

2022

SINGAPORE

December 7-9, 2022



2022 3rd Asia Symposium on Signal Processing



*2022 3rd International Conference on
Computer Communication and Information Systems*

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DAILY SCHEDULE



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WELCOME MESSAGE

We welcome your participation and contribution to the 2022 3rd International Conference on Computer Communication and Information Systems (CCCIS 2022), with its workshop 2022 3rd Asia Symposium on Signal Processing (ASSP 2022), which is to be held in Singapore during December 7-9, 2022.

This year, CCCIS 2022 and ASSP 2022 will be organized to provide a platform for academicians, researchers, scientists, professionals and students to share their knowledge and expertise in the field of Computer Communication and Information Systems, Signal Processing, and address various issues to Increase awareness of technological innovations and to identify challenges and opportunities for the development of future using multidisciplinary research techniques. CCCIS 2022 and ASSP 2022 will include state-of-the-art oral presentation related to the key areas. Featured with keynote session, technical session, social networking event.

We are very pleased to announce this year's Keynote speeches and invited speech will be given by

- ❖ Robert Minasian, The University of Sydney, Australia, IEEE Life Fellow, OSA Fellow, Fellow of The Royal Society of NSW
- ❖ Akihiko K. Sugiyama, Yahoo! Japan Research, Japan
- ❖ Sergei Gorlatch, University of Muenster, Germany
- ❖ C. M. Fong, Western Michigan University, USA

All of the papers were subjected to peer-review by conference committee members and international reviewers. We feel deeply grateful to all that have contributed to make this event possible: authors who contributed papers, the conference steering committee, the conference speakers, and the peer reviewers. Thanks are also extended to the conference administrative committee and the supporters for their tireless efforts throughout the course of the conference.

Once again, on behalf of the conference committee, we welcome you all to Singapore in the future! And hope you will find the CCCIS 2022 and ASSP 2022 experience a memorable one.

Conference Committee



USEFUL INFORMATION

Online Presentation Instruction

- Please unmute audio and start video while your presentation.
- It's suggested to use headset with microphone or earphone with microphone, please prepare the slide file of your presentation on your laptop in advance.
- Duration of each Presentation: about 12 Minutes of Presentation and 3 Minutes of Q&A.
- E-certificate will be sent to presenters after conference by email. An excellent presentation will be selected from each session and announced on the website after conference. An excellent presentation certificate will be sent after conference by email.
- The conference secretary will capture a group photo at the end of each session, and you can download the picture after the conference on website after conference.
- Conference rooms will be open 30 mins before scheduled time. please enter the room 10-15 minutes in advance and be prepared.

Please rename yourself before entering the conference room as below (in English):

Author: Paper ID-Name; Listener: Listener-Name; Keynote Speaker: Keynote-Name; Conference Committee: Position-Name

Zoom Meeting Instruction

ZOOM Download: (oversea authors): URL: <https://zoom.us/>

Meeting Link: <https://us02web.zoom.us/j/88570882025>

Meeting ID: 885 7088 2025 Password: 120709





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DAY 1-PRETEST

December 7th, 2022

10:00-15:00 Test time for Keynote Speakers, Invited Speakers and Committee Members

11:00-11:30 Test time for Session Chairs

14:00-15:00 Test time for Authors

DAY 2-PROGRAM

December 8th, 2022

09:00-09:05 Opening Remarks

Professor Ling Tok Wang, National University of Singapore, Singapore

09:05-09:45 Keynote Speaker I

Professor Robert Minasian, The University of Sydney, Australia

Speech Title: Advances in integrated microwave photonics for signal processing and sensing

09:45-10:25 Keynote Speaker II

Akihiko K. Sugiyama, Yahoo! Japan Research, Japan

Speech Title: History of Personal Media Terminals: From Walkman to Apple Watch



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10:25-10:40

Group Photo & Break Time

10:40-11:20

Keynote Speaker III

Professor Sergei Gorlatch, University of Muenster, Germany

Speech Title: Distributed Software Applications Based on Mobile Cloud and Software-Defined Networks

