5th International Conference on Control Engineering and Artificial Intelligence

CCEAI 2021

In Conjunction with ICDPR 2021

Conference Program

www.cceai.org

www.icdpr.org

Conference Organized by
Asia Pacific Institute of Science and Engineering (APISE)
Technical Sponsored by
York University

Jan. 14-16, 2021 ● Sanya, China

CONTENTS

WELCOME MESSAGE

Dear Participants,

5th International Conference on Control Engineering and Artificial Intelligence (CCEAI 2021), in Conjunction with 5th International Conference on Data Processing and Robotics (ICDPR 2021) are organized by Asia Pacific Institute of Science and Engineering (APISE), technical sponsored by York University. This conference aims to provide a platform for researchers and engineers to share their ideas, recent developments and successful practices in Control Engineering and Artificial Intelligence.

Taking into account the COVID-19 pandemic, the CCEAI 2021 conference was held virtually as agencies around the world are now issuing restrictions on travel, gatherings, and meetings in an effort to limit and slow the spread of this pandemic. The health and safety of our participants and members of our research community is of top priority to the Organizing Committee. Therefore, the CCEAI 2021 conference was held online through VooV software.

However, the change of conference form will not influence on papers' publication and index. All the accepted papers will be included in the ACM International Conference Proceedings Series, which will be submitted to EI Compendex, Thomson Reuters (WoS) and other databases for review and indexing.

Also, the change of conference form will not influence on our conference's aim and pursuit. CCEAI 2021 aims to present the latest research and results of scientists related to Control Engineering and Artificial Intelligence and other topics. By on-line oral presentations and poster presentation, this conference provides opportunities for the delegates to exchange new ideas, to establish business or research relations as well as to find global partners for future collaborations. We hope that the conference results will lead to significant contributions to the knowledge in these up-to-date scientific fields.

We would like to thank our outstanding Keynote Speakers: Prof. Dan Zhang, York University, Canada; Prof. Pierre Larochelle, South Dakota School of Mines & Technology, USA; Prof. Zhengtao Ding, University of Manchester, UK for sharing their deep insights on future challenges and trends.

Thanks to all the committees for their great support on organizing the conference. We also would like to thank all the reviewers for their great effort on reviewing the papers submitted to CCEAI 2021. Special thanks to all the researchers and students who with their work and participate in the conference.

We hope all is well with everyone, with families and friends.

Prof. Dan Zhang, York University, Canada
Conference Committee Chair

CONFERENCE SPEAKERS

Keynote Lectures

Prof. Dan Zhang
York University, Canada

Biography: Dr. Dan Zhang is a Kaneff Professor and Tier 1 York Research Chair in Advanced Robotics and Mechatronics, as well as the Chair of the Department of Mechanical Engineering at York University. Before 2016, Dr. Zhang was a Professor and Canada Research Chair in Advanced Robotics and Automation, and was a founding Chair of the Department of Automotive, Mechanical, and Manufacturing Engineering at the University of Ontario Institute of Technology. He received his Ph.D. in Mechanical Engineering from Laval University, Canada, in June 2000. Dr. Zhang's research interests include robotics and mechatronics; high performance parallel robotic machine development; sustainable/green manufacturing systems; rehabilitation robot and rescue robot. Dr. Zhang's contributions to and leadership within the field of robotic and automation have been recognized with several prestigious awards, within his own university (Research Excellence Award both from university level and faculty level) and Kaneff Professorship, the Province of Ontario (Early Researcher Award), the professional societies (Fellow of the ASME, the CAE, the EIC and the CSME), and federal funding agencies (Canada Research Chair in January 2009 and renewed in January 2014). Dr. Zhang is the editor-in-chief for International Journal of Mechanisms and Robotic Systems, the editor-in-chief for International Journal of Robotics Applications and Technologies. Dr. Zhang served as a member of Natural Sciences and Engineering Research Council of Canada (NSERC) Grant Selection Committee. Dr. Zhang is a Fellow of the Canadian Academy of Engineering (CAE), a Fellow of the Engineering Institute of Canada (EIC), a Fellow of American Society of Mechanical Engineers (ASME), and a Fellow of Canadian Society for Mechanical Engineering (CSME), a Senior Member IEEE, and a Senior Member of SME.

