# APSIPA
## Signal and Information Processing

# APSIPA
### NEWSLETTER
Asia-Pacific Signal and Information Processing Association Newsletter

## Greetings!

Welcome to the October issue of the APSIPA Newsletter.

Technical committees (TCs) have been formed to promote and achieve the technical objectives of the APSIPA. In September issue of the Newsletter, information about "Signal and Information Processing Theory and Methods (SIPTM)" TC and "Speech, Language and Audio (SLA)" TC have been shared. Hope that members understand more about these two TCs. In this issue, we have the pleasure to invite another two TC chairs to be our guest editors. They are Prof. Sanghoon Lee (Yonsei University, Korea) and Prof. Zhiyi Yu (Sun Yat-sen University, China), who are the technical committee chairs of Image, Video, and Multimedia (IVM) and Signal Processing System: Design and Implementation (SPS) TCs respectively. Information about these two TCs such as their compositions, research interests and recent activities can be found in this issue.

In about one month, APSIPA ASC 2019 will be held in Lanzhou, China. The exact date is from 18 to 21 November 2019. The tentative technical program can be found at http://www.apsipa2019.org/TechnicalProgram.html . You may also find other information such as the keynote speakers, overview sessions, tutorials at http://www.apsipa2019.org. Look forward to seeing you at APSIPA ASC 2019.

Enjoy reading this issue!

Sanghoon Lee, Zhiyi Yu and Bonnie Law
Guest editors and EiC
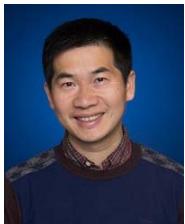
# Image, Video and Multimedia (IVM) TC

## Prof. Sanghoon Lee

Yonsei University (Korea)

http://insight.yonsei.ac.kr

## Message from TC Chair

In APSIPA community, we are able to look at the diversity of others, and let the others feel our color while pursuing our meaningful life. In this sense, it is important to be getting familiar with each other. We should carry on while hearing the breath of each other even via an email to say "It is very nice to meet you". I believe that the founders of APSIPA knew that such way would be meaningful, and someone on the intersection of choices would inherit him. Working for the APSIPA organization as a member brings us difficulty and responsibility. When we see the gentle lives of those around us, it will bring us new energy and we can feel the warmth we pass through the time given to us as TC members. There has been several issues for the IVM-TC in 2019. As always, new members joined, and some previous members have been taking a break for a while. During the year, TC activity has been being conducted among the members with the following issues:

> 1) APSIPA Trans. Special Issue;
>
> 2) APSIPA ASC 2019 Special Session;
>
> 3) Friend Labs. for Mutual Interests;
>
> 4) ICIP 2019 Lunch Event;
>
> 5) Newsletter.

Towards this, I have sent emails frequently, either collectively or personally, to seek cooperation with TC members. With the help of many TC members, we have carried out those activities without much difficulty. In this newsletter, we would like to summarize the activities we have done so far, and to share the information with the society members. Personally, the most memorable thing is the lunch time at ICIP2019, Taipei, where we could open our mind and say hello to each other. I think that this event could make our future APSIPA activity much smoother. Finally, we hope that the new chair and vice chair of our TC will have better teamwork and breathe together with our members to achieve more rewarding TC-activities, and I look forward to seeing the development of APSIPA IVM-TC in the future.

## IVM Technical Committee, and New Members 2019

Image, Video and Multimedia (IVM) technical committee is one of the technical committees of APSIPA at http://www.apsipa.org/TC/IVM.html. As announced at http://www.apsipa.org/TC/IVM.html, currently, the IVM TC has 38 members including chair (Sanghoon Lee) and past chairs (Yo-Sung Ho, Oscar Au, Jiwu Huang, Supavadee Aramvith). According to by-laws, from the election of 2018 and 2019, 9 and 8 members joined in the IVM-TC, respectively.

