2019 Annual Report (June 2018 – May 2019)
Multimedia Systems and Applications Technical Committee
IEEE Circuits and Systems Society

Chairman: Dr. Shao-Yi Chien
Secretary: Dr. Samson Cheung

1. TC Activities June 2018 – May 2019:

1.1. New Election Results

- ICME steering committee members: Junsong Yuan, Ce Zhu
- New members (term: 2019/9~2023/8):

1.2. Subcommittees (not updated)

- TC by-law/P&P sub-committee: Zicheng Liu (Chair), Yen-Kuang Chen, Chia-Wen Lin, Samson Cheung, Joern Ostermann, Anthony Vetro, Yap-Peng Tan
- Technical vision sub-committee: Jian Zhang (Chair), Yen-Kuang Chen, Shao-Yi Chien, JongWon Kim, Yong Rui, Wenjun Zeng
- Membership and election sub-committee: Wenjun Zeng (Chair), Yap-Peng Tan, , Enrico Magli, Ying Li
- Award and nomination sub-committee: Anthony Vetro, Ming-Ting Sun, Ling Guan, Homer Chen, and Pascal Frossard, Jorn
- T-MM Subcommittee: Ching-Yung Lin (Chair), C.-C. Jay Kuo, Ming-Ting Sun, Yong Rui, Moncef Gabbouj, Anthony Vetro, Pascal Frossard, Wenjun Zeng, Yen-Kuang Chen, Zicheng Liu, Chia-Wen Lin
- On-line community sub-committee: Chia-Wen Lin (Chair), …
- Promotional activities sub-committee: Samson Cheung (Chair),
  - Webminar
  - Special session
  - News letter

2. Technical Committee Meetings:

The Multimedia Systems and Applications Technical Committee in the IEEE Circuits and Systems Society annually organized two TC meetings, which were held in ISCAS and ICME. The details of TC Meetings are enlisted in the following:

2.1. Upcoming TC Meeting in ISCAS 2019
Date: 27 May
Time: 12:00--13:15
Location: Sapporo Convention Center, Room 2
Chairman: Shao-Yi Chien
Secretary: Samson Cheung

3. Members submitted Annual Reports:

First Name	Last Name	Affiliation	Email
Shao-Yi	Chien	National Taiwan University, Taiwan	sychien@ntu.edu.tw
Tao	Mei	AI Research, JD.COM	tmei@live.com
Ichiro	Ide	Nagoya University, Japan	ide@i.nagoya-u.ac.jp
Enrico	Magli	Politecnico di Torino	enrico.magli@polito.it

Ngai-Man	Cheung	Singapore University of Technology and Design	ngaiman_cheung@sutd.edu.sg
Chang-Su	Kim	Korea University, Korea	changsukim@korea.ac.kr
Jingjing	Meng	SUNY Buffalo	jmeng2@buffalo.edu
Samson	Cheung	University of California, Davis and University of Kentucky	sccheung@ieee.org
Nam	Ling	Santa Clara University	nling@scu.edu
Lei	Zhang	Microsoft	leizhang@microsoft.com
Jie	Liang	Simon Fraser University	jiel@sfu.ca
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Weisi	Lin	Nanyang Technological University	WSLin@ntu.edu.sg
Xiao-Ping	Zhang	Ryerson University	xzhang@ee.ryerson.ca
Pau-Choo	Chung	National Cheng Kung University, Taiwan	pcchung@ee.ncku.edu.tw
Tian Sheuan	Chang	National Chiao Tung University	tschang@g2.nctu.edu.tw
Iraklis	Anagnostopoulos	Southern Illinois University	iraklis.anagno@siu.edu
Wenjun	Zeng	Microsoft Research Asia	wezeng@microsoft.com
Chris Gwo Giun	Lee	National Cheng Kung University	clee@mail.ncku.edu.tw
Yong	Rui	Lenovo	yongrui@lenovo.com
Weiyao	Lin	Shanghai Jiao Tong University	wylin@sjtu.edu.cn
Nicu	Sebe	University of Trento	sebe@disi.unitn.it
Junsong	Yuan	University at Buffalo	jsyuan@buffalo.edu
Mladen	Berekovic	TU Braunschweig	berekovic@c3e.cs.tu-bs.de

4. Accomplished Technical Activities (June 2018 to May 2019)

Conference organizations:

- ISCAS 2019: Shao-Yi Chien, Samson Cheung, Jianfei Cai (Track Co-chair), Chris Gwo Giun Lee, (Industry Forum Co-orgnanizer)
- ICME 2018: Wenjun Zeng (General Co-Chair), Junsong Yuan (TPC Co-chair), Ngai-Man Cheung (area chair), Samson Cheung (area chair), Lei Zhang (area chair), Marta Mrak (Area Chair), Yap-Peng Tan (Technical Program Co-Chair), Ivan Bajic (Area Chair)
- AICAS 2019: Shao-Yi Chien (TPC Co-chair), Yen-Kuang Chen (Plenary Co-chair), Zicheng Liu (Plenary Co-chair), Chris Gwo Giun Lee (Special Session Chair)
- VCIP 2018: Ichiro Ide (Demo Co-chair), Enrico Magli (RCM), Jiaying Liu (Publicity Co-Chair), Ivan Bajic (Area Chair)
- ISM 2018: Ichiro Ide (Workshop Co-chair), Ivan Bajic (Publicity Co-Chair)
- ICME 2019: Enrico Magli (special sessions co-chair), Ngai-Man Cheung (area chair), Marta Mrak (Technical Program Committee Lead Chair), Jiaying Liu (Grand Challenge Co-Chair), Yong Rui (Multimedia Star Innovator Award Review Committee Member), Weiyao Lin (Student program chair)
- ICASSP 2019: Enrico Magli (track chair), Samson Cheung (area chair)

- ICIP 2018: Enrico Magli (area chair), Xiao-Ping Zhang (area chair), Xiao-Ping Zhang (International Liaisons)
- VCIP 2019: Jiaying Liu (Technical Program Co-Chair)
- ICIP 2019: Ngai-Man Cheung (area chair), Samson Cheung (area chair), Lei Zhang (area chair), Yap-Peng Tan (Technical Program Co-Chair), Jiaying Liu (Publicity Co-Chair), Ivan Bajic (Area Chair), Weisi Lin (Area Chair),   Xiao-Ping Zhang (Area Chair)
- MMSP 2018: Samson Cheung (area chair), Jie Liang (Publication Chair), Ivan Bajic (TPC Co-Chair)
- Umedia 2018: Nam Ling (General Co-Chair)
- SiPS 2018: Nam Ling (Special Session Co-organizer)
- CVPR 2019: Zicheng Liu (area chair)
- ICCV 2019: Jiaying Liu (area chair)
- GlobalSIP2019: Xiao-Ping Zhang (General Co-chair)
- IPSN2019: Xiao-Ping Zhang (IEEE Signal Processing Society Liaison)
- ICMR2019: Xiao-Ping Zhang (Demonstrations Chair)
- ACM MM 2017: Yong Rui (Publicity Co-chair)
- ACM MM2018: Xiao-Ping Zhang (Area Chair)
- AAAI 2019: Yong Rui (Program Committee Member)
- MMChina 2019: Yong Rui (Steering Committee Member)

IEEE and Other Journal Editorships:

- IEEE Transactions on Multimedia: EiC: Wenwu Zhu; Steering committee member: Shao-Yi Chien; AEs: Chang-Su Kim, Samson Cheung, Lei Zhang, Marta Mrak, Yap-Peng Tan
- IEEE Multimedia Magazine: AE:
- IEEE Transactions on Circuits & Systems for Video Technology: EiC: Shipeng Li; Deputy EiC: Feng Wu; AEs: Tao Mei, Enrico Magli, Jingjing Meng, Lei Zhang, Jie Liang, Yap-Peng Tan, Weisi Lin, Weiyao Lin, Junsong Yuan
- IEEE Transactions on Image Processing: AEs: Tao Mei, Samson Cheung, Jie Liang, Marta Mrak, Weisi Lin, Xiao-Ping Zhang
- IEEE Transactions on Signal Processing: Xiao-Ping Zhang (Senior Area Editor), Chris Gwo Giun Lee (AE)
- Multimedia Systems: AE: Ichiro Ide, Lei Zhang, Weisi Lin
- IEEE Access: (Special Issue) Guest Editor: Nam Ling; AE: Yap-Peng Tan
- Signal Processing Image Communication, AEs: Marta Mrak, Ivan Bajic
- IEEE JSTSP Special Issue on Perception-Driven 360-Degree Video Processing, Guest Editor: Marta Mrak
- Journal of Visual Communication and Image Representation: Jay Kuo, Ming-Ting Sun (Editors Emeriti), Zicheng Liu (EiC), Junsong Yuan (Senior Area Editor), Chia-Wen Lin (AE), Ying Li (AE)
- International Journal of Multimedia Information Retrieval: Ying Li (AE)
- IEEE Signal Processing Magazine, AEs: Ivan Bajic
- IEEE Transactions on Biomedical Circuits and Systems: Pau-Choo Chung (AE)
- IEEE Transactions on Intelligent Transportation Systems: AEs: Weiyao Lin
- International Journal of Computer Vision: Wenjun Zeng (AE)
- Journal of Signal Processing Systems: Chris Gwo Giun Lee (AE)
- ACM TOMM: AE: Yong Rui