11:20-11:40

Invited Speaker

Professor A. C. M. Fong, Western Michigan University, USA

Speech Title: Building a Customizable Toolkit for Natural Language Processing

11:40-14:00

Break Time

14:00-17:30

Author Presentation

Session Chair: Associate professor Lili Nurliyana Abdullah, University Putra Malaysia, Malaysia

CA3207, CA3309, CA4018, CA3102, CA3411, CA3412, CA3416, CA4019, CA37-A, CA38, CA03, CA36-A, CA31

DAY 3-REPLAY

December 9th, 2022

10:00-16:00

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Prof. Robert Minasian

The University of Sydney, Australia

IEEE Life Fellow, OSA Fellow, Fellow of The Royal Society of NSW

Professor Minasian is a Chair Professor with the School of Electrical and Information Engineering at the University of Sydney, Australia. He is also the Founding Director of the Fibre-optics and Photonics Laboratory. His research has made key contributions to microwave photonic signal processing. He is recognized as an author of one of the top 1% most highly cited papers in his field worldwide. Professor Minasian has contributed over 394 research publications, including Invited Papers in the IEEE Transactions and Journals. He has 80 Plenary, Keynote and Invited Talks at international conferences. He has served on numerous technical and steering committees of international conferences. Professor Minasian was the recipient of the ATERB Medal for Outstanding Investigator in Telecommunications, awarded by the Australian Telecommunications and Electronics Research Board. He is a Life Fellow of the IEEE, a Fellow of the Optical Society of America (now Optica), and a Fellow of The Royal Society of NSW.

Speech Title: Advances in integrated microwave photonics for signal processing and sensing

Abstract: Integrated photonic signal processing offers new powerful paradigms for signal processing sensor systems. This stems from its inherent advantages of wide bandwidth and immunity to electromagnetic interference. Microwave photonics, which merges the worlds of RF and photonics, shows strong potential as a key enabling technology to provide new signal processing systems and sensors that can overcome inherent electronic limitations. Photonic signal processors are intrinsically compatible with optical-wireless systems, and can provide connectivity with in-built signal conditioning. Optical sensors for monitoring the environment for IoT provide advantages of immunity to electromagnetic interference, inertness in chemical and biological applications, compactness, lightweight, and the ability to operate in harsh environments. Current trends are focused on the integration of photonics on silicon platforms that leverage highly developed CMOS fabrication technologies to enable boosting the performance of future systems performing signal processing and sensing. Recent advances in integrated microwave photonic signal processing and sensing are presented. These include dense optical integration techniques for LIDAR on-a-chip systems, widely tunable microwave photonic filters, multi-function and programmable photonic signal processors, and high-resolution integrated sensors for IoT. These photonic processors herald new capabilities for achieving high-performance signal processing and sensing.



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Akihiko K. Sugiyama

Yahoo! Japan Research, Japan

Akihiko Sugiyama (a.k.a. Ken Sugiyama), affiliated with Yahoo! JAPAN Research, has been engaged in a wide variety of research projects in signal processing such as audio coding and interference/noise control. Prior to Yahoo Japan, he had a long career at NEC Central Research Laboratories as a research engineer. He served as the Chair of Audio and Acoustic Signal Processing Technical Committee, Signal Processing Society (SPS), as associate editor for Trans. Signal Processing, as the Secretary and a Member at Large to the SPS Conference Board, as a member of the SPS Awards Board, as the Chair of SPS Japan Chapter, and a member of IEEE Fellow Committee. He was a Technical Program Chair for ICASSP2012. Currently, he serves as a member of the IEEE Fellow Committee and the IEEE James Clerk Maxwell Medal Committee. He has contributed to 17 chapters of books and is the inventor of 217 registered patents with more pending applications in the field of signal processing. He received 20 awards such as the 2002 IEICE Best Paper Award, the 2006 and 2018 IEICE Achievement Award, the 2013 Ichimura Industry Award, and the 2021 IEICE Distinguished Achievement and Contribution Award. He has delivered 167 invited talks in 87 cities of 30 countries. He is a past SPS Distinguished Industry Speaker, a Renowned Distinguished Speaker (The Rock Star) for Consumer Technology Society (CTS) and a past Distinguished Lecturer for SPS and CTS.

