2018 Annual Report (June 2017 – May 2018)
Multimedia Systems and Applications Technical Committee
IEEE Circuits and Systems Society

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

1. TC Activities June 2017 – May 2018:

1.1. New Election Results

- ICME steering committee members: Chia-Wen Lin, Tao Mei, Junsong Yuan
- New members (term: 2018/9~2022/8):

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: Yap-Peng Tan (Chair), Wenjun Zeng, Enrico Magli, Ying Li
- Award and nomination sub-committee: Anthony Vetro (Chair), Ming-Ting Sun, Ling Guan, Homer Chen, and Pascal Frossard
- 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:

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 2017

Date: 28 May
Time: 13:15--14:15
Location: VVG.7
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
Samson	Cheung	University of Kentucky	sccheung@ieee.org
Dong	Tian	Mitsubishi Electric Research Laboratories	tian@merl.com
Enrico	Magli	Politecnico di Torino, Italy	enrico.magli@polito.it
Ichiro	Ide	Nagoya University, Japan	ide@i.nagoya-u.ac.jp
Ivan	Bajic	Simon Fraser University, Canada	ibajic@sfu.ca
C.-C. Jay	Kuo	University of Southern California	cckuo@sipi.usc.edu

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Ngai-Man	Cheung	Singapore University of Technology and Design	Ngaiman_cheung@sutd.edu.sg
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Yong	Rui	Lenovo	yongrui@lenovo.com
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Chang-Su	Kim	Korea University, Korea	changsukim@korea.ac.kr
Jiaying	Liu	Peking University	liujiaying@pku.edu.cn
Tian Sheuan	Chang	National Chiao Tung Univ. Taiwan	tschang@g2.nctu.edu.tw
Chun-Shien	Lu	Academia Sinica	lcs@iis.sinica.edu.tw
Chia-Wen	Lin	National Tsing Hua University, Taiwan	cwlin@ee.nthu.edu.tw
Lei	Zhang	Microsoft	leizhang@microsoft.com
Jian	Zhang	University of Technology Sydney	jian.zhang@uts.edu.au
Marta	Mrak	British Broadcasting Corporation (BBC)	marta.mrak@bbc.co.uk
Ching-Yung	Lin	Graphen, Inc.	cylin@graphen.ai
Ce	Zhu	UESTC, China	eczhu@uestc.edu.cn

4. Accomplished Technical Activities (June 2017 to May 2018)

Conference organizations:

- ISCAS 2018: Shao-Yi Chien, Samson Cheung, Jianfei Cai (Track Co-chair), Ying Li (Area Chair)
- ICME 2017: Zicheng Liu (Steering Committee member), Chia-Wen Lin (Steering Committee member), Ce Zhu (Technical Program Co-Chair), Gwo Giun Chris Lee (TPC Track Chair), Enrico Magli (Area chair), Samson Cheung (Area Chair), Anthony Vetro (Hot3D Workshop Co-Chair), Jiaying Liu (workshop Co-chair), Lei Zhang (Area Chair)
- MMSP 2017: Marta Mrak (industry and demo chair, special session co-chair "Enabling convergence of new forms of media"), Samson Cheung (Area Chair)
- Umedia 2017: Nam Ling (Honorary Co-Chair)
- ICIEA 2017: Nam Ling (Int'l Advisory Committee)
- ICCV 2017: Nicu Sebe (Program Chair)
- ACM ICMR: Nicu Sebe (General Chair)
- DSAA 2017: Pau-Choo Chung (Trends and Controversy Chair)
- IEEE FG 2018: Ying Li (Finance chair)
- ACM MM 2017: Yong Rui (Publicity Co-chair), Lei Zhang (Area Chair, Program Chair of Open Source Competition)
- VCIP 2017: Jianying Liu (Registration Chair), Marta Mrak (Area Chair)
- ICIP 2017: Lei Zhang (Area Chair)

IEEE and Other Journal Editorships:

- IEEE Transactions on Multimedia: EiC: Wenwu Zhu; Steering committee member: Zicheng Liu; AEs: Ivan Bajic, Jianfei Cai, Winston Hsu, Benoit Huet, Chang-Su Kim, Zhu Li, Enrico Magli, Tao Mei, Joern Ostermann, Yap-Peng Tan, Qi Tian, Yi-Hsuan Yang, Cha Zhang, Jian Zhang, Lei Zhang, Jing dong Wang, Lei Zhang
- IEEE Multimedia Magazine: EiC: Yong Rui, AE: Wen-Huang Cheng, Tao Mei
- IEEE Transactions on Circuits & Systems for Video Technology: Deputy EiC: Shipeng Li; Deputy EiC: Feng Wu; AEs: Zhu Li, Jie Liang, Weisi Lin, Alexander Loui, Siwei Ma, Junsong Yuan, Ce Zhu, Xiao-Ping Zhang, Enrico Magli, Jingdong Wang, Jiwen Lu, Tao Mei, Lei Zhang

- IEEE Transactions on Image Processing: AEs: Samson Cheung, Junsong Yuan, Tao Mei, Chun-Shien Lu, Chia-Wen Lin, Ce Zhu
- IEEE Transactions on Biomedical Circuits and Systems: AEs: Pau-Choo Chung
- IEEE Journal on Emerging and Selected Topics in Circuits and Systems, EIC: Yen-Kuang Chen (2016-2017)
- IEEE Signal Processing Magazine: SAE: C.-C. Jay Kuo, AE: Ivan Bajic
- IEEE Selected Topics on Signal Processing: SAE: C.-C. Jay Kuo
- Signal Processing: Image Communications: AE: Samson Cheung, Marta Mrak
- American Statistical Association Journal on Statistical Analysis and Data Mining: AE: Samson Cheung
- ITE Journal of Media Technology and Applications, Editor: Ichiro Ide
- Pattern Recognition: AE: Jiwen Lu
- Journal of Visual Communications and Image Representation: EiC: Zicheng Liu, SAE: Junsong Yuan, AE: Jiwen Lu, Ying Li
- Human-centric Computing and Information Sciences (Springer): AE: Nam Ling
- International Journal of Multimedia Information Retrieval: AE: Ying Li
- ACM TOMM: AE: Yong Ru

Distinguished Lecturer:

- Distinguished Lecturer of the IEEE Circuit and System Society: Weisi Lin (2016—2017), Chia-Wen Lin (2018--2019), Yen-Kuang Chen (2016-2017)
- Distinguished Lecturer of APSIPA: Junsong Yuan (2018-2019)
- Distinguished Industry Speaker of the IEEE Signal Processing Society: Tao Mei (2018-2019)

Keynote Speeches:

- Shao-Yi Chien, "Quantized Convolutional Neural Network for Efficient Hardware Realization," 13th Bay Area Multimedia Forum (BAMMF), Santa Clara, USA, 27 Sept., 2017.
- Shao-Yi Chien, "Deep Learning on the Edge: New Opportunity for Internet-of-AI-Things," NTU@SV Deep Learning on the Edge and Startup Demo, USA, 12 Feb, 2018.
- Samson Cheung, "Multimedia and Autism," Keynote Speech, IEEE 19th International Workshop on Multimedia Signal Processing, London-Luton, UK, Oct. 18, 2017
- C.-C. Jay Kuo, "Rethinking Convolutional Neural Networks (CNNs)," IEEE 2018 International Conference on Consumer Electronics, National Chung Hsing University, Taichung, Taiwan, May 19-21, 2018.
- C.-C. Jay Kuo, "Why and why not convolutional neural networks (CNNs)," International Conference on Data Intelligence and Security (ICDIS), South Padre Island, TX, USA, April 8-10, 2018.
- C.-C. Jay Kuo, "Why and why not convolutional neural networks (CNNs)," Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC), Kuala Lumpur, Malaysia, Dec. 12-15, 2017.
- C.-C. Jay Kuo, "Intelligent service robots – from today to tomorrow," International Conference on Orange Technologies (ICOT), Singapore, Dec. 8-10, 2017.
- C.-C. Jay Kuo, "Deep learning networks: architectural evolution and theoretical foundation," International Conference on Image Processing Theory, Tools and Applications (IPTA), Montreal, Canada, November 29, 2017.
- C.-C. Jay Kuo, "Why deep learning networks work so well," International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS), Xiamen, China, November 6-9, 2017.
- C.-C. Jay Kuo, "Why deep learning networks work so well," Academia Sinica Data Science Frontiers Workshop, Taipei, Taiwan, July 19, 2017.
- C.-C. Jay Kuo, "Deep learning networks: architectural evolution and theoretical foundation," National Symposium on System Science and Engineering (NSSSE), Taipei, Taiwan, May 19, 2017.
- Jingdong Wang."CNN Architecture Design: From Deeper to Wider". International Conference on Internet Multimedia Computing and Service. ICIMCS 2017.
- Pau-Choo Chung, "Deep Learning Networks in Image Analysis: Introduction and Thoughts," Symposium on Digital Life Technology, Taiwan 2017.
- Yen-Kuang Chen, "Deep Learning for Internet of Visual Things - Hype or Hope?", Taiwanese American Industrial Technology Association Annual Conference, April 21, 2018.
- Zicheng Li, "Visual Understanding with RGB-D Sensors and Its Applications In a Collaboration Environment", 30th Conference on Graphics, Patterns and Images (SIBGRAPI), Brazil. Oct. 2017