Keynote Lecture: Synthesis and Optimization of Parallel and Hybrid Manipulators

Accuracy is one of the most crucial factors which affects the profound laboratory research and extensive industrial application of parallel robotic manipulators. Kinematic calibration is a necessary approach to make the nominal value approximately equivalent to the actual value for the pose of end-effector under different input of actuation variables. Since the error source of parallel manipulator is strong coupling, highly nonlinear, and uncontrollable, the pseudoerror theory is proposed by considering multiple errors, including manufacturing and assembly error, thermal error, and nonlinear stiffness error, as a single hypothetical error source, which only causes the deflection of joint variables. A novel cooperative coevolutionary neural network (CCNN) is designed to establish the complex nonlinear relationship between joint variables and the related deviation with respect to the measured pose of the end-effector. With CCNN, the pseudoerror in arbitrary joint configuration can be obtained, and thus, the control parameters can be adjusted accordingly. The results are validated through the case studies about a parallelogram-based 3-DOF parallel manipulator and a parallel robotic machine tool. This approach is generic and feasible for all types of robotic system.

Since performance improvement is one of the most important factors that greatly affect the application potential of hybrid manipulators in different industry fields, to deeply investigate the comprehensive features, the local/global performance indexes of stiffness, dexterity, and

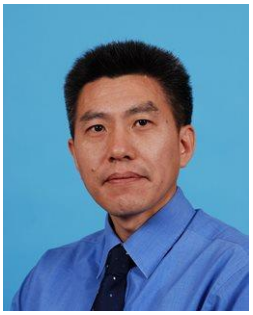
manipulability are mathematically modeled and mapped. A discrete-boundary-searching method is developed to calculate and visualize the workspace. Pareto-based evolutionary multi objective performance optimization is implemented to simultaneously improve the four indexes, and the representative nondominated solutions are listed.

Prof. Pierre Larochelle
South Dakota School of Mines & Technology, USA

Biography: (Ph.D., Mechanical Engineering, University of California at Irvine) is the Department Head and a Professor of Mechanical Engineering at the South Dakota School of Mines & Technology. Previously he served as an Associate Dean and Professor of Mechanical Engineering at the Florida Institute of Technology. His research focuses on the design of complex robotic mechanical systems and enabling creativity and innovation in design. He is the founding director of the RObotics and Computational Kinematics INnovation (ROCKIN) Laboratory, has over 100 publications, holds two US patents, and serves as a consultant on robotics, automation, machine design, creativity & innovation, and computeraided design. He serves on the Executive Committee of ASME's Design Engineering Division and will serve as Chair of the Division in 2018-2019. He serves on ABET's Engineering Accreditation Commission (EAC) and as an ABET Accreditation Visit Team Chair. Moreover, he currently serves as the Chair of the U.S. Committee on the Theory of Mechanisms & Machine Science and represents the U.S. in the International Federation for the Promotion of Mechanism & Machine Science (IFToMM) (2016 - 2020). He has served as Chair of the ASME Mechanisms & Robotics Committee (2010-2014) and as an Associate Editor for the ASME Journal of Mechanisms & Robotics (2013 – 2016, 2017 - present), the ASME Journal of Mechanical Design (2005 – 2011), and for Mechanics Based Design of Structures & Machines (2006 – 2013). He is a Fellow of the American Society of Mechanical Engineers (ASME), a Senior Member of IEEE, and a member of Tau Beta Pi, Pi Tau Sigma, ASEE, and the Order of the Engineer.