Speech Title: History of Personal Media Terminals: From Walkman to Apple Watch

Abstract: This talk presents a brief history of personal media terminals, highlighting the development of the Silicon Audio, the world's first all solid-state audio player. The background of its development, its concept, and details of early versions are explained. The family of personal media terminals are presented followed by the impact on the following products such as smartphones, tablet PCs, and smart watches.



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Prof. Dr. Sergei Gorlatch

University of Muenster, Germany

Sergei Gorlatch is Full Professor of Computer Science at the University of Muenster (Germany) since 2003. Earlier he was Associate Professor at the Technical University of Berlin, Assistant Professor at the University of Passau, and Humboldt Research Fellow at the Technical University of Munich, all in Germany. Prof. Gorlatch has more than 200 peer-reviewed publications in renowned international books, journals and conferences. He was principal investigator in several international research and development projects in the field of software for parallel, distributed, Grid and Cloud systems and networking, funded by the European Community and by German national bodies.

Speech Title: Distributed Software Applications Based on Mobile Cloud and Software-Defined Networks

Abstract: We consider an emerging class of challenging software applications called Real-Time Online Interactive Applications (ROIA). ROIA are networked applications connecting a potentially very high number of users who interact with the application and with each other in real time, i.e., a response to a user's action happens virtually immediately. Typical representatives of ROIA are multiplayer online computer games, advanced simulation-based e-learning and serious gaming. All these applications are characterized by high performance and QoS requirements, such as: short response times to user inputs (about 0.1-1.5 s); frequent state updates (up to 100 Hz); large and frequently changing numbers of users in a single application instance (up to tens of thousands simultaneous users). This talk will address two challenging aspects of software for future Internet-based ROIA applications: a) using Mobile Cloud Computing for allowing high application performance when a ROIA application is accessed from multiple mobile devices, and b) managing dynamic QoS requirements of ROIA applications by employing the emerging technology of Software-Defined Networking (SDN).



INVITED SPEAKER

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Prof. A. C. M. Fong

Western Michigan University, USA

A.C.M. Fong was appointed professor of computer science at Auckland University of Technology in 2008. Since 2013, he has been with University of California Irvine, University of Glasgow, and now Western Michigan University. His research interests revolve around data-driven knowledge discovery and aspects of machine intelligence, such as learning for classification and knowledge representation and reasoning. His scientific contributions include two books, fourteen book sections/chapters, two international patents, and 213 papers in reputable journals and conference proceedings. Leading journals that carry his work include IEEE T-KDE, IEEE T-ITBiomed, IEEE T-MM, IEEE T-Evolutionary Computing, IEEE T-Affective Computing, IEEE T-II, and a few other IEEE Transactions titles. He has served on several journal editorial boards and numerous conference committees. Dr. Fong holds four degrees in EE and CS. He is a registered Chartered Engineer and European Engineer.

Speech Title: Building a Customizable Toolkit for Natural Language Processing

Abstract: From smart homes to smart cities, and from autonomous vehicles to multilingual translators, artificial intelligence (AI) is increasingly becoming integrated into human society. Natural language processing (NLP) is an important application of AI. The ability of machines to understand human commands and be understood by human users is vital in ensuring successful deployments of smart X. NLP can serve as an enabler of human-centric communication between human users and intelligent machines. This talk begins with a review of the recent developments in a branch of AI that concerns machine learning (ML) for NLP. The most promising methods are assembled into a customizable toolkit that can potentially be applied to multiple NLP tasks. The talk will highlight experiments conducted to evaluate the effectiveness of the toolkit when it was applied to two increasingly difficult NLP tasks. Using a benchmark dataset, we found that it was possible to achieve near-human levels of performance using the toolkit.