Distinguished Lecturer:

- Distinguished Lecturer of the IEEE Circuit and System Society: Chia-Wen Lin (2018--2019)
- Distinguished Lecturer of the IEEE Circuit and System Society: Chris Gwo Giun Lee (2019--2020)

Keynote/Tutorial Speeches:

- Enrico Magli, "Deep learning: a great fit for onboard data processing?", 2018 Onboard Payload Data Compression Workshop, Matera, Italy, Sept. 2018.
- Yen-Kuang Chen "Challenges and Opportunities of CAS on IoT" at IEEE CASS Seasonal School 2018 on Enabling CAS Technologies for Industrial IoT at the Core of Industry 4.0
- Pau-Choo Chung, "Deep Learning Networks for Medical Image Analysis: Its past, Future and Issues," Keynote Speech, IEEE International Conference on Consumer Electronics-Taiwan (2018 ICCE-TW)
- Chris Gwo Giun Lee, IEEE SiPS Tutorial, "Algorithm/Architecture Co-design for Smart Signals and Systems in Cognitive Cloud/Edge," Oct. 23rd, 2018
- Junsong Yuan, Towards More Intelligent Machines: Understanding Human Behaviours with 2D and 3D Sensors, ICIMCS, 2018

Other IEEE services (e.g., CAS BoG, Region presidents, VP, …) :

- CAS BoG: Yen-Kuang Chen
- Award review committee member of 2019 IEEE CASS Industrial Pioneer Award Subcommittee: Yen-Kuang Chen
- SPS Technical Directions Board member: Marta Mrak
- MMSP TC: Marta Mrak (elected member 2018, vice chair 2019), Xiao-Ping Zhang (Elected Member)
- SIG IoT: Yen-Kuang Chen (SIG chair)
- ICME Steering Committee: Yap-Peng Tan (Chair, 2018-19), Xiao-Ping Zhang (Member)
- Sensor Array and Multichannel Signal Processing Technical Committee (SAM TC), IEEE Signal Processing Society: Xiao-Ping Zhang (Elected Member)
- Signal Processing Theory and Methods Technical Committee (SPTM TC), IEEE Signal Processing Society: Xiao-Ping Zhang (Elected Member)
- Visual Signal Processing and Communications Technical Committee (VSPC TC), IEEE Circuits and System Society: Xiao-Ping Zhang (Elected Member)
- Image, Video, and Multidimensional Signal Processing Technical Committee (IVMSP TC), IEEE Signal Processing Society: Xiao-Ping Zhang (Elected Member)
- IEEE CAS Sensory Systems Technical Committee: Iraklis Anagnostopoulos (Elected member).
- 2019 IEEE Jack S. Kilby Signal Processing Medal Committee: Wenjun Zeng (Member)Yong
- IEEE Region 10 ExCom, Industry Relation Committee: Chris Gwo Giun Lee (Chair, 2019-present)
- IEEE Life Science Technical Community: Chris Gwo Giun Lee (BoG Member, 2018-present)
- Technical Activities, IEEE Tainan Section: Chris Gwo Giun Lee (Vice Chair, 2018-present)
- IEEE Member & Geographic Activities, Member Benefit Portfolio Committee: Chris Gwo Giun Lee (Member, 2018-2019)
- IEEE Region 10 ExCom, Individual Benefits & Services Committee: Chris Gwo Giun Lee (Chair, 2017-2018)
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Awards and Honors (e.g., Fellow, best paper awards, outstanding services, etc…):

- New IEEE Fellow (Class of 2019) : Lee-Sup Kim, Tao Mei, Yap-Peng Tan, Cha Zhang
- the 2nd place of NVIDIA AI City Challenge in CVPR 2018: Shao-Yi Chien
- Minjiang Scholar (Chair Professor category): Nam Ling.
- Honorary Professor at Queen Mary University of London: Marta Mrak
- Industrial Distinguished Leader Award, 2018, APSIPA: Wenjun Zeng
- Second place winner, the 6th Visual Object Tracking Challenge VOT2018 (http://www.votchallenge.net/vot2018/) "real-time" tracker challenge: Wenjun Zeng
- Outstanding Technology Transfer Award Ministry of Science and Technology 2018, Taiwan
- ACM SIGMM 2018 Technical Achievement Award : Yong Rui
- Outstanding Area Chair award of ICME 2018: Weiyao Lin
- Junsong Yuan, IAPR Fellow