Keynote Lecture: Spatial Free Form Additive Manufacturing of Lattice Structures

In this talk the conceptualization and realization of a system that deploys an industrial robot arm platform for additive manufacturing of lattice structures is presented. Conventional 3D printers, especially those employing fused deposition modeling (FDM) processes, are restricted to depositing material in a single toolpath plane (e.g. x-y plane). To ameliorate this limitation, we have been exploring various kinematic architectures and motion planning methods. The focus of this study was to explore the feasibility of integrating commercial off the shelf (COTS) additive manufacturing technologies with a six degree of freedom industrial robot arm to yield a 3D additive manufacturing system with the capability to perform freeform six degree of freedom fused deposition modeling. Here, we utilized the general motion capabilities of an industrial robot arm to yield the ability to deposit material as desired in three dimensions. A Yaskawa Motoman SV3X six degree of freedom general purpose industrial robot arm was equipped with a fused deposition modeling extruder print head. This integration combined two mature technologies, industrial robot arms and FDM print heads, into a new system with new additive manufacturing capabilities that we call MotoMaker. Using the MotoMaker system a three dimensional lattice structure generator for multi-plane fused deposition modeling printing was investigated. Experimental results show the achievable capabilities of the 3D lattice structure generator for use with the multi-plane platform. In this talk we summarize the knowledge gained and lessons learned in developing the MotoMaker robot platform for additive manufacturing of lattice tructures.



Prof. Zhengtao Ding
University of Manchester, UK

Biography: Zhengtao Ding received B.Eng. degree from Tsinghua University, Beijing, China, and M.Sc. degree in systems and control, and the Ph.D. degree in control systems from the University of Manchester Institute of Science and Technology, Manchester, U.K. After working as a Lecturer with Ngee Ann Polytechnic, Singapore, for ten years, he joined the University of Manchester in 2003, where he is currently Professor of Control Systems with the School of Electrical and Electronic Engineering. He is the author of the book: Nonlinear and Adaptive Control Systems (IET, 2013) and has published over 200 research articles. His research interests include nonlinear and adaptive control theory and their applications, more recently network-based control, distributed optimization and distributed learning, with applications to power systems and robotics. Prof. Ding has served as an Associate Editor for the IEEE Transactions on Automatic Control, IEEE Control Systems Letters, Transactions of the Institute of Measurement and Control, Control Theory and Technology, Mathematical Problems in Engineering, Unmanned Systems, and the International Journal of Automation and Computing, etc. He is a member of IEEE Technical Committee on Nonlinear Systems and Control, IEEE Technical Committee on Intelligent Control, and IFAC Technical Committee on Adaptive and Learning Systems.

Keynote Lecture: Consensus-Based Distributed Data Analysis: Learning, Fusion and Optimization

Huge amount of data are collected by various systems every day, and how to effectively analysing the data collected in various geographic locations remains a huge challenge in engineering and even in our daily life. Due to the distributed nature of collected data, and ever-increasing sensitivity in privacy protection, analysing data locally in a distributed manner over a network is more appealing. In this talk, some fundamental analytical methods will be presented, in particular, the methods based on consensus principles over communication networks. The talk will fundamental description network connections, and certain dynamic considerations over the networks. From an application point of view, consensus principles are demonstrated for machine learning, through certain consensus mechanism in dealing with learning parameters. The talk also covers applying consensus principles in sensor fusion and distributed optimization based on data.