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Meeting Link: <https://us02web.zoom.us/j/88570882025>

Time: 14:00-17:30, December 8, 2022, Singapore Time

Session Chair: Associate professor Lili Nurliyana Abdullah, University Putra Malaysia, Malaysia

Polynomial Phase Signal-Based Modulation for Downlink NOMA

Xing Hao, Eli Hwang, Guillermo E. Atkin

Presenter: Xing Hao, Illinois Institute of Technology

CA3207

14:00-14:15

Abstract: In this paper, we present a new modulation scheme based on polynomial phase signals (PPS) for non-orthogonal multiple-access (NOMA) transceivers. The PPS leading to outstanding spectral efficiency are exploited to modulate the signal of users in the NOMA system. The demodulation procedure is performed by High-Order Ambiguity Function (HAF)-based successive interference cancellation (SIC). The performance evaluation, such as bit error rate (BER) and peak-to-average power ratio (PAPR) analysis of our new NOMA technique, is also demonstrated in this paper. Simulation results illustrate that the proposed scheme has the capability to increase the BER performance while suppressing the peak-to-average-power ratio (PAPR) compared to the traditional OFDM-based NOMA system or other existing modulation schemes.

A 160 GBaud PAM-4 Analog Multiplexer in 0.13 μ m SiGe BiCMOS technology

Chao Guo, Yingmei Chen, Yinghao Chen, Wentian Fan, En Zhu, Zhengfei Hu

Presenter: Chao Guo, Southeast University, China

CA3309

14:15-14:30

Abstract: This article presents a 2:1 analog multiplexer (AMUX) for a digital preprocessed analog-multiplexed digital-to-analog converter (DP-AM-DAC) in optical transmitter, which can generate a 160 GBaud (320 Gb/s) four-level pulse-amplitude modulation (PAM-4) signal. The AMUX was designed in 0.13 μ m BiCMOS technology that contains bipolar devices based on SiGe:C NPN-heterojunction bipolar transistor's (HBT's) with up to 300 GHz transient frequency and 500 GHz oscillation frequency. The AMUX with fully differential configurations, consisting of two data input buffers, a three-stage polyphase filter, two clock input buffers, an AMUX core, and an output buffer, occupies an area of 1.143 \times 1.078 mm² and



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consumes 1.52-W from 5 V and 6 V supplies. This AMUX could meet the requirements of the 160 GBaud class systems by using the SiGe BiCMOS technology that has low cost and can be integrated with CMOS compared with the InP HBT-designed AMUX.

The Relationship Between Time Reversal and Multipath

Zhaoming Zhang, Bo Zhao, Yang Sun, Wanli Lu, Wenjing Zhao

Presenter: Xi'an Modern Control Technology Research Institute, China

CA4018

14:30-14:45

Abstract: Time reversal (TR), as an effective technique of multipath utilization, has been applied to radar signal processing. However, due to the complex and changeable multipath environment, there is no quantitative analysis of multipath channels and TR echo. In this paper, we construct a typical multipath signal model and further study the time reversal echo on this basis. Subsequently, the relationship between the number of multiple propagation paths and the TR echo is analyzed. The results demonstrate the efficiency of TR technology for multipath utilization and applicable scenarios, which provides a basis for popularizing the application of TR technology.