Upcoming Event and Future Conference Activities

- ICME 2018: C.-C. Jay Kuo, Wenjun Zeng (General Chair), Yap-Peng Tan, Junsong Yuan (Technical Program Co-Chair)
- ICME 2019: Tao Mei, Feng Wu (General Chair), Lei Zhang (TPC Co-chair), Junsong Yuan (sponsor co-chair)
- ISM 2019: Ichiro Ide (Program Co-chair)
- Umedia 2019: Nam Ling (General Co-Chair)
- ICME 2020: Marta Mrak (General Co-Chair)
- VCIP 2019: Marta Mrak (Industry Liaison Co-chair), Jiaying Liu (Technical Program Co-Chair)
- ICIP 2019, Zicheng Liu (Tutorial), Chia-Wen Lin, Yap-Peng Tan (Technical Program Co-Chair)
- IEEE VCIP 2019: Chris Gwo Giun Lee (Industry Chair)
- IEEE TENCON 2019: Chris Gwo Giun Lee (Special Industry Track Chair)
- ICASSP2021:   Xiao-Ping Zhang (General Co-Chair)

5. TC Significant Activities List

[Please list your 2 (or less) most significant activities in the past year (March 2018--May 2019), including paper, special session, special issue, workshop, conference, award, important position, etc. Please specially highlight those major activities that could be interesting to other TCs or cross-TC activities.]

- **Shao-Yi Chien**

    [Paper] Wei-Chih Tu; Ming-Yu Liu, Varun Jampani, Deqing Sun, Shao-Yi Chien, Ming-Hsuan Yang, and Jan Kautz, "Learning Superpixels with Segmentation-Aware Affinity Loss," *Proc. the 29th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2018, Sault Lake City, USA.
    50-word summary: In this work, we leverage deep neural networks to facilitate extracting superpixels from images. We propose a segmentation-aware affinity learning approach for superpixel segmentation. The proposed algorithm based on the learned segmentation-aware loss performs favorably against the state-of-the-art methods.

    [Award] Chih-Wei Wu, Chih-Ting Liu, Cheng-En Chiang, Wei-Chih Tu, Shao-Yi Chien, the 2nd place of NVIDIA AI City Challenge in CVPR 2018
    50-word summary: Vehicle re-identification (Re-ID) is fundamentally challenging due to the difficulties in data labeling, visual domain mismatch between datasets and diverse appearance of the same vehicle. We propose the adaptive feature learning technique based on the space-time prior to address these issues. We then develop a vehicle Re-ID system based on the learned vehicle feature extractor. Our meticulous system design leads to the second place in the 2018 NVIDIA AI City Challenge Track 3.

- Tao Mei

    [ACM Multimedia 2018] Tao organized ACM Multimedia 2018 as a Lead TPC Chair in Seoul, Korea, Oct 2018.

- **Ichiro Ide**

    [Paper] M.A. Kastner, I. Ide, Y. Kawanishi, T. Hirayama, D. Deguchi, and H. Murase, "Estimating the visual variety of concepts by referring to Web popularity", Multimedia Tools and Applications, Published online in Aug. 2018.
    50-word summary: In this paper, a method to measure the visual variety of concepts is proposed to quantify the semantic gap between vision and language. For this, an image corpus is recomposed using ImageNet and Web data. Web-based metrics for measuring the popularity of sub-concepts are used as a weighting to ensure that the image composition in a dataset is as natural as possible. Using clustering methods, a score describing the visual variety of each concept is determined. A crowd-sourced survey is conducted to create ground-truth values applicable for this research. The evaluations show that the recomposed image corpus largely improves the measured variety compared to previous datasets.

    [Conference] 8th ACM Int. Conf. on Multimedia Retrieval (ICMR2018)

50-word summary: Organized the 8th ACM Int. Conf. on Multimedia Retrieval (ICMR2018), which is one of the top-level conferences in the multimedia field in Yokohama, Japan. I contributed to the organization of this conference as the Organization chair, which involved solutions to various logistics issues. The conference attracted more than 220 participants, approximately 50% increase than the past conferences of the series.

