eng. and the Ph.D degrees from Wuhan University, China in 2002 and 2007 respectively. Since 2008, he joined the Interactive and Digital Media Institute, National University of Singapore (NUS), as a Research Fellow (A) and project manager. In 2014, he joined Temasek Laboratories in NUS (TL@NUS) as a Research Scientiest (A) and Principal Investigator. In Oct 2019, he joined Wuhan University as a professor.

He has published more than 70 research papers on top journals and conferences, such as IJCV, IEEE T-PAMI, IEEE TIE, IEEE TGRS, IEEE T-ITS, ISPRS JPRS, Neurocomputing, IEEE TCSVT, CVPR, ECCV, ACCV, BMVC, etc. His research interests include computer vision, machine learning, remote sensing and their applications. In particular, he has strong interests in vision for intelligent systems and intelligent system based vision.

Keynote Speaker

Prof. Zhi Gao

Wuhan University, China

Speech Time: 14:05-14:50, Nov. 21, 2021 (UTC+8)

Speech Title: Vision for Intelligent Systems and Intelligent Systems based Vision

Abstract: In this amazing AI era, a variety of intelligent systems, such as unmanned ground vehicles (UGVs), unmanned aerial vehicles (UAVs), etc, have been developed to accomplish many tasks of different complexities. For such intelligent agents, vision typically plays a critical role, which not only provides necessary information for localization, obstacle avoidance, and navigation to ensure that the agent can move quickly and safely to the designated location, but also realizes scene understanding to address specific task. In this talk, advanced techniques of these two aspects will be introduced, including bio-inspired motion estimation, localization in challenging environments, and target detection.

Keynote Speaker

Prof. Ioannis Pitas (IEEE Fellow)

Aristotle University of Thessaloniki, Greece

Prof. Ioannis Pitas (IEEE fellow, IEEE Distinguished Lecturer, EURASIP fellow) received the Diploma and PhD degree in Electrical Engineering, both from the Aristotle University of Thessaloniki (AUTH), Greece. Since 1994, he has been a Professor at the Department of Informatics of AUTH and Director of the Artificial Intelligence and Information Analysis (AIIA) lab. He served as a Visiting Professor at several Universities. His current interests are in the areas of computer vision, machine learning, autonomous systems, intelligent digital media, image/video processing, human-centred computing, affective computing, 3D imaging and biomedical imaging.

He has published over 920 papers, contributed in 45 books in his areas of interest and edited or (co-)authored another 11 books. He has also been member of the program committee of many scientific conferences and workshops. In the past he served as Associate Editor or co-Editor of 13 international journals and General or Technical Chair of 5 international conferences. He delivered 98 keynote/invited speeches worldwide. He co-organized 33 conferences and participated in technical committees of 291 conferences. He participated in 71 R&D projects, primarily funded by the European Union and is/was principal investigator in 43 such projects. Prof. Pitas lead the big European H2020 R&D project MULTIDRONE: https://multidrone.eu/. He is AUTH principal investigator in H2020 R&D projects Aerial Core and AI4Media. He was chair and initiator of the Autonomous Systems Initiative https://ieeeasi.signalprocessingsociety.org/. He is head of the EC funded AI doctoral school of Horizon2020 EU funded R&D project AI4Media (1 of the 4 in Europe). He has 33100+ citations to his work and h-index 86+ (Google Scholar).

Keynote Speaker

Prof. Ioannis Pitas (IEEE Fellow)

Aristotle University of Thessaloniki, Greece

Speech Time: 14:50-15:35, Nov. 21, 2021 (UTC+8)

Speech Title: Video Summarization Methods

Abstract: The latest rapid growth in multimedia applications, digital multimedia content delivery in the Internet and the existence of large video databases of video, in social media (e.g., Youtube), Media Asset Management systems and TV broadcaster Mediatheques, have initiated an strong demand for efficient tools for fast video browsing methods towards accessing video shots of interest. As video files are typically large, it is impractical to see the entire video to spot interesting shots, e.g., for journalistic purposes. Therefore, the preferred solution is to provide video summaries, either in the form of video keyframe galleries or in the form of very short videos (video skiming). Sport highlights and movie and serial trailers are special cases of video summaries. Supervised and unsupervised learning for video summarization will be overviewed, based on video color, motion, object, trajectories, events and/or attention information. In particular, video summarization with Deep Neural Networks (NN) and Generative Adversarial Network (GAN) will be presented.

Invited Speaker

Prof. Linlin Shen

Shenzhen University, China

Prof. Linlin Shen is currently the "Pengcheng Scholar" Distinguished Professor at School of Computer Science and Software Engineering, Shenzhen University, Shenzhen, China. He is also an Honorary professor at School of Computer Science, University of Nottingham, UK and a Consultant on computer vision for Huawei Technology Co. Ltd. He serves as the director of Computer Vision Institute, AI aided Medical Image Analysis & Diagnosis research center and China-UK joint research lab for visual information processing. He also serves as the Co-Editor-in-Chief of the IET journal of Cognitive Computation and Systems. He received the BSc and MEng degrees from Shanghai JiaoTong University, Shanghai, China, and the Ph.D. degree from the University of Nottingham, Nottingham, U.K.

He was a Research Fellow with the University of Nottingham, working on MRI brain image processing. His research interests include deep learning, facial analysis and medical image processing. Prof. Shen is listed as the Most Cited Chinese Researcher by Elsevier. He received the Most Cited Paper Award from the journal of Image and Vision Computing. His cell classification algorithms were the winners of the International Contest on Pattern Recognition Techniques for Indirect Immunofluorescence Images held by ICIP 2013 and ICPR 2016.