For 2018,

> Celia Shahnaz - Bangladesh University of Engineering and Technology
>
> Engin Erzin – Koc University

Huihui Bai - Beijing Jiaotong University

Jae Young Sim - Ulsan National Institute of Science and Technology

Jewon Kang - Ewha Womans University

Junhui Hou – City University of Hong Kong

Kenjiro Sugimoto - Waseda University

Shogo Muramatsu - Niigata University

Yukihiro Bandoh - Tokyo University of Agriculture and Technology

and for 2019,

Chul Lee - Dongguk University

Yoonsik Choe - Yonsei University

Chi-Chun Lee - National Tsing Hua University

Zhibo Chen - University of Science and Technology of China

King Ngi Ngan - University of Electronic Science and Technology of China

Na Lv - University of Jinan

Yo-Sung Ho – Gwangju Institute of Science and Technology

Marie Katsurai - Doshisha University

Recently, as the deep learning technologies have been developed, a lot of new paradigms have been shifted in the field of image, video and multimedia. In particular, the traditional cross fields among different majors now have been studied without so many barriers (ex. computer graphics and computer vision). Researchers have been making huge efforts to build up new technologies over artificial intelligence. Along with this trend, the IVM-TC technical committee has been undertaking the tasks in calling for organizing special sessions for APSIPA ASC2019 and special issues for APSIPA Trans. on SIP. In addition, our members have collaborated with each other through academic activities (ex. organizing academic seminars and making mutual collaboration agreements).

## Organizing Special Sessions for APSIPA ASC 2019

For APSIPA ASC 2018, 7 special sessions out of the total 42 special sessions had been presented under the IVM fields. For APSIPA ASC 2019, we have 5 special sessions out of the total 28 special sessions under the IVM fields. Among the five, two sessions were organized by the IVM-TC titled "Technologies for A Maximized Experience of Multi-dimensional Content: from 2D, 3D Modeling to An Objective Assessment" (Sanghoon Lee, Chia-Hung Yeh), and "Advanced Topics on High-dimensional Data Analytics and Processing" (Supavadee Aramvith, Shogo Muramatsu).

## Friend Labs Activities

1) The TC-chair shared his developments in IVM research, education, etc with Ph.D. students under the advisor Hui Bai, who is the current an IVM-TC member, at Beijing Jiatong University in Sep. 12, 2019. During the visiting, he gave a talk titled "Data Driven based QoE measurements" summarized as "we consider the deep convolutional neural network (CNN) based QA tasks which analyze the human

perception more accurately. Recently, CNN has emerged as a core technology while breaking most performance records in the area of artificial intelligence via intensive training in accordance with the massive dataset. The main motivation of this speech lied in finding new insight into human perception analysis for QoE evaluation through visualization of intermediate node values".



2) The TC-chair and Vice TC-chair made an agreement for Memorandum of Agreement (MoA) on Collaborative Research via "Joint Research Laboratory, JRL" between National Taiwan Normal University and BEST Institute of Information Technology at Yonsei University. This MoA contains a statement of pursing collaborative research between the two institutes in regard to 1) Joint R&D activity; 2) Fostering collaborative research via visiting partner's institute; 3) Producing co-authored conference or journal publication.

## APSIPA Transactions on Signal and Information Processing

For the special issue of APSIPA Trans. on SIP, we considered several topics of covering the mutual interests among TC members, and reached a topic: Special Issue on "Data-Driven Image, Video and Multimedia Content Analysis: the Current and the Future". Prof. Yeh, Prof. Tanaka and Prof. Bai were willing to be the guest editors and we advertised this issue to members. The aim of this special issue is to provide researchers and professionals with high-quality tutorial-style papers addressing the latest advances in the design, development, and deployment of data-driven based signal processing analysis technologies for various applications. Based on this experience, any recent topics would be great to follow the trend and to exchange our mutual interests. In addition, it is necessary to setup the issue once the topic is consented among members.

## APSIPA TC lunch at ICIP 2019

While working on APSIPA-TC and personally sending an e-mail to each TC member, I felt that it is necessary to have friendship among the members. Even if we have the regular TC meeting once a year at APSIPA ASC, I think that it would be difficult to exchange our academic experience organically among members. Timely, ICIP2019 was held in Taiwan, and I expected that many IVM TC members would attend the conference. So I suggested to Prof. Chung-Nan Lee (VP-Technical Activities) for a lunch together, and he was happy to go ahead. I am sure that the lunch time provided a valuable opportunity to know each other, and we have become more friendly with each other through our conversations. In particular, Prof. Wan-Chi Siu, who is the past APSIPA president, joined the lunch, and we could feel his warm mental support for the APSIPA TC activity. In the future, it is very recommended to have such exchanges through ICIP conferences, etc., which would have a significant impact on TC-Membership. Below is the photo of 12 attendees who attended the banquet: Daniel P. K. Lun, Mingyi He, Jiaying Liu, Toshiaki Fujii, Xiangui Kang, Chul Lee, Shogo Muramatsu, Jae Young Sim, Sanghoon Lee, Wan-Chi Siu, Chung-Nan Lee, and Yuming Fang.