- **Ngai-Man Cheung**

[Paper] NT Tran, DK Le Tan, AD Doan, TT Do, TA Bui, M Tan, NM Cheung, "On-Device Scalable Image-Based Localization via Prioritized Cascade Search and Fast One-Many RANSAC." IEEE Transactions on Image Processing 2018.

We present the design of an entire on-device system for large-scale urban localization using images. The proposed design integrates compact image retrieval and 2D-3D correspondence search to estimate the location in extensive city regions. We propose a new hashing-based cascade search for fast computation of 2D-3D correspondences. In addition, we propose a new one-many RANSAC for accurate pose estimation. The new one-many RANSAC addresses the challenge of repetitive building structures (e.g. windows and balconies) in urban localization.

[Paper] Yiluan Guo, Ngai-Man Cheung, "Efficient and Deep Person Re-Identification using Multi-Level Similarity," in Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR-18).

To address Person Re-Identification (ReID), we propose an efficient, end-to-end fully convolutional Siamese network that computes the similarities at multiple levels. We demonstrate that multi-level similarity can improve the accuracy considerably using low-complexity network structures in ReID problem.

- **Chang-Su Kim**

[Paper] Minhyeok Heo, Jaehan Lee, Han-Ul Kim, and Chang-Su Kim, "Monocular depth estimation using whole strip masking and reliability-based refinement," in Proc. ECCV, Munich, Germany, Sep. 2018.

A single-image depth reconstruction algorithm was proposed in this paper, based on the whole strip masing. It exploits the tendency that most depths in indoor images are vertically or horizontally flat, and provides competitive 3D reconstruction performance.

[Paper] Yeong Jun Koh, Young-Yoon Lee, and Chang-Su Kim, "Sequential clique optimization for video object segmentation," in Proc. ECCV, Munich, Germany, Sep. 2018.

A novel algorithm to segment out objects in a video sequence is proposed in this work. We formulated the problem as finding the maximal weight clique in a complete k-partite graph, which is NP hard. Therefore, we developed the sequential clique optimization (SCO) technique to efficiently determine cliques. Experimental results show that the proposed algorithm significantly outperforms the state-of-the-art video object segmentation and video salient object detection algorithms.

[Paper] Jae-Han Lee, Minhyeok Heo, Kyung-Rae Kim, and Chang-Su Kim, "Single-image depth estimation based on Fourier domain analysis," in Proc. CVPR, Salt Lake City, Utah, June. 2018.

Another single-image depth reconstruction algorithm was proposed in this paper. We generate multiple depth map candidates by cropping input images. A cropped image with a small ratio yields depth details faithfully, while that with a large ratio provides the overall depth distribution reliably. To exploit these complementary properties, we combine the multiple candidates in the frequency domain. Experimental results demonstrate that proposed algorithm provides the state-of-art performance.

- **Jingjing Meng**

[Paper] Tan Yu, Jingjing Meng, and Junsong Yuan, "Multi-view Harmonized Bilinear Network for 3D Object Recognition", in Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018 (Spotlight)

We propose an end-to-end framework, Multi-view Harmonized Bilinear Network (MHBN), which obtains an effective 3D object representation by aggregating local convolutional features through bilinear pooling. Different components in the bilinear feature are harmonized to increase its discriminative power. Experiments on benchmark datasets demonstrate its efficacy in 3D object recognition.

[Paper] Jiaqi Zhang, Zhenzhen Wang, Jingjing Meng, Yap-Peng Tan, and Junsong Yuan, "Boosting Positive and
Unlabeled Learning for Anomaly Detection With Multi-Features", in IEEE Transactions on Multimedia (T-MM),
2019.

We formulate anomaly detection as a semi-supervised Positive and Unlabeled (PU) learning problem , where only labeled positive (normal) data and unlabeled (normal and anomaly) data are required for learning an anomaly detector. It does not require labeled anomaly data for training, thus can be easily deployed to various applications.

- Samson Cheung

[Award] Automated Detection of Eye Gaze in Infancy to Quantify Risk for ASD - first prize winner in the University of California Davis' seed grant competition on AI & Healthcare

In the campus-wide AI-in-Health competition, our team (Sally Ozonoff and Samson Cheung) won first place out of five finalists among a total of 26 submissions. The proposal is on the development and validation of automated methods for assessing social behaviors through eye gaze measurement in young children. The goal is to facilitate early detection of autism spectrum disorder (ASD) in which declining frequency of eye contact have been demonstrated to be highly predictive of later diagnosis of ASD.