Invited Speaker

Prof. Linlin Shen

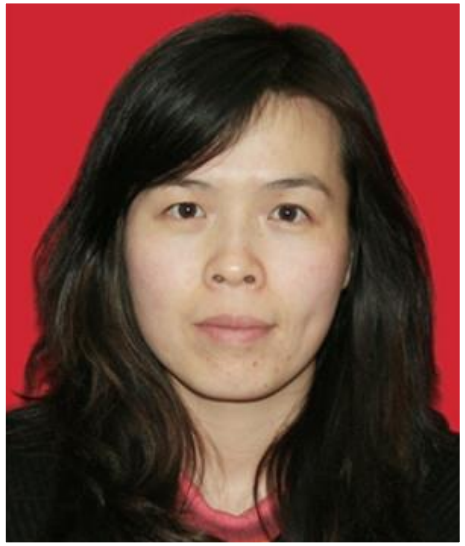
Shenzhen University, China

Speech Time: 11:20-11:40, Nov. 20, 2021 (UTC+8)

Speech Title: Weakly Supervised Object Localization and Semantic Segmentation

Abstract: As massive training data is required to train a CNN model, the annotation cost is actually very high as well. In this talk, I will start with CAM (Class Activation Map) based object localization and semantic segmentation approaches, which requuires image-level category label only. Both pros and cons of CAM based WSOL (Weakly Supervised Object Localization) and WSSS (Weadly Supervised Semantic Segmentation) will be discussed. After that, our WSOL and WSSS works using improved CAM extraction will be followed. Finally, the applications of WSOL and WSSS in wild animal image analysis and Perosn ReID will be introduced.

Invited Speaker

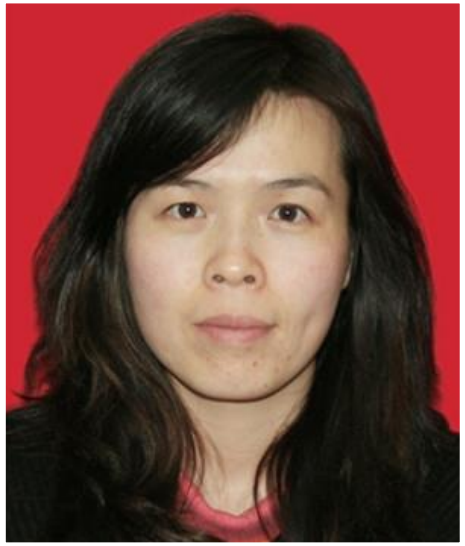


Assoc. Prof. Yongqing Huo

University of Electronic Science and Technology of China, China

Yongqing Huo received the B.S. degree in communication engineering and the M.S. and Ph.D. degrees in signal and information processing from the University of Electronic Science and Technology of China, Chengdu, China, in 2002, 2005, and 2007, respectively. In 2008, she joined the University of Electronic Science and Technology of China. From 2011 to 2012, she was a Postdoctoral Researcher with the University of Burgundy, France. She is currently an Associate Professor with the School of information and Communication Engineering, University of Electronic Science Technology of China. Her current research interests include data hiding and HDR imaging.

Invited Speaker



Assoc. Prof. Yongqing Huo

University of Electronic Science and Technology of China, China

Speech Time: 11:40-12:00, Nov. 20, 2021 (UTC+8)

Speech Title: Data Hiding in High Dynamic Range Image

Abstract: Data hiding techniques aim to protect secret data by embedding it in various types of carriers and make the secret data undetectable by transmitting the embedded carriers. Among the various types of digital carriers, images remain a popular one because they can be easily captured, edited and shared. In addition, with the advent and penetration of HDR images in various fields, there is a growing need for appropriate technologies to manage HDR images and protect privacy. HDR images are more suitable for hiding secret information because of their larger dynamic range and more redundant space. Therefore, data hiding based on HDR images has attracted more and more attention and has been rapidly developed in recent years with the proposal of several algorithms. These algorithms focus on different HDR image formats respectively, including distortion-free methods and distorted methods. The existing HDR image-based data hiding algorithms as well as our research findings will be presented.

Invited Speaker

Prof. Tarek Ismail Mohamed

Ajman University, UAE

Professor Tarek Ismail is a specialist in Product Design and 3D Visual Communication by Computer. Tarek is educated in the Product Design Department at the College of Applied Arts, Helwan University – Egypt, from 1990 to 1996. He moved to Germany to get A Ph.D. in collaboration with the College of Fine Arts (H.B.K.) in Braunschweig –from 1996 to 1999. Tarek went back to Egypt and worked as a doctor of Product Design and 3D Visual communication in the Industrial Design Department, Faculty of Applied Arts, Helwan University. Tarek held many exhibitions that reflected his thoughts on the 2D, 3D Design of different products, using the Computer and 3d Modeling.

Invited Speaker

Prof. Tarek Ismail Mohamed

Ajman University, UAE

Speech Time: 16:30-16:50, Nov. 20, 2021 (UTC+8)

Speech Title: The Creative Methods of Products' E-marketing with VR/AU Reality

Abstract: With the rapid development of digital technology and its various tools and applications, the electronic marketing of products has become more widespread and influential. Soon, experts predict that E-marketing is the dominant method of product marketing according to the many advantages of saving time, effort, money, and being more attractive.

One of the modern E-marketing techniques is VR/AU reality, which provides users with additional information and an exciting view in complete immersion. So this paper examines the importance of using VR/AU reality as one of the developed methods in the E-marketing of the products and the need to integrate the E-marketing by VR/AU reality with the early stages of the design process.

Invited Speaker

Prof. Dimiter Velev

University of National and World Economy, Bulgaria

Professor Dr. Dimiter Velev is with the Department of Information Technologies and Communications at the University of National and World Economy (UNWE), Sofia, Bulgaria. Dimiter Velev is the Director of the Science Research Center for Disaster Risk Reduction at UNWE. Prof. Velev's main areas of academic and R&D interest are Information Technology, Integrated Information Systems for Disaster Management, Artificial Intelligence, Cybersecurity, XR.

Invited Speaker

Prof. Dimiter Velev

University of National and World Economy, Bulgaria

Speech Time: 16:50-17:10, Nov. 20, 2021 (UTC+8)

Speech Title: Improving Disaster Situation Awareness through Virtual Reality Training

Abstract: An important aspect of disaster prepardness is the suitable training how people to behave in such emergency situations and it is closely related to situation awareness, which represents the perception of environmental elements within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future. Situational awareness is important that everyone is aware of their surroundings and the potential hazards they face. Traditional disaster preparedness training could be expensive or impractical for certain situations. Virtual Reality (VR) technology could be used to reduce the negative aspects of real-life training and the consequences of inadequate training. The aim of the paper is to propose a concept for improving disaster situation awareness through Virtual Reality training.

Invited Speaker

Prof. Yu-Dong Zhang

University of Leicester, UK

Prof. Yu-Dong Zhang received the PhD degree in Signal and Information Processing from Southeast University in 2010. He worked as a postdoc from 2010 to 2012 with Columbia University, USA; and as an assistant research scientist from 2012 to 2013 with Research Foundation of Mental Hygiene (RFMH), USA. He served as a Full Professor from 2013 to 2017 with Nanjing Normal University. Now he serves as Professor with School of Informatics, University of Leicester, UK. His research interests include deep learning and medical image analysis.