- Jiaying Liu, “Intelligent Visual Computing”, IEEE FG 2018 Workshop, Xian, Shaanxi, China, May 2018.
- Lei Zhang, “Large-scale Celebrity Recognition and One Shot Learning”, ICCV 2017 Workshop on Analysis and Modeling of Faces and Gestures, Venice, Italy, October 28, 2017
- Ching-Yung Lin, “Advancing State-of-the-Art AI Technologies for Finance Industry”, Fintech O2O Forum, Hong Kong, May 2018.
- Ching-Yung Lin, “Teaching Medical Knowledge to Humanoid Robots”, EITA Healthcare Ventures, New York, April 2018.
- Ching-Yung Lin, “Building up AI Solutions for Finance Industry”, Big Data Forum, San Diego, Dec. 2017.

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

- **CAS BoG:** Yen-Kuang Chen (2018-2020)
- Award review committee member of IEEE Transactions on Circuits and Systems for Video Technology Best Paper Award: Yen-Kuang Chen
- IEEE Tainan Section BoG: Pau-Choo Chung
- IEEE CIS Vice President : Pau-Choo Chung
- IEEE CIS Fellow Committee: Pau-Choo Chung
- Judging panel of 2017-2018 CASS Student Design Competition: Yen-Kuang Chen
- 2018 IEEE Transactions on Multimedia Best Paper Award Committee Member: Chang-Su Kim
- TC TIFS: Samson Cheung (Committee Member)
- TC MMSP: Marta Mrak (Committee Member)
- IEEE SPS: Marta Mrak (Technical directions board member)

Awards and Honors (e.g., Fellow, best paper awards, outstanding services, etc…):

- New IEEE Fellow (Class of 2018) : Chia-Wen Lin, Yihong Gong, Pascal Frossard
- New ACM Fellow (Class of 2017) : Yong Rui
- Honorable Mention Award of UIST 2017: Shao-Yi Chien
- Outstanding reviewer award of ACM ICMR 2017: Ichiro Ide
- Chapter of the Year Award, IEEE Signal Processing Society: Ivan Bajic (IEEE SPS Vancouver Chapter Chair)
- USC Distinguished Professor of Electrical Engineering and Computer Science, 2018 - Present.
- USC Provost’s Mentoring Award, 2018. C.-C. Jay Kuo
- IEEE Signal Processing Society Education Award, 2017. C.-C. Jay Kuo
- IEEE Leon K. Kirchmayer Graduate Teaching Award, 2017. C.-C. Jay Kuo
- IAPR Fellow (class of 2018): Junsong Yuan
- Umedia Outstanding Paper Award (2017): Nam Ling.
- Tianjin University Guest Professorship (2017 -) (renewed): Nam Ling.
- Nicolas D. Georganas Best Paper Award, ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM), 2017. “Automatic Generation of Visual-Textual Presentation Layout,” Tao Mei, Shipeng Li, Yong Rui.
- APSIPA Industrial Distinguished Leaders (2017): Yong Rui
- First place winner team in Visual Question Answering Challenge @ CVPR 2017: Lei Zhang
- Best Student Paper Award of ICME 2017: Ce Zhu