[Paper] Uzuegbunam, N. M., W.-H. Wong, S.-C. Cheung, L. A. Ruble. 2018. MeBook: combining evidence-based autism intervention with camera-based multimedia systems. IEEE Transactions on Learning Technologies. Oct.-Dec. 2108, Volume 11, Issue 4, pp 520-535.

In this paper, we proposed the MEBook system which incorporated evidence-based approaches including social narrative and positive reinforcement into a depth-based body posture tracking system so that proper greeting behaviors are recognized and immediately reinforced. A multiple-baseline single subject pilot study has been conducted and the preliminary results show that MEBook is potentially effective in teaching greeting behaviors to children with ASD.

- **Lei Zhang**

[Paper] Z. Shou, H. Gao, L. Zhang, K. Miyazawa, S.-F. Chang, "Autoloc: Weaklysupervised temporal action localization in untrimmed videos," European Conference on Computer Vision (ECCV), Sep. 8-10, 2018, Munich, Gemany.

Temporal action localization in untrimmed video is important for many applications. But it is very expensive to annotate action boundaries. We develop a novel weakly-supervised framework to predict the temporal boundary of each action instance. Our method dramatically improves mAP on THUMOS'14 (13.7% to 21.2%) and ActivityNet (7.4% to 27.3%).

[Paper] Q. Huang, P. Zhang, D. Wu, L. Zhang, "Turbo Learning for Captionbot and Drawingbot," Neural Information Processing Systems (NeurIPS), acceptance rate: 20.8% (1011 out of 4856 valid submissions), Dec. 3-8, 2018, Montreal, Canada.

We study the problems of both image captioning and text-to-image generation and present a novel turbo learning approach to jointly training the two problems. This enables semi-supervised learning since the closed loop can provide peudo-labels. Experimental results on COCO demonstrate significantly improved performance on both problems by a large margin.

- **Jie Liang**

[Paper] M. Akbari, J. Liang, J. Han, "DSSLIC: Deep Semantic Segmentation-based Layered Image Compression," 2019 IEEE Inter. Conf. Acoustics, Speech, and Signal Processing (ICASSP), Brighton, UK, May 2019.

We propose a deep semantic segmentation-based layered image compression framework, motivated by the pix2pixHD method. Experimental results show that the proposed framework outperforms the H.265/HEVC-based BPG and other codecs in both PSNR and MS-SSIM metrics across a wide range of bit rates, demonstrating the potential of deep learning for image/video compression.

- **Marta Mrak**

Members of MSA TC provided great support in organisation of ICME 2019. In addition to a notable 20th anniversary, we are pleased to report a record high number of submissions to the conference main track. From more than 1,000 papers submitted to the conference, approx. 30% were accepted (313 papers). The Technical Program Co-chairs recruited 72 Area Chairs who first of all assisted in the recruitment of reviewers to cover 32 distinctive subject areas. This year the selection of subject areas mainly reflected the growing use of machine learning and artificial intelligence in multimedia applications. Out of 32 subject areas, 15 covered various topics of deep learning and artificial intelligence for multimedia, which were then addressed by approx. 1/2 of all submissions. The next most popular topic was Multimedia and Vision, with approx. 1/8 of the submissions to this area. Conference attendees will also have a chance to participate in workshops which are traditionally held in conjunction with ICME. This year we have the pleasure to bring to you 13 workshops, covering recent developments in visual fashion computing, visual emotion analysis and smart-health technologies, among other emerging topics.

- **Zicheng Liu**

[Paper] Yue Wu, Yinpeng Chen, Lijuan Wang, Zicheng Liu, Lu Yuan, Yun Fu, Incremental learning for large scale datasets, CVPR 2019.

We propose a simple yet effective method to address the data imbalance problem in incremental learning. Our method performs remarkably well on two large datasets: ImageNet (1000 classes) and MS-Celeb-1M (10000 classes), outperforming the state-of-the-art algorithms by 11.1% and 13.2% respectively.

- **Jiaying Liu**

[Paper] Rui Qian, Robby Tan, Wenhan Yang, Jiajun Su, and Jiaying Liu. "Attentive Generative Adversarial Network for Raindrop Removal from A Single Image", Proc. of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Salt Lake City, Utah, U.S., June 2018. [Spotlight]

In this work, we propose a visual attention into generative discriminative networks. By injecting this information, the generative network pays more attention to the raindrop regions and the surrounding structures, and the discriminative network can assess the local consistency of the restored regions. Our approach outperforms previous methods quantitatively and qualitatively.

[Award] Ye Yuan, Yueyu Hu, Junru Wu, Wenhan Yang, Xiaoshuai Zhang, Jiaying Liu, Zhangyang Wang. UG2 PRIZE Challenge: Bridging the Gap Between Computational Photography and Visual Recognition, in CVPR 2019.