He is the Fellow of IET (FIET), and Senior Members of IEEE, IES, and ACM. He was included in “Most Cited Chinese researchers (Computer Science)” by Elsevier from 2014 to 2018. He was the 2019 recipient of “Web of Science Highly Cited Researcher”. He won “Emerald Citation of Excellence 2017” and “MDPI Top 10 Most Cited Papers 2015”. He was included in "Top Scientist" in Guide2Research. He is the author of over 250 peer-reviewed articles, including more than 40 “ESI Highly Cited Papers”, and 3 “ESI Hot Papers”. His citation reached 14769 in Google Scholar, and 8657 in Web of Science. He has conducted many successful industrial projects and academic grants from NSFC, NIH, Royal Society, GCRF, EPSRC, MRC, and British Council.

Invited Speaker

Prof. Yu-Dong Zhang

University of Leicester, UK

Speech Time: 17:10-17:30, Nov. 20, 2021 (UTC+8)

Speech Title: Image Processing Techniques for COVID-19 Diagnosis

Abstract: CT scans are a medical imaging technique used in radiology to get detailed images of the body noninvasively for diagnostic purposes. COVID-19 is a pandemic disease that has already caused more than 4.99 million deaths until 1/Nov/2021. This presentation will discuss the recent image processing techniques in chest CT-based COVID-19 diagnosis. Two other chest-related diseases: secondary pulmonary tuberculosis and community-acquired pneumonia, will be covered in this presentation.

Invited Speaker

Prof. Xiaobu Yuan

University of Windsor, Canada

Dr. Xiaobu Yuan is a full professor with the School of Computer Science at the University of Windsor, Canada. He started research on Virtual Reality (VR) more than twenty years ago, with his first paper on the subject published in 1997. For his contribution of applying VR in robotics, he was invited to serve three times in the technical program of IEEE International Conference on Robotics and Automation (IEEE ICRA). His research mainly focuses on inventing new means for the creation of joint human - computer intelligence via VR, and his on - going research projects include the use of software avatar for interactive software customization and the construction of simulation environment for autonomous vehicles.

Invited Speaker

Prof. Xiaobu Yuan

University of Windsor, Canada

Speech Time: 09:00-09:20, Nov. 21, 2021 (UTC+8)

Speech Title: The Challenge of Reality Gap for VR‐Based Testing of Autonomous Vehicles

Abstract: Along with rapid development of advanced sensor technologies and AI‐empowered perception systems, we are fast approaching the days when autonomous vehicles can operate on the road without the need of human intervention. While modeling and simulation are well‐established tools for analysis, design, acquisition, and training in the automotive domain, the difference between computersynthesized and real environments has created a so‐called “reality gap” that prevents the transfer of simulated experience to the real world. In this talk, we are going to examinate the issues that cause the problem, discuss approaches that have been developed as possible solutions, and explore directions to reduce the reality gap for more reliable and effective testing of autonomous vehicles.

Invited Speaker

Assoc. Prof. Jianxin Lin

Hunan University, China

Jianxin Lin received the B.E. and Ph.D. degrees from University of Science and Technology of China (USTC) in 2015 and 2020. He is currently an associate professor at the School of Computer Science and Electronic Engineering, Hunan University, Changsha, China. His research interests include image/video processing, image/video synthesis and few-shot learning.

He has published more than 20 papers on top-tier computer vision and image processing conferences and journals, including CVPR, ECCV, TPAMI, TIP and so on. He also served as reviewers for many top-tier conferences and journals, such as NeuriPS, ICLR, ICML, IJCV and so on.

Invited Speaker

Assoc. Prof. Jianxin Lin

Hunan University, China

Speech Time: 09:20-09:40, Nov. 21, 2021 (UTC+8)

Speech Title: A Brief Review of Recent Advances in Image-to-Image Translation

Abstract: Over the past several years, we have witnessed the impressive progress of image-to-image translation (I2I) based on deep learning approaches. It is attracting increasing attention because of its promising performance on a wide range of computer vision and image processing applications. In this talk, I will provide a comprehensive overview of recent advances in I2I. I will categorize the I2I problem into several main sets, provide a few examples of the I2I application and point out some remaining challenges in I2I.

Invited Speaker

Prof. Wei Li

Beijing Institute of Technology, China

Wei Li received the B.E.degree in telecommunications engineering from Xidian University, Xi'an, China, in 2007, the M.S. degree in information science and technology from Sun Yat-Sen University, Guangzhou, China, in 2009, and the Ph.D. degree in electrical and computer engineering from Mississippi State University, Starkville, MS, USA, in 2012. Subsequently, he spent 1 year as a Postdoctoral Researcher at the University of California, Davis, CA, USA. He is currently a professor with the School of Information and Electronics, Beijing Institute of Technology. His research interests include hyperspectral image analysis, pattern recognition, and data compression.

He is currently serving as Associate Editor for the IEEE Transactions on Geoscience and Remote Sensing (TGRS), IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS), and IEEE Signal Processing Letters (SPL). He has published more than 150 peer-reviewed articles and 100 conference papers totally cited by 7500 times（Google Scholar）. He received the JSTARS Best Reviewer in 2016 and TGRS Best Reviewer award in 2020 from IEEE Geoscience and Remote Sensing Society (GRSS), and the Outstanding Paper award at IEEE International Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (Whispers), 2019.