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), Tao Mei (Program Co-chair), Samson Cheung (Area Chair, Workshop Chair), Ivan Bajic (Area Chair), Jiwen Lu (Area Chair), Ngai-Man Cheung (Area Chair), Chang-Su Kim (Area Chair), Jiaying Liu (Area Chair), Chia-Wen Lin (Special Session Chair), Lei Zhang (Area Chair, Grand Challenges Chair), Marta Mrak (Area Chair; ICMEW 2018 “Mobile Multimedia Computing” workshop co-chair)
- ACM ICMR 2018: Ichiro Ide (Organizing Co-chair)
- ACM Multimedia 2018: Ichiro Ide (Web & Social Media Co-chair)

- IEEE VCIP2018: Chia-Wen Lin (General Chair), Wen-Huang Cheng (Technical Chair), Ichiro Ide (Demo Co-chair), Jiaying Liu (Publicity Chair)
- IEEE ISM 2018: Ichiro Ide (Workshop Co-chair)
- ACM Multimedia 2019: Ichiro Ide (Tutorial Co-chair), Chang-Su Kim (Local Arrangement Chair)
- ICIP 2018: Jiwen Lu (Area Chair), Lei Zhang (Area Chair)
- ICPR 2018: Jiwen Lu (Area Chair)
- AAAI 2018: Jiwen Lu (Area Chair)
- ICB 2018: Jiwen Lu (Area Chair)
- BTAS 2018: Jiwen Lu (Area Chair)
- WACV 2018: Jiwen Lu (Area Chair)
- Umedia 2018: Nam Ling (General Co-Chair).
- SocialSec 2018: Nam Ling (General Chair).
- IEEE International Conference on Multimedia Big Data, Nicu Sebe (Program Chair), Jiaying Liu (Financial Co-Chair)
- ICME 2019: Tao Mei (General Co-chair), Marta Mrak (Technical Program Co-Chair)

5. TC Significant Activities List

[Please list your 2 (or less) most significant activities in the past year (March 2017--May 2018), 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] Yu-Sheng Lin, Wei-Chao Chen, and Shao-Yi Chien, "Unrolled Memory Inner-Products: An Abstract GPU Operator for Efficient Vision-Related Computations," *Proc. the 29th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2016, Las Vegas, USA.
  50-word summary: In this paper, we discuss an operator, called Unrolled-Memory-Inner-Product (UMI), that can be used to succinctly express computational kernels in CNNs and various scientific and vision applications. We demonstrate this operator by converting several popular applications into the UMI representation, and achieve 1.3x-26.4x speedup against frameworks such as OpenCV and Caffe

  [Award] Po-Chen Wu, Robert Wang, Kenrick Kin, Christopher Twigg, Shangchen Han, Ming-Hsuan Yang, Shao-YiChien, "DodecaPen: Accurate 6DoF Tracking of a Passive Stylus," Honorable Mention Award of UIST 2017
  50-word summary: We propose a system for real-time six degrees of freedom (6DoF) tracking of a passive stylus that achieves submillimeter accuracy, which is suitable for writing or drawing in mixed reality applications. Our system is particularly easy to implement, requiring only a monocular camera, a 3D printed dodecahedron, and hand-glued binary square markers.

- **Samson Cheung**

  [paper] Uzuegbunam, N. M., W.-H. Wong, S.-C. Cheung, and L. A. Ruble. 2018. MeBook: combining evidence-based autism intervention with camera-based multimedia systems. IEEE Transactions on Learning Technologies. DOI: 10.1109/TLT.2017.2772255
  50-word summary: Autism spectrum disorder (ASD) is a developmental disorder that impairs the development of social and communication skills. Based on evidence that children with ASD prefer images of self over others, we propose the MEBook system which to inject self-images into a gesture-based social narrative to teach them proper greeting behaviors.

  [paper] Sajid, H. and S.-C. Cheung. 2017. Universal Multimode Background Subtraction. IEEE Transactions on Image Processing, vol. 26, no. 7, pp. 3249-3260, July 2017.
  50-word summary: In this paper, we present a complete change detection system named multimode background subtraction. The universal nature of system allows it to robustly handle multitude of challenges associated with video change detection, such as illumination changes, dynamic background,

camera jitter, and moving camera.

- **Dong Tian**

  [paper] Siheng Chen, Dong Tian, Chen Feng, Anthony Vetro, and Jelena Kovačević. "Fast resampling of 3D point clouds via graphs". In: IEEE Transactions on Signal Processing 66.3, pp. 666–681, Feb 2018.
  50-word summary: We propose a randomized resampling strategy that selects a representative subset of points while preserving application-dependent features. The strategy is based on graphs, which can represent underlying surfaces and lend themselves well to efficient computation.