People Detection and Tracking Using Ground LiDAR

Marino Matsuba, Masafumi Hashimoto, Kazuhiko Takahashi

Presenter: Masafumi Hashimoto, Doshisha University, Japan

CA3102

14:45-15:00

Abstract: People detection and tracking are crucial issues in various fields, such as surveillance, security, and intelligent transportation systems. This paper presents a people detection and tracking method using light detection and ranging (LiDAR) set in an environment. People detection is achieved using a one-dimensional convolutional neural network (1D-CNN) together with the background subtraction method. Regions of interest are detected based on the background subtraction method, and people are detected in those regions using 1D-CNN. The detected people are tracked using the interacting multimodel estimator; people positions, velocities, and behaviors, such as stopping, walking, and suddenly rushing out, are estimated. Simulation and real-world experiments are conducted using a Velodyne 32-layer LiDAR. The experimental results show that the people tracker conjunction with people detection using both the 1D-CNN and background subtraction method enables accurate multiperson tracking.

A 56Gbaud PAM-4 Linear Driver for Mach-Zehnder Modulators in 90-nm SiGe BICMOS Technology

Wentian Fan, Yingmei Chen, Haojie Cui, Chao Guo, En Zhu, Zhengfei Hu

Presenter: Wentian Fan, Southeast University, China

CA3411

15:00-15:15

Abstract: This paper presents a 4-level pulse amplitude modulation (PAM-4) linear driver for Mach-Zehnder Modulators (MZM) in 90-nm SiGe



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BiCMOS technology. The transmission line was employed in the input and output wiring to reduce the transmission loss of the high-speed signal. In addition, by adopting coupled inductor peaking technology and continuous time linear equalizer (CLTE), the bandwidth of system reaches 42.1 GHz. The drive output stage of the system uses single emitter follower push pull (SEFPP) structure to achieve large output swing. Post-simulation results show that the MZMdriver can deliver a differential output signal of 3.6 Vpp when inputting 56Gbaud PAM-4 signal of 300-900 mVppd, and the total harmonic distortion (THD) is 2.7%. The driver works under a 5 V supply with a power consumption equal to 905 mW. The physical layout occupies an area of 0.96×1.1 mm².

Complete Operating Deflection Shapes for an Excited Workpiece in Thermal Environments via an Improved Continuously Scanning Laser Doppler Vibrometer with a two-dimensional Scan Scheme

Yuhao Hu, Yatao Kang, Kaiping Yu, Weidong Zhu

Presenter: Yuhao Hu, Nanyang Technology University, Singapore

CA3412

15:15-15:30

Abstract: It is significant to optimize the efficiency and accuracy of operational modal analysis (OMA) in extreme operation. Modal parameters in thermal environments, especially complete operating deflection shapes (ODSs), was first reconstructed through an improved continuously scanning laser Doppler vibrometer (CSLDV) with a two-dimension scan (2D-S) scheme (CSLDV 2D-S) system. Before this work, the manual-moving laser Doppler vibrometer, which replaced heat resistant accelerometers, was used in thermal vibrational measurements to extract only a few dozens of measured points across the grid. Compared with a manual-moving laser Doppler vibrometer in thermal vibrational measurements, the CSLDV is able to sweep its laser spot along a scan path on the surface of a workpiece. An improved CSLDV 2D-S system is able to measure thousands of vibration points in a few seconds and reconstitute precise multi-ODSs through the demodulation method and arranging each single ODS according to the position of scan paths on the measured workpiece. Therefore, the complete ODSs can be meshed after interpolation, instead of rough mode shapes formed by the LDV.

15:30-15:45

Short Break

Liver and Tumor Segmentation in Selective Internal Radiation Therapy 99mTc-MAA SPECT/CT Images using MANet and Histogram Adjustment

CA3416

Sukanya Saeku, Nut Noipinit, Kitiwat Khamwan, Punnarai Siricharoen

Presenter: SUKANYA SAEKU, Chulalongkorn University, Thailand

15:45-16:00

Abstract: Selective Internal Radiation Therapy (SIRT) is a widely used radioembolization method for treating primary liver cancer and malignant neoplasms in the liver. Tumor-Liver ratio (TLR) is an important dosimetric parameter for SIRT treatment using 90Y-microspheres. TLR can be calculated from liver and tumor segmentation attained from 99mTc-MAA SPECT/CT. In this study, we propose Multi-Scale Attention U-Net