Invited Speaker

Prof. Wei Li

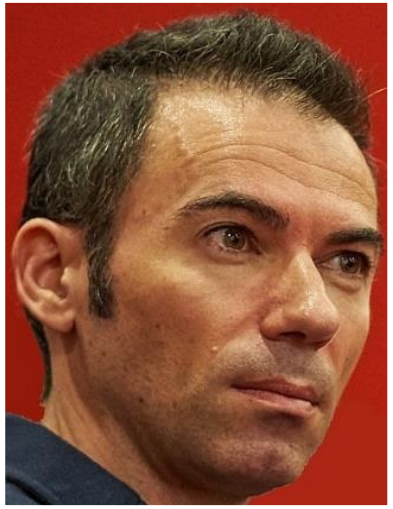
Beijing Institute of Technology, China

Speech Time: 09:40-10:00, Nov. 21, 2021 (UTC+8)

Speech Title: Deep Convolutional Neural Network for Hyperspectral Image Classification

Abstract: With the development of hyperspectral image technology, the data types for earth observation are becoming more and more abundant while the amount of data is increasing dramatically. Deep learning model has prominent superiority in image feature extraction; specifically, the multi-layer perceptron structure enables deep learning model to capture the essential representation of data. This report focuses on the topic of hyperspectral image classification based on deep convolution neural network. This is the important part of our previous work, mainly including pixel-pair strategy for small sample problem, and diverse-region based CNN for spatial-window selection and contextual sensitivity control. In addition, researches on deep convolutional neural networks for multi-source remote sensing image classification would be discussed further, involving two-branch convolutional neural networks, and unsupervised feature extraction algorithm based on end-to-end network. Experimentally, compared with traditional methods, aforementioned deep learning models can obtain more useful information from remote sensing images, thus improving classification accuracy.

Invited Speaker



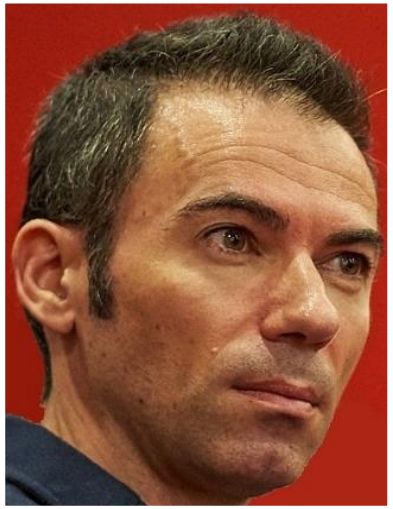
Prof. Julian Fierrez

Universidad Autónoma de Madrid, Spain

Julian Fierrez received the MSc and the PhD degrees in telecommunications engineering from Universidad Politecnica de Madrid, Spain, in 2001 and 2006, respectively. Since 2004 he has been at Universidad Autonoma de Madrid, where he is Associate Professor since 2010. From 2007 to 2009 he was a visiting researcher at Michigan State University in the USA under a Marie Curie fellowship. His research is on signal and image processing, AI fundamentals and applications, HCI, forensics, and biometrics for security and human behavior analysis.

He is actively involved in large EU projects in these topics (e.g., BIOSECURE, TABULA RASA and BEAT in the past; now IDEA-FAST, PRIMA and TRESPASS-ETN). Since 2016 he has been Associate Editor for Elsevier's Information Fusion and IEEE Trans. on Information Forensics and Security, and since 2018 also for IEEE Trans. on Image Processing. He has been General Chair of the IAPR Iberoamerican Congress on Pattern Recognition (CIARP 2018) and the Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA 2019). Since 2020 he is a member of the ELLIS Society. Prof. Fierrez has received best papers awards at AVBPA, ICB, IJCB, ICPR, ICPRS, and Pattern Recognition Letters. He is also recipient of several world-class research distinctions, including: EBF European Biometric Industry Award 2006, EURASIP Best PhD Award 2012, Medal in the Young Researcher Awards 2015 by the Spanish Royal Academy of Engineering, and the Miguel Catalan Award to the Best Researcher under 40 in the Community of Madrid in the general area of Science and Technology. In 2017 he was also awarded the IAPR Young Biometrics Investigator Award, given to a single researcher worldwide every two years under the age of 40, whose research work has had a major impact in biometrics. [http://biometrics.eps.uam.es].

Invited Speaker



Prof. Julian Fierrez

Universidad Autónoma de Madrid, Spain

Speech Time: 16:00-16:20, Nov. 21, 2021 (UTC+8)

Speech Title: Biases in Machine Learning and Responsible Artificial Intelligence

Abstract: In the last few years, we are witnessing a growing interest in the Artificial Intelligence research community in studying bias effects when machine learning methods are applied on large amounts of data. These bias effects can stem from the data itself or from the learning process, which nowadays is clearly dominated by deep learning methods that most of the time are quite opaque. When those learning processes are related to AI applications dealing with personal information, or whose application affects people's lives, then biases can result in unfair AI-based automated decision-making processes, very harmful in terms of undesired discrimination among population groups. This keynote will discuss the current state of the topic with special emphasis in AI applications involving face biometrics. Recent methods and approaches to reduce undesired discrimination towards fair biometrics will be also discussed.

Invited Speaker

Assoc. Prof. Plamena Zlateva

Bulgarian Academy of Sciences, Bulgaria

Associate professor Dr. Plamena Zlateva is with the Institute Robotics at the Bulgarian Academy of Sciences (BAS), Sofia, Bulgaria. She hods M.Sc. degrees in Applied Mathematics from the Sofia Technical University and in Economics from the Sofia University St. Kl. Ohridski, and Ph.D. degree in Manufacturing Automation from the Institute of Conrol and System Research, BAS. Her main areas of academic and research interest are Control Theory, Mathematical Modeling and System Identification, Risk Management, Risk Assessment.

Invited Speaker

Assoc. Prof. Plamena Zlateva

Bulgarian Academy of Sciences, Bulgaria

Speech Time: 16:20-16:40, Nov. 21, 2021 (UTC+8)

Speech Title: Challenges of Combining Virtual Reality and Artificial Intelligence

Abstract: Combining VR and AI can provide important areas of life and business with new incredible opportunities. Bringing these technologies together will make various experiences more engaging. The mergence of AI and VR will surely offer new exciting opportunities and it will undoubtedly change the experiences and attitude of the traditional user. The speech will focus on ideas of AI+VR application in areas, such as disaster training, military training, education. Current issues will be addressed too.

Invited Speaker

Prof. Liangxiu Han

Manchester Metropolitan University, UK

Prof. Liangxiu Han has a PhD in Computer Science from Fudan University, Shanghai, P.R. China (2002). Prof. Han is currently a Professor of Computer Science at the Department of Computing and Mathematics, Manchester Metropolitan University. She is a co-Director of Centre for Advanced Computational Science and Deputy Director of ManMet Crime and Well-Being Big Data Centre. Han's research areas mainly lie in the development of novel big data analytics/Machine Learning/AI, and development of novel intelligent architectures that facilitates big data analytics (e.g., parallel and distributed computing, Cloud/Service-oriented computing/data intensive computing) as well as applications in different domains (e.g. Precision Agriculture, Health, Smart Cities, Cyber Security, Energy, etc.) using various large scale datasets such as images, sensor data, network traffic, web/texts and geo-spatial data. As a Principal Investigator (PI) or Co-PI, Prof. Han has been conducting research in relation to big data/Machine Learning/AI, cloud computing/parallel and distributed computing (funded by EPSRC, BBSRC, Innovate UK, Horizon 2020, British Council, Royal Society, Industry, Charity, respectively, etc.).