PRESENTATION PROGRAMME OVERVIEW

Date	Time	Programme
Jan. 15th, 2021	9:30-9:40	Opening Ceremony
	9:40-10:20	Keynote Lecture Prof. Pierre Larochelle
	10:20-11:00	Keynote Lecture Prof. Dan Zhang
	11:00-12:00	Technical Session I
	12:00-15:00	Lunch & Break
	15:00-15:40	Keynote Lecture Prof. Zhengtao Ding
	15:40-17:10	Technical Session II
	17:10-17:30	Poster Session
	17:30-17:40	Closing Ceremony

INSTRUCTIONS TO PRESENTATIONS

Materials Prepared and Provided by the Presenters:

Oral Presenter:
PowerPoint or PDF files
Duration of each Presentation (Tentatively 15 minutes)
Laptops (with MS-Office & Adobe Reader)

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

Minutes of Q&A

Keynote Speech: 35 Minutes of Presentation and 5 minutes' Q&A;
Presenter: 10 Minutes of Presentation and 5 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	Time	Conference ID	Link
CCEAI & ICDPR 2021	9:30 a.m-17:40 p.m Jan. 15th, 2021 （GMT+8）	659 749 594	https://meeting.tencent.com/s/EBTRMSOO5aT2

● 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 and poster presentation to test one by one. (p.s. Conference ID keeps the same with testing ID)

Time	Attendees	Conference ID	Link
16:00 p.m-18:00 p.m Jan. 12th, 2021 (GMT +8)	Authors	659 749 594	https://meeting.tencent.com/s/EBTRMSOO5aT2

● 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/EBTRMSOO5aT2), or click "Join the conference", then input the Conference ID. 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 9:00(GMT+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.

- Please follow WeChat for Consultation (**APISE17358663189**) for more information. CCEAI 2021 Wechat Group will update conference information in realtime.

- 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 +86-17723329879(China), +852-30506939 (Hong Kong)

TECHNICAL SESSION

Keynote Speech Session 9:40-10:20, Jan. 15th, 2021, Friday (GMT+8) Room ID: 659 749 594			
Time	**No.**	**Content**	**Page**
9:40-10:20	KN1	Spatial Free Form Additive Manufacturing of Lattice Structures ***Prof. Pierre Larochelle,*** South Dakota School of Mines & Technology, USA	3
10:20-11:00	KN2	Synthesis and Optimization of Parallel and Hybrid Manipulators ***Prof. Dan Zhang,*** York University, Canada	2
Technical Session I **Session Chair: Prof. Ping Zhu** (Tellhow Institute of Smart City, China) **11:00-12:00, Jan. 15th, 2021, Friday (GMT+8)** **Room ID: 659 749 594**			
11:00-11:15	A024	Attention backpropagation: A backtracking approach to visualize the discriminative image regions ***Yui Lo,*** Shenzhen International Graduate School, Tsinghua University, China	13
11:15-11:30	A010 (Video)	Action-limited, multimodal deep Q learning for AGV fleet route planning ***Hang Liu,*** Research & Development Group, Hitachi, Ltd, Japan	13
11:30-11:45	A033	Hand Gesture Recognition Using IR-UWB Radar with ShuffleNet V2 ***Yao Li,*** Air Force Engineering University, China	14
11:45-12:00	A012 (Video)	IMC Control of Oil Wells Pressure During Drilling Modeled As An Integrative Process With Time Delay ***Carlos Alexis Alvarado Silva,*** Universidad Señor de Sipán, Perú	14
12:00-15:00	**Lunch & Break**		