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(MANet) and histogram adjustment for accurate liver and tumor segmentation of CT and fused SPECT/CT images, respectively. MANet introduces the multi-scale strategy network to learn and fuse various semantic features from different scales. Histogram adjustment is used for handle normal and abnormal histogram distribution. Noisy-Student pre-trained weights which is learned from noisy images by data augmentation is used in our work. This pre-trained model helps generalize our model and improve overall segmentation performance. 3DIRCADb-01 public dataset is used along with our MAA CT images collected from King Chulalongkorn Memorial Hospital (KCMH) for liver segmentation, and MAA SPECT/CT dataset is used for tumor segmentation. Our proposed method can accurately segment liver, and tumor with DSC of 0.87, 0.65 and IoU of 0.82 and 0.54 respectively.

Research on denoising method of mud pulse signal based on adaptive coefficient Kalman

Zhao Xueyang, Ren Xuhu, Yan Zhidan, Wang Hanlin

Presenter: Zhao Xueyang, China University of Petroleum (East China), China

CA4019

16:00-16:15

Abstract: The surface mud pressure pulse signal based on the Measurement While Drilling (MWD) system is interfered with by pump noise and random noise. Even the pump noise not only completely covers the useful pulse signal in the time domain but also exists band aliasing with the useful pulse signal in the frequency domain. To solve this problem, this paper presents a combined denoising method for the mud pulse signal of the single sensor MWD. Based on the characteristics of solid pump noise, a state space model of pump noise (linear time-invariant model) is established. The Kalman filter based on the adaptive coefficient is used to reconstruct and filter the pump noise. And the residual random noise after pump noise is filtered by the stochastic resonance principle. At the same time, the positive pulse signals of several different SNR muds containing noise under an unsteady pump noise state are simulated, and the noise suppression ability of the scheme is analyzed and evaluated. The results show that the proposed scheme can suppress or even remove the unsteady pump noise in the original signal, and the signal-to-noise ratio can be increased by about 5-24 dB.

Adversarial Detection Using Feature Prediction Networks

Kyoungchan Park, Seungwan Seo, Jaehyuk Heo, YongGi Jeong, Pilsung Kang

Presenter: KYOUNGCHAN PARK, Korea University, Korea

CA37-A

16:15-16:30

Abstract: Deep Neural Networks (DNNs)-based models can be completely neutralized by an adversarial attack. We observed that adversarial examples inevitably distort hidden layer features in the process of damaging the final classification result of DNNs, this paper introduces a new adversarial detection method using a Feature Prediction Networks (FPN), which can estimate the size of distortion in hidden layer features. In addition, to improve the detection performance of FPN, we also propose a training method called Adversarial Augmentation Training. Our study reveals the effectiveness of the method we propose by using the representative image classification benchmark data sets: CIFAR10 and CIFAR100. The experiment result shows that the proposed method exhibits superior adversarial detection performance compared to other models for various



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adversarial attack methods. Notably, the FPN demonstrates its superiority by recording high detection performance for transfer attacks and low confidence attacks that often degrade the performance of adversarial detection. Furthermore, we demonstrated that the FPN shows high detection performance in a white-box attack that assumes an attacker knows the information of the detection mechanism.

Content Moderation in Social Media: The Characteristics, Degree, and Efficiency of User Engagement