Prof. Han has served as an associate editor/a guest editor for a number of reputable international journals and a chair (or Co-Chair) for organisation of a number of international conferences/workshops in the field. She has been invited to give a number of keynotes and talks on different occasions (including international conferences, national and international institutions/organisations). Prof. Han is a member of EPSRC Peer Review College, an independent expert for Horizon 2020 proposal evaluation/mid-term project review, and British Council Peer Review Panel.

Invited Speaker

Prof. Liangxiu Han

Manchester Metropolitan University, UK

Speech Time: 16:40-17:00, Nov. 21, 2021 (UTC+8)

Speech Title: Scalable Deep Learning for Alzheimer's Disease Diagnosis from Large Neuroimaging Data

Abstract: Computer-aided early diagnosis of Alzheimer's disease (AD) and its prodromal form mild cognitive impairment (MCI) based on structure Magnetic Resonance Imaging (sMRI) has provided a cost-effective and objective way for early prevention and treatment of disease progression, leading to improved patient care. In this work, we have proposed a new scalable deep learning solution for efficient and early Alzheimer’s Disease Diagnosis. Meanwhile, to understand inside our model and how our model reach decisions, visual explanation approach was also applied to identify and visualize those important areas contributing to our model decisions. The experimental evaluation shows the proposed work has a competitive advantage over existing methods.

Session 1: Virtual Technology and Information Engineering

Session Chair: Assoc. Prof. Kenji Funahashi, Nagoya Institute of Technology, Japan

Time | Date: 14:00-15:30 | Saturday, November 20, 2021 (UTC+8)

Zoom Meeting ID

Paper ID	Beijing Time	Presenter Local Time
VK2003	14:00-14:15	14:00-14:15
VK0003	14:15-14:30	14:15-14:30
VK0007	14:30-14:45	14:30-14:45
VK2006	14:45-15:00	14:45-15:00
VK2004	15:00-15:15	08:00-08:15
VK2005-A	15:15-15:30	08:15-08:30

Note: The local time is for reference only, please check your local time by yourself.

Session 1: Virtual Technology and Information Engineering

VK2003 **14:00-14:15**	A Practice of Combining Game and Exercise using Virtual Reality Mingmei Lyu, Benjamin. K. Ng and Chan-Tong Lam **Presenter: Mingmei Lyu** Macao Polytechnic Institute, China **Abstract:** Virtual Reality (later all abbreviated as VR) technology has been widely applied in many fields. With its traits like high interactivity and immersivity, many remarkable VR applications for different use have come out and been popular. We design and develop a motion-based VR interactive game that utilizes the advantages of VR to help users get mild physical activities in a fun way within a confined indoor area. In the game, various game objects move towards the players as the background music starts. Players are supposed to move their body in the real world to avoid barriers, hit oncoming game objects and rotate their directions in a virtual world. Besides, a game guide was completed to help players get familiar with in-game interactions. And various effects were achieved to enhance play experiences. The game was successfully developed using Unity and Oculus Rift series devices. The results of play tests show that it can motivate players to exercise in an immersive virtual environment.
VK0003 **14:15-14:30**	Mixup Augmentation for Deep Hashing Futao Liu, Weida Cao, Xiaomin Yin, Mingrui Chen, Weizhi Lu and Ran Song **Presenter: Mingrui Chen** Shandong University, China **Abstract:** Deep hashing methods has gained growing popularity in approximate nearest neighbour search for large-scale image retrieval, but exhibit undesirable behaviors such as sensitivity to adversarial examples. In the paper, inspired by the success of mixup-based data augmentation in adversarial training, we for the first time apply this technique to deep hash codes-based image retrieval, and evaluate its performance on six kinds of typical deep hashing methods. Experiments show that the mixup augmentation indeed could provide stable performance gains, ranging from 0.2% to 1.3%.

Session 1: Virtual Technology and Information Engineering

VK0007 **14:30-14:45**	Attention-based Multi-View Stereo Network Liufeng Chen, Ruifang Zhai and Hui Peng **Presenter: Liufeng Chen** Huazhong Agricultural University, China **Abstract:** The convolutional neural networks (CNNs) is a basic component in deep learning-based multi-view stereo (MVS) network for feature extraction, which effectively extract feature representations on single image scale. A broad range of prior research has exploited feature pyramids to compute a multi-scale feature representation, seeking to strengthen semantics at all scales. In this paper, we focus to improving the quality of representations by explicitly modelling the interdependencies between channels throughout its feature hierarchy. We propose to add a lightweight attention module to the feature pyramids, allowing us inferring high resolution depth maps to achieve better reconstruction results. Using attention module in Cas-MVSNet, our method only slightly increases the complexity and computational burden of the model, and achieves a more complete point cloud and less noise results on the DTU benchmark.
VK2006 **14:45-15:00**	Research on Interactive Object Generation in VR Games Based on Grid Deformation Jian Du, Shengwei Qin, Zhonghua Li and ZiLong Wu **Presenter: Shengwei Qin** Zhejiang Sci-Tech University, China **Abstract:** In order to make the objects in VR games more diverse and the interaction more immersive, this paper investigates the interaction process of object generation in the VR environment of head-mounted devices. Based on Laplacian grid deformation and Loop subdivision methods, interactive handles are used to generate 3D objects in the VR environment. Variable game objects are implemented in the VR game, which simulates the plant growth. Players can control the morphological changes of any object through the handle, so that the user's self-made content is presented on the user's retina in a way that meets the requirements of game precision. In the experiment of this paper, the deformation and growth process of plants are simulated, and the user interaction is freer and the experience has more realistic immersion.