- **Enrico Magli**

  [Service] IEEE Trans. on Multimedia and IEEE Trans. on Circuits and Systems for Video Technology, AE

  [Paper] G. Cheung, E. Magli, Y. Tanaka, M.K. Ng, "Graph spectral image processing," Proc. Of the IEEE, v. 106 n. 5, May 2018
  50-word summary: This paper surveys the emerging field of graph signal processing specifically for image/video processing applications. It provides a broad view of recent research activities employing graph-based techniques in the areas of image compression, image restoration, image filtering, and image segmentation.

- **Ichiro Ide**

  [Conference] Hiroki Takimoto, Magali Philippe, Yasutomo Kawanishi, Ichiro Ide, Takatsugu Hirayama, Keisuke Doman, Daisuke Deguchi, Hiroshi Murase, "Detection of similar geo-regions based on visual concepts in social photos," *2017 Pacific-rim Conf. on Multimedia (PCM)*, Sept. 2017, Harbin, China.
  50-word summary: In this paper, we propose a method for the detection of similar geo-regions based on Visual Concepts in social photos. We report experimental results and analyses by applying the proposed method to the YFCC100M dataset.

  [Workshop] General Chair, 9th Workshop on Cooking and Eating Activities (CEA2017) in conjunction with IJCAI2017, Aug. 2017, Melbourne, Australia.
  50-word summary: This workshop series is held for providing an opportunity for research groups on multimedia concerning cooking and eating activities to discover each other, introduce their trials, and discuss how it should be and where they should go. As the ninth of the series, this year, 7 and 6 papers were submitted for long and short papers

- **Ivan Bajic**

  [Paper] S. R. Alvar, H. Choi, and I. V. Bajic, "Can you find a face in a HEVC bitstream?" *Proc. IEEE ICASSP'18*, pp. 1288-1292, Calgary, AB, Apr. 2018.
  15-word summary: This paper shows how to detect and localize faces in HEVC bitstreams without full decoding

  [Paper] H. Choi and I. V. Bajic, "High efficiency compression for object detection," *Proc. IEEE ICASSP'18*, pp. 1729-1796, Calgary, AB, Apr. 2018.
  20-word summary: This paper proposes a bit allocation and rate control scheme that improves object detection and classification by recent single shot detectors

- **C.-C. Jay Kuo**

  [Paper] Hao Xu, Yueru Chen, Ruiyuan Lin and C.-C. Jay Kuo, "Understanding CNN via deep features analysis," APSIPA Annual Summit and Conference, Kuala Lumpur, Malaysia, Dec. 12-15, 2017.
  50-word summary: This paper received the Best Paper Award in the 2017 Asia Pacific Signal and Information Processing Association (APSIPA) Annual Summit Conference (ASC), Kuala Lumpur, Malaysia, Dec. 12-15, 2017

[Award] Qin Huang, Haiqiang Wang, Sung Chang Lim, Hui Yong Kim, Se Yoon Jeong and C.-C. Jay Kuo, "Measure and prediction of HEVC perceptually lossy/lossless boundary QP values," Data Compression Conference (DCC), Snowbird, Utah, USA, April 4-7, 2017.
50-word summary: This paper received the Capocelli Prize in 2017 Data Compression Conference (DCC), Snowbird, Utah, USA, April 4-7, 2017.

- **Jingdong Wang**

  [Paper] Ting Zhang, Guo-Jun Qi, Bin Xiao, Jingdong Wang, "Interleaved Group Convolutions for Deep Neural Networks". ICCV 2017.
  50-word summary: We design a novel modularized block, interleaved group convolutions, for efficient convolutional neural networks. Its performance is better than Google's MobileNet.

- **Jiwen Lu**

  [Paper] Jiwen Lu, Junlin Hu, and Jie Zhou, "Deep Metric Learning for Visual Understanding: An Overview of Recent Advances," *IEEE Signal Processing Magazine*, vol. 34, no. 6, pp. 76-84, 2017.
  50-word summary: In this paper, we overview the state-of-the-art deep metric learning techniques and their applications in wide visual understanding applications such as face recognition, object tracking, multimedia search, person re-identification, image set classification, and cross-modal matching. We show that deep metric learning is very effective to more visual analysis and recognition applications.