Keynote Speech Session 15:00-15:40, Jan. 15th, 2021, Friday (GMT+8) Room ID: 659 749 594			
Time	**No.**	**Content**	**Page**
15:00-15:40	KN3	Consensus-Based Distributed Data Analysis: Learning, Fusion and Optimization ***Prof. Zhengtao Ding,*** University of Manchester, UK	4
Technical Session II **Session Chair: Prof. Zhengtao Ding** (University of Manchester, UK) **15:40-17:10 Jan. 15th, 2021, Friday (GMT+8)** **Room ID: 659 749 594**			
15:40-15:55	A036	Label-Based Convolutional Neural Network for Text Classification ***Chen Wang,*** Central South University, China	15
15:55-16:10	A1005 (Video)	Feature Selection Technique for Autism Spectrum Disorder ***IN-ON WIRATSIN,*** Mahidol University, Thailand	15
16:10-16:25	A1003	Semantic Engineering Platform: Case Research on Humanoid Resolving Primary Mathematics Application Problems ***Zhu Ping***, Tellhow Institute of Smart City, China	15
16:25-16:40	A1004	A Network for Detecting Facial Features During The COVID-19 Epidemic ***Bin Lin,*** Sichuan Agricultural University, China	16
16:40-16:55	A1007	Numerical Study on Magnetic Field Characteristics of Electromagnetic Flowmeter with Small Excitation Module ***Xuejing Li***, Shanghai Institute of Measurement And Testing Technology, Shanghai Key Laboratory of On-line Testing and Control Technology, China	16
16:55-17:10	A030 (Video)	Adaptive Brain-Machine Interface of Brain-Controlled Vehicles Using Semi-MIM and TSVM ***Weijie Fei***, Beijing Institute of Technology, China	17
17:10-17:30	**Poster Session**		
17:30-17:40	**Closing Ceremony**		

Poster Session Session Chair: Prof. Kai Zhang (Shenzhen International Graduate School, Tsinghua University, China) Jan. 15th, 2021, Friday Room ID: 659 749 594	
A014	Identifying Chinese herbal medicine by image with three deep CNNs ***Jinghong Yue,*** Nanjing University of Aeronautics and Astronautics, China
A016	Networks Ensemble for Multi-modal Cross-ethnicity Face Anti-spoofing ***Cuiqun Chen,*** HeFei University of Technology, China
A017	An Improved Capillary Tube Downhole Temperature and Pressure Integrated Monitoring Technology ***Zheng Wang,*** Chongqing Chemical Industry Vocational College, China
A019	Design of Maglev controller considering track influence ***Liu Hengkun,*** Hunan Lingxiang Maglev Technology Co. Ltd, China
A020	An Enhanced HDCA Algorithm for Single-trial EEG Classification ***Xiyu Song,*** PLA Strategy Support Force Information Engineering University, China
A022	Structure Similarity for Image Quality Assessment from isotropic to anisotropic ***Yuanyuan Chang,*** Shaanxi University of Science and Technology, China
A025	Chinese live-streaming barrage chatbot combined with user vectors ***Yu Shi,*** Jiangnan University, China
A026	Electric Vehicle Charging Navigation Strategy Based on Data Driven and Deep forcement Learning ***Liangliang Chen,*** Southeast University, China
A027	Home Energy Management System Optimization Strategy Based on Reinforcement Learning ***Yingchun He,*** Southeast University, China
A031	Improved CTR Prediction algorithm based on LSTM and attention ***Qiaojun Chen,*** South China University of Technology, China
A034	Review of Target Detection Technology based on Deep Learning ***Futai LIANG,*** Air Force Early Warning Academy, China
A037	A review expert recommendation method based on comprehensive evaluation in multi-source data ***Mengmeng Shen,*** Beihang University, China
A1001	Review of the Application of Machine Learning in Rumor Detection ***Yuhang Yu,*** Beijing Forestry University, China
A1009	Design of wear resistance test device for bolt bit used in coal mine ***XU Hai-long,*** China Coal Research Institute, China

A1011	Research on Gait Recognition of Exoskeleton Robot Based on DTW Algorithm ***Hao Wang,*** Wuhan University of Technology, China
A1012	Learning Rubost Features with Refined Spatial Interactions of Inter-part for Person Re-Identification ***Bo Tan,*** Hefei University of Thechnlogy, China
A2001	Research on grid with harmonic based on virtual synchronous generator ***Yuzhang Mo,*** Hezhou University, China