Session 1: Virtual Technology and Information Engineering

VK2004
15:00-15:15

Semantic Computing Enhancement of Industrial Augmented Reality Solutions with Machine Learning

Juan Izquierdo-Domenech, Jordi Linares-Pellicer and Jorge Orta-Lopez
Presenter: Juan Izquierdo-Domenech
Universitat Politècnica de València, Spain

Abstract: Augmented reality (AR) systems in the industrial sector offer numerous advantages. From maintenance and repair processes to control and monitoring of complete manufacturing lines. All these applications focus on what we call the AR physical layer: determining the position and orientation of the user in front of the component to augment and superimpose synthetic elements aligned with the reality to facilitate the operator's task. In the present work, we propose the extension of this functionality using semantic computing. With techniques based on deep learning (DL), i.e., convolutional neural networks (CNNs), we add a semantic layer that interprets the environment and user actions from the physical layer of current AR systems. This semantic layer visually recognizes the status of both discrete and analog controls and obtains a set of values. These values, complemented by those from possible sensors, allow detecting anomalies or patterns of interest in decision-making using outliers and machine learning models for pattern detection. This information is also valuable in providing feedback to the AR system, giving the operators visually aligned information over the physical environment.

VK2005-A
15:15-15:30

Using Data Mining Techniques for An Effective Email Marketing

Kenza Bayoude and Mohamed Azouazi
Presenter: Kenza Bayoude
Hassan II University of Casablanca, Morocco

Abstract: The explosion of Big Data has profoundly transformed many sectors that are all concerned by the exploitation of data collected in real time from prospects and customers [1]. Combined with the Marketing sector, it is possible to exploit large volumes of information to guide marketing decisions using Data mining techniques by extracting customer data ,detecting patterns and predicting future customer behavior [2-3].

Session 1: Virtual Technology and Information Engineering

VK2005-A 15:15-15:30	In this sphere, email marketers have become aware of what Big Data can teach them based on data mining analysis that includes clustering and classification methods for better personalization of email marketing [4] and hence enhancing the response rate of email campaigns[5]. In this paper, our contribution focuses mainly on the study of the impact of Big Data on email marketing activities, we also present a comparative study on the most important data mining methods applied for solving marketing problems specifically related to email marketing perspectives.

Session 2: Advanced Electronic System and Development

Session Chair:

Time | Date: 10:30-12:00 | Sunday, November 21, 2021 (UTC+8)

Zoom Meeting ID

Paper ID	Beijing Time	Presenter Local Time
VK2002	10:30-10:45	21:30-21:45
VK0013	10:45-11:00	10:45-11:00
VK1022	11:00-11:15	11:00-11:15
VK1005	11:15-11:30	10:15-10:30
VK1024	11:30-11:45	11:30-11:45
VK0018	11:45-12:00	11:45-12:00

Note: The local time is for reference only, please check your local time by yourself.

Session 2: Advanced Electronic System and Development

VK2002 **10:30-10:45**	Multi-user Steerable Virtual Reality Cycling System with 3D Virtual Explorable Environment Yedi Luo **Presenter: Yedi Luo** University of Washington, USA **Abstract:** The design and implementation of a multi-user virtual reality cycling system are presented in this paper. This system is designed to incorporate full steering, speed synchronization, online/local multiplayer, and a 3D virtual explorable environment. To achieve those functions and achieve technical feasibility, multiple sensors, and specially designed 3D printed hardware components were integrated. An ultrasonic sensor was introduced into the system for speed detection and synchronization. A novel turn mechanism component was invented and 3D printed for the bike's turning and steering function. An open world virtual town was built utilizing the Unity 3D engine for visual immersion and interaction. It used the Google cardboard mobile virtual reality (VR) system as the head-mounted display (HDM), for information display and versatility. Lastly, the Unity network framework was incorporated to achieve simultaneous co-existence of up to 20 players. Previous, similar products lacked natural steering control, and a multiplayer and explorable virtual environment. Overall, this prototype system successfully achieved all design objectives and made indoor VR cycling a more intuitive and interactive activity.
VK0013 **10:45-11:00**	Influence of Attenuation Coefficient and Exit Gap on EPID Measurement in Radiotherapy Ning Li, Jun Zhang, Yingchang Juan and Junhai Wen **Presenter: Ning Li** Beijing Institute of Technology, China **Abstract:** In order to improve the safety and treatment quality of patients in radiotherapy, it is necessary to verify the dose delivery in radiotherapy. EPID has the advantages of fast acquisition speed, large imaging area, high resolution, good linear response and long-term stability, and has been used in the quality verification of radiotherapy.

Session 2: Advanced Electronic System and Development

VK0013 **10:45-11:00**	EPID is used to place under the patient during in vivo dose verification. The distance between the patient and the EPID will affect the pixel value of the EPID. In order to accurately use EPID for radiation therapy dose verification, we used a series of measurement data to model the attenuation coefficient and exit gap of the EPID. The EPID transmission image calculated using the modeling data is compared with the actual measured EPID transmission image to verify the accuracy of the model.
VK1022 **11:00-11:15**	A New Method of Specific Emitter Feature Extraction Based on I/Q Imbalance Wang Peng, Wang Jin Ming, Sun Yuan and Zhang Hong Yu **Presenter: Wang Peng** Army Engineering University of PLA, China **Abstract:** A new method for fingerprint feature extraction of specific emitter is proposed, the method used the individual differences of gain mismatch and phase mismatch which based on the I/Q imbalance. Received signal is denoised, demodulated and filtered, and the I/Q information of the original signal is decomposed in this method. Respectively calculate the ratios of autocorrelation functions to the cross-correlation function of I/Q signals at 0, and two specific values only related to gain and phase mismatch parameters. The values are used as two dimensional characteristic parameters and the parameters are used in specific emitter identification. Compared with the method based on bispectrum and Hilbert-huang transform method, the identification accuracy of new method is improved by more than 5% and 10% under the condition of simulation experiment. Compared with the SNR estimation method based on eigenvalue decomposition, the identification accuracy of the proposed method is improved by 3% and identification effect is better under the condition of low SNR.