We achieve the first runner-up award in 2019 UG2 challenge track 2: image enhancement for automatic object recognition. We propose a pipeline consisting of sequentially cascaded visual degradation removal modules to improve automatic machine recognition and design a sample dependent selection model to deploy specific processing for each testing sample.

- **Iraklis Anagnostopoulos**

[Paper] Zois-Gerasimos Tasoulas and Iraklis Anagnostopoulos. Optimizing Performance of GPU Applications with SM Activity Divergence Minimization. In Proceedings of International Conference on Electronics Circuits and Systems (ICECS). IEEE, 2018.

In this work, we paper, we present an allocation method for GPU processing units that improves applications' throughput without sacrificing usage homogeneity among the computing resources of the GPU, and minimizes reliability issues.

[Paper] Ioannis Galanis, Theodoros Marinakis, and Iraklis ANagnostopoulos. Workload-aware Management Targeting Multi-Gateway Internet-of-Things Accepted in IEEE International Conference on Omni-layer Intelligent systems (COINS), 2019.

In this paper, we focus on optimizations of edge computing. Particularly, we propose (1) an intra-gateway methodology to detect and balance application slowdown in terms of local unevenly distributed progress; and (2) a distributed inter-gateway methodology to balance workload among multiple gateways, in order to achieve a global progress threshold.

- **Pau-Choo Chung**

[Paper and device] Chih-Hung Chan, Pau-Choo Chung, Chih-Yang Chen, Chein-Chen Lee, Man-Yee Chan, Tze-Ta Huang, "Texture-Map Based Branch-Collaborative Network for Oral Cancer Detection" accepted by TBioCAS.

50-word summary: We have developed an oral cancer detection system, which based on the autofluorescence images and the embedded analytic tools and deep learning for the detection of oral cancer lesions. For such a device, a branch-collaborative network based on texture map was designed. The device is on clinical trial for the use on daily clinic screening assistance.

- **Wenjun Zeng**

[Conference] ICME 2018 General Co-Chair

[Award] A. He, C. Luo, X. Tian, and W. Zeng, "Towards a Better Match in Siamese Network Based Visual Object Tracker," ECCV 2018 Visual Object Tracking Challenge Workshop VOT2018, Sept. 2018. 2nd place winner, among 72 entries, of VOT2018 (http://www.votchallenge.net/vot2018/) "real-time" tracker challenge.

- **Chris Gwo Giun Lee**

 [Industry Forum] IEEE AICAS 2019 Industry Forum (for YP & WIE).

Title: Influences of EDGE Device's Instant Decision: From Bio-Tech, FinTech to Sustainable Energy & Beyond

Time March 19, 2019 15:00 ~ 16:00

Location: 10F, Ballroom B, Ambassador Hotel, Hsinchu, Taiwan

50-word summary: In view of aging societies, significance of digital economy and global warming, this Industry Forum is organized together with Young Professionals (YP) and Women in Engineering (WIE) within IEEE Circuits and Systems Society with industry leaders, investors, and venture capitalists invited to share their visions on how current state-of-the-art in EDGE/mobile devices, capable of near real-time decisions, may influence our daily life from the perspectives of healthcare, finance, and energy. Upon addressing the pain spots of these industry sectors, internship and potential industry/academia collaboration opportunities upon current Technology 4.0 entrepreneur landscape will also be speculated

[Chair] IEEE Region 10 ExCom, Industry Relation Committee.

Vision: Leadership in bridging industry and academia

Mission: Cross pollinate between industry and academia in fostering innovations, internship and entrepreneurship

50-word summary: In view of the global fast-changing landscape due to Industry 4.0 and with anticipation of aligning Region 10 with IEEE's strategic direction in advancing SMARTECH and HARDTECH for humanity with higher industry involvement, the Industry Relations Committee (IRC) provides a professional networking platform upon which interactive bi-directional industry and academia activities are fostered in servicing IEEE members within Region 10!

- **Weiyao Lin**

[Paper] W. Lin , Y. Mi, J. Wu, K. Lu, H. Xiong, "Action recognition with coarse-to-fine deep feature integration and asynchronous fusion," AAAI Conf. Artificial Intelligence (AAAI), 2018.