- **Junsong Yuan**

  [Paper] Liuhao Ge, Junwu Weng, Yujun Cai, Junsong Yuan, "Hand PointNet: 3D Hand Pose Estimation using Point Sets", in in Proc. IEEE Conf. on Computer Vision and Pattern Recognition (CVPR), 2018
  50-word summary: This paper proposed Hand PointNet that directly processes the 3D point cloud for hand pose regression. Taking the normalized point cloud as the input, our proposed hand pose regression network is able to capture complex hand structures and accurately regress a low dimensional representation of the 3D hand pose. Experiments on three challenging hand pose datasets show that our proposed method outperforms state-of-the-art methods

  [Award] Chen Wang, Junsong Yuan, and Lihua Xie, "Non-Iterative SLAM", in Proc. International Conference on Advanced Robotics (ICAR'17), 2017 (best paper award)
  50-word summary: this paper is to create a new framework for dense SLAM that is light enough for micro-robot systems based on depth camera and inertial sensor. To the best of our knowledge, this method is the first non-iterative and online trainable approach for data association in visual SLAM. Compared with the state-of-the-arts, it runs at a faster speed and obtains 3-D maps with higher resolution yet still with comparable accuracy

- **Nicu Sebe**

  [Paper] J. Wang, T. Zhang, J. Song, N. Sebe, and H. T. Shen, A Survey on Learning to Hash, IEEE Transactions on Pattern Analysis and Machine Intelligence, 40(4):769-790, April 2018.
  50-word summary: Present a comprehensive survey on learning to hash algorithms, discuss their relations, evaluation protocols, and the general performance analysis, and point out that the quantization algorithms perform superiorly in terms of search accuracy, search time cost, and space cost, highlighting also the emerging topics.

  [Paper] Z. Ma, Y. Yang, X. Chang, N. Sebe, and A. Hauptmann, The Many Shades of Negativity, IEEE Transactions on Multimedia, 19(7):1558-1568, July 2017.
  50-word summary: Current classifier training treats the negative videos as equally negative. However, many negative videos resemble the positive videos in different degrees. We use a statistical method on both the positive and negative examples to get the decisive attributes of a specific event. TRECVIDMED14 dataset is used for validation.

- **Ngai-Man Cheung**

  [Paper] Manas Khatua, Seyed Hamid Safavi, Ngai-Man Cheung, "Sparse Laplacian Component

Analysis for Internet Traffic Anomalies Detection." IEEE Transactions on Signal and Information Processing over Networks 2018.
50-word summary: We consider the problem of anomaly detection in network traffic. We propose to capture the essence of the data using the eigenvectors of graph Laplacian. Our work is a new framework to compute the graph Fourier transform (GFT). We demonstrate competitive anomaly detection performance using this framework.

[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-2018.
50-word summary: In this work, we propose an efficient, end-to-end fully convolutional Siamese network that computes the similarities at multiple levels for person re-identification. We demonstrate that multi-level similarity can improve the accuracy considerably using low-complexity network structures in this problem.

- **Pau-Choo Chung**

  [Paper] Wei-Cheng Wang, Chien-Yu Chiou, Chun-Rong Huang, Pau-Choo Chung, Wei-Yun Huang, "Spatiotemporal Coherence based Annotation Placement for Surveillance Videos", IEEE Transactions on Circuits and Systems for Video Technology, Volume: 28, Issue: 3, March 2018
  50-word summary: This paper proposes to formulate the annotation placement of foreground objects in surveillance video as an optimization problem with respect to spatiotemporal coherence of annotations and foreground objects, and uses Markov random fields (MRFs) to solve the optimization. It is shown to achieve better quantitative and qualitative results compared with state-of-the-art approaches.

- **Tao Mei**

  Nicolas D. Georganas Best Paper Award, ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM), 2017. "Automatic Generation of Visual-Textual Presentation Layout".

- **Yong Rui**
  [Award] Andrew P. Sage Best Transactions Paper Award, IEEE SMC Society (Systems, Man and Cybernetics Society), 2017 Oct., J Yu, D. Tao, M. Wang and Y. Rui, Learning to Rank Using Clicks and Visual Features for Image Retrieval, *IEEE Transactions on Cybernetics*, Vol.45, No.4, April 2015.