ABSTRACT

Technical Session I	
Time	**Content**
11:00-11:15	**A024:** Attention backpropagation: A backtracking approach to visualize the discriminative image regions **Presenter:** ***Yui Lo,*** Shenzhen International Graduate School, Tsinghua University, China **Abstract:** In recent years, deep convolutional neural networks (CNNs) have achieved great success in computer vision tasks of classiïňĄcation, detection, segmentation, and etc. However, they are often perceived as âĂIJblack boxâĂİ methods for the lack of interpretability. In this work, we propose an approach to alleviate the opaqueness of deep learning models by providing visual explanations to the predictions of the network. Our approach entitled Attention Backpropagation will backpropagate the networkâĂŹs attention to produce an attention map highlighting the important regions in the image for predicting. This is a generalized method that can be used for all the networks without modification of the network architecture or retraining. We apply the proposed approach to provide visual explanations for the whole inference process of VGG-16 model, and analyze the cause for the erroneous predictions. Furthermore, numerical results suggest that our approach has better ability to localize the discriminative image regions, and outperforms previous methods in weakly-supervised localization task and the pointing game test on ILSVRC-15 dataset.
11:!5-11:30	**A010:** Action-limited, multimodal deep Q learning for AGV fleet route planning **Presenter:** ***Hang Liu,*** Research & Development Group, Hitachi, Ltd, Japan **Abstract:** The superiority of Automated Guided Vehicle (AGV) fleet management system is often reflected in the time-efficient on overall dispatch/navigation. The reinforcement learning can then be applied to help provide an optimal route planning for such fleet. In this study, in order to obtain suitable navigation strategies for certain specific momentary road conditions, we propose an improved deep Q network. It modifies the regression loss calculation method by bounding the Q output of certain actions, so that the network can focus on actions that are more in line with current road conditions. Moreover, multimodal deep Q learning is adopted to further improve fleet efficiency, owing to the help of multi-source monitoring data. Such learning collects action suggestions from each unimodal learning, and integrates their results through experience-based pooling calculations. The simulation results show the proposed method can optimize fleet management efficiency on time consumption level.

11:30-11:45	**A033:** Hand Gesture Recognition Using IR-UWB Radar with ShuffleNet V2 **Presenter:** ***Yao Li,*** Air Force Engineering University, China **Abstract:** In recent years, gesture recognition has developed rapidly in non-contact Human-Computer Interaction (HCI). This paper presents an efficient hand gesture recognition system for HCI based on Impulse-Radio Ultra-Wideband (IR-UWB) radar using ShuffleNet V2, which performed well on accuracy, speed and robustness. We convert time-domain radar signals to continuous Range-Doppler Map (RDM) by algorithm1.RDM images are easier to understand than waveform diagrams for Convolutional Neural Networks (CNN). ShuffleNet V2 is a masterpiece of lightweight CNN and is used to analyze the patterns of different gesture RDM images to classify gestures in this paper. In order to ensure the robustness of the algorithm, we invited 7 participants to construct the gesture data set. The proposed hand gesture recognition system can classify 7 gestures with a promising accuracy of 98.52%.
11:45-12:00	**A012:** IMC Control of Oil Wells Pressure During Drilling Modeled As An Integrative Process With Time Delay **Presenter:** ***Carlos Alexis Alvarado Silva,*** Universidad Señor De Sipan, Peru **Abstract:** Controlling the pressure of oil wells during drilling can be one of the most complex and dangerous processes operating stage. This study proposes the design of an internal model controller (IMC) to control the pressure at the bottom of wells during drilling operations based Managed Pressure Drilling (MPD). MPD adds a control valve in the drilling system to have another manipulate variable on the well pressure. In the first part of this work, there was obtained a mathematical model of the process, which is founded on fluid mechanics (state equation, the Reynolds transport equation: continuity and momentum). The dynamic process presents an integrating element, which makes the process dynamics difficult to handle because any disturbance may alter its stability. Still it becomes more complex in the presence of a delay time in the system model. In the second part, was designed an IMC controller for controlling the integrative process with the addition of time delay looking for the best stability and robustness of the process. Finally, the proposed controller is performed by simulations that show its feasibility in the presence of common problems during drilling, which were tested as disturbances in closed loop system (loss circulation fluid, influxes, pipe addition and loss of pump power). The performance of the process in closed loop is compared with a classical PI.