50-word summary: Propose a novel deep-based framework for action recognition, which improves the recognition accuracy by: 1) deriving more precise features for representing actions, and 2) reducing the asynchrony between different information streams. We first introduce a coarse-to-fine network which extracts shared deep features at different action class granularities and progressively integrates them to obtain a more accurate feature representation for input actions. We further introduce an asynchronous fusion network. It fuses information from different streams by asynchronously integrating stream-wise features at different time points, hence better leveraging the complementary information in different streams. Experimental results on action recognition benchmarks demonstrate that our approach achieves the state-of-the-art performance.

[Paper] K. Chen, J. Li, W. Lin , J. See, J. Wang, L. Duan, Z. Chen, C. He, J. Zou, "Towards accurate one-stage object detection with AP-loss," IEEE Conf. Computer Vision and Pattern Recognition (CVPR), 2019.

50-word summary: Alleviates the foreground-background class imbalance by proposing a novel framework to replace the classification task in one-stage detectors with a ranking task, and invent the Average-Precision loss (AP-loss) for the ranking problem. The AP-loss cannot be optimized directly due to its non-differentiability and non-convexity. We develop a novel optimization algorithm for this purpose, which seamlessly combines error-driven update scheme in perceptron learning and backpropagation algorithm in deep networks together. We verify good convergence property of the proposed algorithm theoretically and empirically. Experimental results demonstrate notable performance improvement of the AP-loss over different kinds of classification-loss on the state-of-the-art one-stage detectors at various benchmarks, without changing the network architectures.

- **Nicu Sebe**

[Paper] Z. Ma, X. Chang, Z. Xu, N. Sebe, and A. Hauptmann, Joint Attributes and Event Analysis for Multimedia Event Detection, IEEE Transactions on Neural Networks and Learning Systems, 29(7):2921-2930, July 2018

In this work, we learn semantic attributes from external videos using their semantic labels. In contrast to multimedia event videos, these videos depict lower level contents (objects, scenes, actions). To

harness video attributes, we propose an algorithm correlating them to a target event. Consequently, we incorporate video attributes latently as extra information into the event detector learnt from multimedia event videos in a joint framework.

[Paper] E. Sangineto, M. Nabi, D. Culibrk, and N. Sebe, Self Paced Deep Learning for Weakly Supervised Object Detection, IEEE Transactions on Pattern Analysis and Machine Intelligence, 41(3):712-725, March 2019

We propose in this paper a training protocol based on the self-paced learning paradigm. The main idea is to iteratively select a subset of images and boxes that are the most reliable, and use them for training. We are the first showing that a self-paced approach can be used with deep-network-based classifiers in an end-to-end training pipeline.

- **Junsong Yuan**

  [Paper] Weixiang Hong, Junsong Yuan, Fried Binary Embedding: From High-Dimensional Visual Features to High-Dimensional Binary Codes. IEEE Trans. Image Processing 27(10): 4825-4837 (2018)

  50-word summary: Generating long binary codes involves large projection matrix and high-dimensional matrix-vector multiplication, thus is memory and compute intensive. In this work we propose Fried binary embedding (FBE) and Supervised Fried Binary Embedding (SuFBE), to tackle these problems.

  [Paper] Liuhao Ge, Yujun Cai, Junwu Weng, Junsong Yuan, Hand PointNet: 3D Hand Pose Estimation Using Point Sets. CVPR 2018: 8417-8426

  50-word summary: Different from existing CNN-based hand pose estimation methods that take either 2D images or 3D volumes as the input, our proposed Hand PointNet directly processes the 3D point cloud that models the visible surface of the hand for pose regression. Experiments on three challenging hand pose datasets show that our proposed method outperforms state-of-the-art methods

- **Mladen Berekovic**

  [Paper] Philipp Jungklass, Mladen Berekovic, Effects of Concurrent Access to Embedded Multicore Microcontrollers with Hard Real-Time Demands. 2018 IEEE 13th International Symposium on Industrial Embedded Systems (SIES)

  50-word summary: Due to increased demand on the performance of real-time control units, multicore microcontrollers are increasingly being used in this sector. The manufacturers of such microcontrollers have developed extensive model families, which have to be compatible with each other due to the same pin assignment and package form. This policy is intended to enable ECU developers to select a next larger type with more processor cores in the event of performance bottlenecks. It should be noted though that the additional processor cores increases the problem of competing access and thus also the Worst-Case Execution Time. This article identifies the impact of competing access on the performance of individual processor cores. For this purpose, three derivatives of the Infineon AURIX microcontroller family are compared and potential bottlenecks identified. Finally, recommendations are drawn up on the basis of these results.

  [Conference] EWME 2018: European Workshop on Microelectronics Education, Braunschweig Germany, 2018