  [Award] 2017 ACM TOMM Nicolas Georganas Best Paper Award, X. Yang, T. Mei, Y. Xu, Y. Rui and S. Li, Automatic Generation of Visual-Textual Presentation Layout, *ACM Trans. on Multimedia Computing Communications and Applications (TOMM),* Vol. 12, Issue 2, 2016.

- **Zichneg Liu**

  [Paper] Yucheng Wang, Jian Zhang, Zicheng Liu, Qiang Wu, Zhengyou Zhang, and Yunde Jia, "Depth Super-Resolution on RGB-D Video Sequences with Large Displacement 3D Motion", Transactions on Image Processing, 2018, accepted
  50-word summary: A video-based depth super-resolution method with novel motion compensation and fusion approaches is proposed in this paper. It well handles large displacement 3D motions by using 3D nearest neighbor fields in compensation stage, and designing a new deep convolutional neural network architecture for fusion.

  [Paper] Discriminative Spatio-Temporal Pattern Discovery for 3D Action Recognition, Junwu Weng , Chaoqun Weng, Junsong Yuan, Zicheng Liu, TCSVT , 2018 accepted
  50-word summary: we propose to discover discriminative spatio-temporal patterns for 3D action recognition. The discovered patterns not only improve the action recognition performance but also help us to understand and differentiate action category. Our proposed method takes the spatio-temporal structure of 3D action into consideration and can discover essential spatio-temporal patterns that play key roles in action recognition.

- **Chang-Su Kim**

  [Paper] Yeong Jun Koh and Chang-Su Kim, "Primary object segmentation in videos based on region augmentation and reduction," Proc. CVPR, Honolulu, Hawaii, July 2017.
  50-word summary: We proposed a novel algorithm to segment a primary object in a video sequence is proposed in this work. The key component is the augmentation and reduction process (ARP), which identifies the primary object region in each frame. Experimental results demonstrate that the proposed algorithm significantly outperforms the state-of-the-art conventional algorithms on recent benchmarks.

  [Conference] Program Chair of 30th Workshop on Image Processing and Image Understanding (IPIU), Feb. 2018, Jeju, Korea.
  50-word summary: IPIU is the largest and the most active local conference, related multimedia technology, in Korea. This year, 282 papers were presented in oral or posters, and there were more than 600 participants. It is growing every year fast, so it is being considered to make this IPIU as an international conference.

- **Jiaying Liu**

  [Workshop & Dataset] Jiaying Liu, Wenjun Zeng, Gang Wang, "Large Scale 3D Human Activity Analysis Challenge in Depth Videos," *IEEE International Conference on Multimedia and Expo* (*ICME*) Workshop, Jul. 2017, Hong Kong, China.
  50-word summary: We organize a challenge on human action recognition and detection on 3D skeleton data as the Workshop in ICME-2017. A new multi-modal dataset, PKUMMD, which consists of over 5.4 million frames, is collected to stimulate the community to design models for human activity analysis. Over 15 teams participated in the challenge and brought the performance of skeleton-based activity analysis to a new state-of-the-art.

  [Paper] Wenhan Yang, Robby T. Tan, Jiashi Feng, Jiaying Liu, Zongming Guo, and Shuicheng Yan. "Deep Joint Rain Detection and Removal from a Single Image", Proc. of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Jul. 2017, Honolulu, Hawaii, USA.
  50-word summary. In this paper, we are the first to propose a deep joint rain detection and removal framework to address a heavy rain removal from a single image. Our method provides visually promising results on real heavy rain images, is easy to deploy in practical application scene, and can be extended to handle a series of image restoration problems.

- **Tian Sheuan Chang**

  [Paper] Y. J. Lin, T. S. Chang, "Data and Hardware Efficient Design for Convolutional Neural Network" IEEE Trans. CAS Part. I. vol. 6. No. 5, May, 2018

  50-word summary: This paper presents an end-to-end CNN accelerator that maximizes hardware utilization with run-time configurations of different kernel sizes. It also minimizes data bandwidth with the output first strategy to improve the data reuse of the convolutional layers. The whole CNN implementation of the target network is generated optimally for both hardware and data efficiency under design resource constraints, which can be run-time reconfigured by the layer optimized parameters to achieve real-time and end-to-end CNN acceleration.