Technical Session II	
Time	**Content**
15:40-15:55	**A036:** Label-Based Convolutional Neural Network for Text Classification **Presenter:** ***Chen Wang,*** Central South University, China **Abstract:** The neural network models based on word embedding have achieved remarkable results in text classification. Even so, these models hardly consider that the importance of each word and labels for text classification is beneficial to obtain informative text representation. The attention mechanisms usually are used to measure the weights of words to improve predictive performance, but we attempt to achieve the same goal in a simple way. Since that word embedding can capture semantic regularities between words. We introduce a text representation based on label by embedding each label and the word vectors in the same space in this paper. In this label-based text representation, each word has weight information of the number of classes, which play an important role in the final performance. So we proposed a label-based convolutional neural network (LBCNN) to obtain the importance of different word in the label-based text sequence and the most influential semantic features in the word vector respectively. The experimental results show that our proposed method outperforms the state-of-art methods on the several large text classification datasets.
15:55-16:10	**A1005:** Feature Selection Technique for Autism Spectrum Disorder **Presenter:** ***IN-ON WIRATSIN,*** Mahidol University, Thailand **Abstract:** Autism Spectrum Disorder (ASD) is a developmental disorder that restricts the development of behaviors, communication, and learning skills. People with ASD have difficulties in communicating and engaging with other people. Presently, a questionnaire called Autism Spectrum Quotient 10 (AQ-10) has been used to diagnose ASD symptoms for individuals [1]. However, using AQ-10 for ASD diagnosis is based on the observation from an individual's behavior and evaluate the result. It cannot show the outstanding attribute or relationship between ASD symptoms in different age-groups. Thus, this research proposed the novel feature selection technique for identifying the important attributes in AQ-10 results from three different age-groups, which are children at age of 7-12, adolescents at age of 13-20, and adults at age over 20. The results will represent the outstanding features and relationships between ASD symptoms in different age-groups, and lead to the proper design of ASD treatment programs for individuals.
16:10-16:25	**A1003:** VSemantic Engineering Platform: Case Research on Humanoid Resolving Primary Mathematics Application Problems **Presenter:** ***Zhu Ping,*** Tellhow Institute of Smart City, China **Abstract:** To solve the problem of sparse semantic representation in semantic processing, this paper designs and develops a semantic engineering platform,

	which involves the accumulation of knowledge and common sense in the whole process of resolving primary mathematics application problems. Firstly, this paper analyzes the steps and technology of resolving primary mathematics application problems; secondly, it discusses various examples, knowledge and common sense types accumulated by the semantic engineering platform, as well as the internal management technologies of the semantic engineering platform; thirdly, an example is used to explain the steps and results of simulated running of humanoid resolving; finally, the paper summarizes the full paper and puts forward the future work directions
16:25-16:40	**A1004:** A Network for Detecting Facial Features During The COVID-19 Epidemic **Presenter:** ***Bin Lin,*** Sichuan Agricultural University, China **Abstract:** The new coronavirus can spread through respiratory droplets, and wearing a mask correctly can effectively prevent the virus from spreading. However, the current detection algorithms are based on unobstructed faces, which affects the detection task when wearing a mask. To solve these problems, a facial feature detection algorithm based on Mtcnn+Mobilenet+GDBT in complex scenes is proposed. First, it can detect whether to wear a mask and the fatigue state of the face. Second, it can set different thresholds according to the facial characteristics of different people, and initialize the characteristics of different frames in 5 seconds. Then train a dataset of masks and feature points containing 708 images. The experimental results show that compared with the traditional detection network, the new network can effectively detect facial features in the context of the epidemic. The detection loss of net is 0.01. In the future, it can be used in areas with severe influenza virus, factories, and sterile environments. It will be able to make judgments on the mask wearing conditions of on-site personnel through real-time images collected by the camera and remind people to wear masks correctly. During the epidemic, it is equipped with an on-board video system, which automatically records the driver's facial state. If fatigue performance such as frequent blinking is detected, the monitoring system will immediately issue an alarm to ensure safety.
16:40-16:55	**A1007:** Numerical Study on Magnetic Field Characteristics of Electromagnetic Flowmeter with Small Excitation Module **Presenter:** ***Xuejing Li,*** Shanghai Institute of Measurement And Testing Technology, Shanghai Key Laboratory of On-line Testing and Control Technology, China **Abstract:** Electromagnetic flowmeter (EMFM) plays an important role in many production processes such as industry, medicine and agriculture. According to the measurement principle, the traditional electromagnetic flowmeter must have a large-size excitation module to provide a uniform magnetic field. However, this structure limits the use of electromagnetic flow meters. The saddle coil design has certain applications in electromagnetic flow sensors. The geometric size of the saddle coil is smaller than the Helmholtz coil and other large coils, so it has certain advantages in practical applications. But it causes the inhomogeneity of the induced magnetic field, which affects