Session 2: Advanced Electronic System and Development

VK1005 **11:15-11:30**	The Influence of Accounting Information System Quality and Human Resource Competency on Information Quality Meiryani and Vaeren Teresa **Presenter: Vaeren Teresa** Binus University, University **Abstract:** This study aims to examine the effect of the quality of accounting information systems and human resource competencies on the quality of accounting information. The collection of data and information needed in this study was carried out by field research. The sampling method used is simple random sampling. The data used are primary data obtained directly from research subjects in the form of a questionnaire. The method of analysis in this study used descriptive and verification analysis consisting of multiple linear regression analysis. The results showed that partially, the quality of accounting information systems and the competence of human resources affect the quality of accounting information. It is also found in simultaneous testing that the quality of accounting information systems and human resource competencies affect the quality of accounting information.
VK1024 **11:30-11:45**	Measurement and Analysis of Electrophysiological Propagation on Slice-based Biosensor QingMei Chen **Presenter: QingMei Chen** Jiangxi University of traditional Chinese Medicine, China **Abstract:** Investigation about electrophysiological propagation in drugs screening is a central technique for analyzing the target action of the cardiovascular drugs. In view of the difficulty to investigate the signal propagation by the cell-based biosensors, in the present study a slice-based biosensor was used to measure the electrophysiological propagation of the cardiac tissues. Here the beating signals was recorded and analyzed, as well as the action of the typical cardiac drugs on propagation was further observed. Some drugs have obvious effects on the cardiac beating as well as the propagation. Slice-based biosensor offers a noninvasive and versatile method to study the cardiac beating and the electrophysiological propagation for drugs screening.

Session 2: Advanced Electronic System and Development

VK0018
11:45-12:00

A Comparison of Three Swarm-Based Optimization Algorithms in Wind Turbine Radar Clutter Micro-Motion Parameters Estimation

Congsheng Zhang, Heng Zhang, Kun Zhang, Juan Yu, Xinxun Zhang and Min Duan
Presenter: Congsheng Zhang
Early Warning Academy, China

Abstract: Wind turbine radar clutter seriously affects the detection performance of radar. The effective estimation of micro-motion parameters is an important part of wind turbine radar clutter suppression. Aiming at the problem of wind turbine radar clutter micro-motion parameters estimation, the micro-motion parameters estimation effectiveness of three swarm-based optimization algorithms, namely Particle Swarm Optimization (PSO) algorithm, Artificial Bee Colony (ABC) algorithm and Grey Wolf Optimizer (GWO), is compared in this paper. Firstly, the basic principles of three swarm-based optimization algorithms are introduced. Then the wind turbine radar clutter model is established to determine the micro-motion parameters to be estimated and the steps of micro-motion parameters estimation are given. Finally, the micro-motion parameters estimation results of the three algorithms are compared and analyzed through simulation experiments. The results show that the three swarm-based optimization algorithms can estimate the micro-motion parameters. The GWO has the smallest estimation error, which has the potential value for practical wind turbine radar clutter suppression.

Session 3: Machine Vision and Image Processing

Session Chair: Assoc. Prof. Aili Wang, Harbin University of Science and Technology, China

Time | Date: 17:30-19:45 | Sunday, November 21, 2021 (UTC+8)

Zoom Meeting ID

Paper ID	Beijing Time	Presenter Local Time
VK1019	17:30-17:45	17:30-17:45
VK1021	17:45-18:00	17:45-18:00
VK0002-A	18:00-18:15	18:00-18:15
VK0017	18:15-18:30	11:15-11:30
VK1020	18:30-18:45	11:30-11:45
VK0009	18:45-19:00	18:45-19:00
VK1026	19:00-19:15	19:00-19:15
VK0019	19:15-19:30	12:15-12:30
VK0001	19:30-19:45	19:30-19:45

Note: The local time is for reference only, please check your local time by yourself.

Session 3: Machine Vision and Image Processing

VK1019
17:30-17:45

DM8168-Based Cotton Field Variable Spraying System

Peng Mingxia and Peng Hui
Presenter: Peng Hui
DM8168-Based Cotton Field Variable Spraying System, China

Abstract: A set of variable spraying system was designed based on TI's DM8168 cpu, and the cotton field video images were acquired via a webcam and sent to the image processor. The image processor would then give the weed position and variety after the analysis and recognition, pass to the DM8168 spraying equipment, and control the pesticide application of the spraying mechanism. In order to accurately distinguish the cotton from weeds, the deep learning model of Faster R-CNN convolutional network was introduced into the cotton weed image recognition, and a method of optimized structure, which was applicable to the cotton field weed recognition under complex background, was proposed. The test results show that the average target recognition accuracy of this method reaches 94.9%, the average time consumed by single-image recognition is 1.51 s, but it is shortened to 0.09 s after the acceleration through the GPU hardware. With a favorable defection effect on cotton weeds, the proposed method can provide a reference for the development of precise weeding.

VK1021
17:45-18:00

UAV Detection and Identification Technology based on RF Signal

Yang Zhang, Yanjun Zhou, Hehua Li, Wuyang Zhuo and Hao Hao
Presenter: Yang Zhang
Shanghai Polytechnic University, China

Abstract: UAV has been widely used in aerial photography, agriculture, entertainment, security and other fields, which has helped the industrial upgrading, but also brought potential safety hazards. Therefore, the research on UAV detection and recognition technology is of great significance. This paper first introduces the background and significance of UAV identification based on RF signal, then briefly describes the basic principle of this technology, then focuses on the research status of the technology and makes a comparative analysis, and finally gives the problems to be solved and the development trend in the future.

Session 3: Machine Vision and Image Processing

VK0002-A
18:00-18:15

Root Image Segmentation Method based on D-Linknet

Jiawei Shi, Shangyuan Xie, Weikun Li and Wanneng Yang
Presenter: Jiawei Shi
Huazhong Agricultural University, China

Abstract: The phenotypic traits of crop root system have certain influence on nutrient absorption and crop yield. However, roots grow in the ground, and because the soil is opaque, phenotypic information cannot be obtained directly. In this paper, the high-throughput root observation box device will be used to obtain the plant root growth, which can be collected multiple times without destroying the root system. The roots in the root box images are small, widely distributed and coherent, and there are a lot of impurities in the soil except the roots, so it is difficult to use the traditional digital image processing methods to accurately segment the roots. However, these features are similar to the segmentation of roads in satellite images, so we use D-LinkNet, which is designed to extract roads in satellite images, as a semantic segmentation model to obtain the binary map of roots, and achieve good results. The accuracy, intersection over union and recall are 0.6883, 0.5904 and 0.6743 respectively. Some phenotypic traits of roots, such as total length, total area, growth rate, width, depth and density, can be calculated according to the segmented root binary map. The experimental results showed that D-Linknet was better than the classical image processing algorithm, showing the potential of deep learning in root extraction task, and serving for root phenotype analysis and breeding.