- **Chia-Wen Lin**

  [Paper] Chih-Chung Hsu and Chia-Wen Lin, "CNN-based joint clustering and representation learning with feature drift compensation for large-scale image data," *IEEE Trans. Multimedia***,** vol. 20, no. 2, pp. 421−429, Feb. 2018.
  50-word summary: In this paper, we propose a convolutional neural network (CNN) to jointly solve clustering and representation learning in an iterative manner. The proposed method is among the first to achieve state-of-the-art accuracy in clustering millions of images at manageable computation and storage costs.

  [Paper] Weng-Tai Su, Gene Cheung, and Chia-Wen Lin, "Graph Fourier transform with negative edge weights for depth image coding," in *Proc. IEEE Int. Conf. Image Processing*, Sept. 2017, Beijing, China.

50-word summary: In this paper, we develop a new transform called signed graph Fourier transform (SGFT), where the underlying graph contains negative edges that describe anti-correlations between pixel pairs. We derive the corresponding precision matrix, and show that the loopy graph Laplacian matrix of a graph with a negative edge and two self-loops at its end nodes is approximately equivalent. This proves that the eigenvectors of SGFT approximates the optimal KLT.

- **Lei Zhang**

[Paper] Peter Anderson, Xiaodong He, Chris Buehler, Damien Teney, Mark Johnson, Stephen Gould, Lei Zhang, "Bottom-Up and Top-Down Attention for Image Captioning and VQA," *Proc. Of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2018, Salt Lake City, USA.

50-word summary: In this paper, we propose a combined bottom-up and top-down attention mechanism that enables attention to be calculated at the level of objects and other salient image regions. Applying this approach to image captioning, our results on MSCOCO established a new state-of-the-art and won the 1st place in VQA 2017.

[Workshop and Grand Challenge] MS-Celeb-1M: Recognizing One Million Celebrities in the Real World

50-word summary: We continually organized a grand challenge as an ICCV 2017 Workshop. In addition to the previous grand challenge for recognizing one million people, we added a new challenge for one shot face recognition. The challenge was well received with 30+ registered teams and 100+ workshop attendees.

- **Jian Zhang**

[Paper] Xiaoshui Huang, Jian Zhang, Lixin Fan, Qiang Wu, Chun Yuan "A Systematic Approach for Cross-Source Point Cloud Registration by Preserving Macro and Micro Structures" IEEE Transactions on Image Processing, Vol 26, No. 7 July 2017.

50-word summary: A systematic approach for registering cross-source point clouds that come from different kinds of sensors. This task is especially challenging due to the presence of significant missing data, large variations in point density, scale difference, large proportion of noise, and outliers. The robustness of our method is attributed to the extraction of macro and micro structures. We use graph to organize these structures and convert the registration into graph matching the results show we obtain much better performance than other methods.

- **Ching-Yung Lin**

Founded a new AI company – Graphen, Inc., headquarters in New York with subsidiaries and branches in Taipei, Hong Kong, Beijing, Shanghai, Singapore and Austin. Inspired by brain's structure being graphs, Graphen's mission is to advance state-of-the-art AI technologies and make real life solution impacts, especially in the finance industry and healthcare industry.

- **Ce Zhu**

[Paper] Y.B. Gao, C. Zhu, S. Li, T.W. Yang, "Temporally Dependent Rate-Distortion Optimization for Low-Delay Hierarchical Video Coding," *IEEE Transactions on Image Processing*, vol. 26, no. 9, pp. 4457-4470, Sept. 2017.
50-word summary: This paper addresses the temporally dependent rate distortion optimization (RDO) problem by developing a source distortion propagation model to estimate the varying temporal dependency of different units. Our method shows a promising coding gain of 2.5% BD-rate saving in average (up to 7.2% for one sequence), with a negligible increase in encoding time.

[Award] X. Li, M. Ye, Y. Liu, C. Zhu, "Memory-based Pedestrian Detection Through Sequence Learning," Best Student Paper Award of ICME 2017
50-word summary: We propose a memory-based sequence learning model to simulate human recognition process. Our model not only memorizes the sequence patterns but also learns the sequence order. In the pedestrian detection, the proposed approach achieves the state-of-the-art performance in term of accuracy and speed.