	the measurement accuracy. This paper analyzes a saddle-shaped excitation module. An extended theory with a small magnetized flowmeter is proposed and compared with the experimental results. The electromagnetic field solution of the finite element program is proposed. The results of this study have certain guiding significance for the design process of the electromagnetic flowmeter excitation coil.
16:55-17:10	**A030:** Adaptive Brain-Machine Interface of Brain-Controlled Vehicles Using Semi-MIM and TSVM **Presenter: Weijie Fei,** Beijing Institute of Technology, China **Abstract:** Brain-machine interfaces (BMIs) have been developed for healthy individuals to control external devices. However, like all the existing BMIs, they require a time-consuming training process. To address this problem, we propose a semi-supervised decoding framework to develop an adaptive BMI. The adaptive BMI first initializes with a small labeled training set, and then increasingly adjusts itself by updating with newly collected unlabeled electroencephalogram (EEG) samples. The semi-supervised decoding framework starts with a semi-supervised mutual information maximization (semi-MIM) method to select optimal features and then uses the transductive support vector machine (TSVM) for classification. Experimental results show that the proposed semi-supervised framework performs better than other semi-supervised approaches and enables the adaptive BMI to catch up with the performance of the supervised learning-based BMI. Since the adaptive BMI uses a smaller training set, it can significantly reduce the training effort.

CONFERENCE COMMITTEE

Conference Committee Chair

Dan Zhang, York University, Canada

Program Committee Co-Chair

Marek Ogiela, AGH University of Science and Technology, Poland

Pierre Larochelle, South Dakota School of Mines & Technology, USA

Advisory Committee

Michael R. M. Jenkin, York University, Canada

Naira Hovakimyan, University of Illinois at Urbana-Champaign, USA

Scientific Committee Co-Chair

Zhengtao Ding, University of Manchester, UK

Wenqiang Zhang, Fudan University, China

Financial Chair

Wei Dong, Harbin Institute of Technology, China

Publication Co-Chair

Yong Yue, Xi'an Jiaotong-Liverpool University, China

Qian Wu, Institute of Intelligent Manufacturing Technology, China

Local Committee

Pijitra Jomsri, Suan Sunandha Rajabhat University, Thailand

Thumrongrat Amornraksa, King Mongkut’s University of Technology Thonburi, Thailand

Program Committees

Aznul Qalid Bin Md Sabri, University of Malaya, Malaysia

Azizi Abdullah, Universiti Kebangsaan Malaysia, Malaysia

ORGANIZER BY

Asia Pacific Institute of Science and Engineering

TECHNICAL SPONSORED BY

NOTE

NOTE