Kanlun Wang, Zhe Fu, Lina Zhou, Yunqin Zhu

Presenter: Zhe Fu, The University of North Carolina at Charlotte, USA

CA38

16:30-16:45

Abstract: Social media emerge as common platforms for knowledge sharing/exchange in online communities. Meanwhile, they also become a hotbed for the diffusion of misinformation. Content moderation is one of the measures for preventing the distribution of misinformation. Despite the increasing research attention to content moderation, the role of user engagement in content moderation remains significantly understudied. It is unclear how different characteristics and degrees of user engagement in social media might impact the performance of content moderation. In addition, the efficiency of content moderation has not been addressed by prior studies. This study aims to fill these research gaps by investigating the characteristics of user engagement behavior in social media and developing automated models to support content moderation that leverage a state-of-the-art pre-trained model for text analysis. The evaluation results with Reddit data suggest that the directivity and temporal characteristics of user engagement have significant effects on the effectiveness of content moderation. Additionally, leveraging the entire history of user engagement tends to be inefficient or even impractical, yet our findings provide evidence and a guide for improving the efficiency of content moderation using user engagement data without compromising model effectiveness. Our findings have research and practical implications for the moderation and deterrence of misinformation in social media.

Integration of Machine Learning Methods into Agent-based Simulations for Predicting Evacuation Time in Disaster Scenarios

Mina Abadeer, Fady Ebeid, and Sergei Gorlatch

Presenter: Fady Ebeid, Arab Academy for Science and Technology and Maritime Transport, Egypt. Mina Abadeer, University of Muenster, Germany

CA03

16:45-17:00

Abstract: The behavior of people during an evacuation may have a significant impact on evacuation time, so it has been extensively studied using agent-based simulations. This paper aims to use machine learning for predicting agent evacuation time faster in advance, rather than waiting the entire simulation time. We use the well-known machine-learning polynomial regression as our prediction model, and linear regression and decision tree regression as our benchmark models. In order to generate a suitable dataset for training and validating our models, we automate the scenario-creation process from a single template scenario and the simulation output extraction process in the Vadere simulation framework. Our simulation experiments are carried out using the structure plan of the University of Münster's administrative building, with up to 100 agents located in a source room as individuals and in groups, attempting to find the shortest path to an exit. We significantly improve evacuation



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prediction using machine learning regression models in agent-based simulation experiments. Our polynomial regression model can predict evacuation time before the simulation begins, and the prediction results are close to the simulation results, with an average R^2 score of 84\%.

Graph Convolutional Network-based Fashion Item Recommendation

Jungho Lee, Pilsung Kang

Presenter: Jungho Lee, Korea university, Korea

CA36-A

17:00-17:15

Abstract: Fashion item recommendation is a task that recommends other items suitable for a specific fashion item given in the form of an image. Fashion images have hierarchical features with detail categories, such as length and fit, in addition to clothing categories, such as tops and bottoms. A recommendation system based on a method of simply extracting features of an image does not reflect such hierarchical features. For this reason, similarity search through simple image feature extraction is not suitable for fashion image recommendation. In this paper, we propose a recommendation method using a graph neural network that has recently been showing excellent performance in various fields. The proposed methodology learns by using not only the extracted image features, but also the structural relationships of each image. For the structural relationship of images, a graph is constructed using category information of the corresponding images. As a result of the experiment, the performance of the recommendation through the proposed method was quantitatively and qualitatively evaluated, demonstrating that the proposed method was superior to the methods proposed in previous studies.

Research on the interactive design of mobile reading APP payment promotion based on hooked model--taking the iReader as an example

Xiao Yu Zhuang, Jian Tan, Peng Fei Cao

Presenter: Xiao Yu Zhuang, Beijing University of Posts and Telecommunications, China

CA31

17:15-17:30

Abstract: With the development of mobile Internet application services, the proportion of mobile reading in digital reading is increasing. The payment model is an important economic factor in the operation of mobile reading APPs and the maintenance of user experience. Aiming at the low actual payment rate of users in the current mobile reading APP, the method of improving mobile reading APP payment is studied, from the perspective of the interactive design. Firstly, the product design model - hooked theory is introduced to derive the mapping relationship between mobile reading and hooked model. Secondly, taking the iReader as an example, starting from the theory of trigger, action, changeable reward and investment of the hooked model, the corresponding payment promotion interaction design strategy is proposed respectively. Finally, A/B test method is conducted on the versions before and after the improvement through the actual online operation, and the effectiveness of the design strategy on the payment promotion of mobile reading APP is verified.



Thank you

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