Session 3: Machine Vision and Image Processing

VK0017 **18:15-18:30**	Activity Recognition in Industrial Environment Using two Layers Learning Robin Fays and Rim Slama **Presenter: Robin Fays** Henallux Engineering school, Belgium **Abstract:** Action and activity recognition is essential in the world of cobots to ensure the best efficiency and a safety collaboration between a robot and the human-being. The approach of the article is the creation of a new activity dataset for an industrial context with cobots for recognition. We proposed to use LSTM (Long Short-Term Memory) to analyse and recognize the activities and we also proposed to model the action using the Principal Component Analysis (PCA) and then recognize the activity using LSTM. Using this two level approaches on the dataset we collected, we obtained high recognition level : 96.826 (+/-0.383) %.
VK1020 **18:30-18:45**	Real Time Hand Gesture Recognition in Industry Dumoulin William **Presenter: Dumoulin William** Henallux Pierrard industrial Engineer, Belgium **Abstract:** With the 4th industrial revolution and the increased use of cobots in the industries comes many opportunities for new generation control panels. In this article, we proposed to develop a deep learning model to recognize in real time 10 different gestures that can be used to interact with a cobot. We proposed a new dataset containing gestures that can be used in industrial context. The videos were taken from a computer webcam and then processed to remove the noise created by the background by isolating the movement of the gray scale images. We proposed to extract the spatio-temporal features by the combination of 3D convolution and LSTM layers. We also proposed a real time method to recognize our gestures, the frames are captured continuously and fed to the model to get a prediction every 2.4 seconds. Our experimental results show for 8 out of 10 gestures, a recognition rate of more than 90%. Furthermore, an interface was created to test our method in real time and to add new classes of gestures to be recognized by our model.

Session 3: Machine Vision and Image Processing

VK0009 **18:45-19:00**	Cross-modal and Semantics-Augmented Asymmetric CycleGAN for Data-Imbalanced Anime Style Face Translation Shiping Deng, Kaoru Uchida and Zhengwei Yin **Presenter: Shiping Deng** University of Science and Technology of China&&Hosei University, China **Abstract:** Human face to anime face translation has attracted the attention of many researchers in recent years, and various works have achieved high-quality style transfer on conventional tasks. However, existing works often have fatal shortcomings when the target domain training data is heavily insufficient, which is named as imbalanced setting. Here the imbalanced (low-resource) task, generally means there is no sufficient data on the training dataset compared with the conventional task, e.g. the training data size is less than 100. To solve this problem, we propose a multi-modal translation model for a specific style. Based on the cyclic adversarial network and class activation map, we import semantic modality to enhance data information and attention modules, which help the model focus more on the discriminative areas between source and target domain. The experimental results show that our method has superiority in low-resource settings compared with similar existing work.
VK1026 **19:00-19:15**	Image Deep Steganography Detection based on Knowledge Distillation in Teacher–student Network Huifang Hao, Shangping Zhong and Kaizhi Chen **Presenter: Huifang Hao** Fuzhou University, China **Abstract:** The current hot deep steganography can hide confidential information of an image into a carrier image of the same size. It also has the characteristics of a high steganography rate and is often used for private communication within specific organizations. However, the existing deep steganography detection network is complex and time-consuming. Thus, rapid steganography detection for massive image information is urgently needed. In this study, a typical distillation algorithm is applied to the existing classical deep steganography detection network (Ye-Net and Yedroudj-Net). We constructed a student network, taking Ye-Net and Yedroudj-Net as teacher networks respectively.

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VK1026 **19:00-19:15**	Appropriate parameters T and α are also selected in accordance with the effect of knowledge distillation. With these parameters, a fast training model of deep steganography detection is established. The proposed deep steganography detection network is compared with Ye-Net and Yedroudj-Net through experiments. Three spatial steganography algorithms(Wow,S-uniward and Hill) and different steganography rates are used. The experimental results show that the proposed network can shorten the training and average detection time by about 70% and 24% when the detection accuracy is slightly lower. Overall, compared with Ye-Net and Yedroudj-Net, the proposed method can achieve fast detection of deep steganography. And code will be available at: https://github.com/hhfshiqi/KD-Ye-net
VK0019 **19:15-19:30**	Multi-Resolution Gabor Descriptor for Corrosion Detection in Pipeline Video Sequences Nadia Mhamda Bouloudani, Nafaa Nacereddine and Bahia Lounis **Presenter: Nadia Mhamda Bouloudani** Research Center in Industrial Technologies CRTI, Algeria **Abstract:** The application of this paper is destined to internal pipeline video diagnosis. These videos are acquired using a pipeline endoscope named "Pipe-Explorer". Our work consists of texture analysis to detect corrosion on pipeline video where, the video processing steps consist in recovering the input video into different frames, each frame is divided into different patches and each patch has to be classified as corroded region or safe one, using as image features a set of well-known and powerful texture descriptors such as FLBP, Haralick, HOG and Gabor descriptors. In this paper, a new texture descriptor based on the application of 1-D wavelet transform on the Gabor descriptor, which is called Wavelet Transform-Based Gabor descriptor (WTBG).Through the experiments, it has been shown that the new descriptor outperforms the other descriptors, in terms of classification rate of corrosion indications. The different processed frames are assembled to build an output video on which the corroded regions appear in red frames, as shown in Experiments.

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VK0001
19:30-19:45

Epidemic Prevention System Based on Voice Recognition Combined with Intelligent Recognition of Mask and Helmet

Huaming Zhou, Aili Wang, Meixin Li, Yinghui Zhao and Yuji Iwahori
Presenter: Huaming Zhou
Harbin University of Science and Technology, China

Abstract: At present, COVID-19 cross-infection is easy to occur in dense places such as elevators. There are no epidemic prevention measures for construction site elevators on the market, and most of them require manual temperature measurement and reminders to wear masks and helmets to avoid the spread of the epidemic. This paper designs an intelligent epidemic prevention system for the elevator ride process in a modern construction site environment, which can achieve non-contact human temperature measurement, mask and helmet recognition and voice call elevator function. The system uses Arduino UNO as the control core, Kendryte K210 as machine vision processing module, non-contact infrared temperature sensor MLX90614, and voice recognition sensor LD3320. The system has the functions of non-contact temperature detection, mask/helmet recognition(YOLOv3) and voice call elevator. Experimental results showed that the recognition accuracy rate of helmet, mask, voice call elevator is 91.5%, 92.0% and 93.0% respectively. The temperature measurement accuracy rate is 0.2℃, which can effectively prevent the spread of the epidemic caused by contact and breathing, and has the advantages of stable, intelligent, and safe work.

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