# Signal Processing Systems: Design and Implementation (SPS) TC

## Prof. Zhiyi Yu

Sun Yat-sen University (China)

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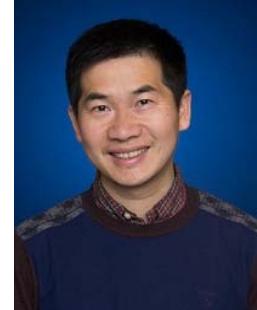
## Introduction of SPS and TC Members

Signal Processing Systems: Design and Implementation (SPS) is one of the technical committees of APSIPA.  It is established to promote advancement and exchange of the research fields of design and implementation related to signal processing systems in the Asia-Pacific region.  The fields of interest include analog/digital LSI and systems, hardware/software systems, AI and deeplearning accelerator and system, image/video processing and coding systems, multimedia systems, computer vision/graphics systems, speech/audio processing systems, VLSI communication systems and design methodologies and CAD tools for signal processing systems.

SPS has over 30 TC members from China, Japan, Korea, Taiwan, Indonesia, Singapore, and Malaysia. The key members of SPS TC members include:

Chair: Zhiyi Yu, *Sun Yat-sen University, China*

Vice-Chair: Hiroshi Tsutsui, *Kyoto university, Japan*

Secretary, Jia-Ching Wang, *National Central University, Taiwan*

Mentor, Akinori Nishihara, *Tokyo Institute of Technology, Japan*

Past-Chair, Takeshi Ikenaga, *Waseda University, Japan*

Past-Chair, Gwo Giun Lee, *National Cheng-Kung University, Taiwan*

Past-Chair, Jiun-In Guo, *National Chiao-Tung University, Taiwan*

You may find more information about SPS TC at http://www.apsipa.org/TC/SPS.html.

The TC chair of SPS is Prof. Zhiyi Yu from Sun Yat-Sen University, China. His webpage is http://seit.sysu.edu.cn/teacher/127 and email is yuzhiyi@mail.sysu.edu.cn . His research intrest focus on the next generation processor design & signal processing system design, such as: on-chip interconnect, in-memory-computing, circuits and systems based on nonvolatile devices, and circuits and system for AI applications. Sun Yat-sen University locates at Guangdong Province of China, close to Hong Kong and Macau. It is one of the most advanced areas in China. These cities together are called the Bay Area of China. We welcome new members join Sun Yat-sen University and our group.

Fig 1. The research group of Prof. Zhiyi Yu



Fig. 2: Sun Yat-sen University locates at the Bay Area of China, we welcome new faculties member to join

## Special sessions in APSIPA ASC 2019

This year SPS will organize four special sessions and two regular sessions in APSIPA ASC 2019. The four special sessions cover the areas of 5G communication, AI, and Video/Image processing, including:

### 1) Advanced Signal Processing for 5G Communication, chaired by Prof. Na Chen and Minoru Okada

Abstract: The upcoming 5th Generation (5G) wireless communication network is expected to support enhanced mobile broadband, ultra-reliable and low latency for flexible access and diverse services. While for 5G different functional splits of the processing in the core network and the access network are discussed in many works, still a very high-capacity connection will be required. In order to meet the exponentially increasing traffic demand of 5G, research on ultra-high speed data transmissions, exceeding the transmission limit of conventional signal, has been carried out across the globe. The related problem has been largely investigated in both theory and algorithm aspects. Researchers are carrying out a number of promising solutions for long-haul high-capacity systems, such as multicarrier modulation, phase beamforming, etc., bearing fruitful applications. The advanced signal processing schemes are promising to offer great reliability and flexibility in the design, deployment, and operation of 5G communication networks.

This special session invites contributions revolving around the current state-of-the-art advances in theory, algorithms and applications of the signal processing for 5G communication, with the goals to highlight new achievements and developments and promising new directions and extensions. Both survey papers and the papers of original contributions that enhance the existing works are also highly encouraged.

## 2) Lightweight Signal Processing and Machine Learning for Embedded Applications, chaired by Hakaru Tamukoh and Hiroshi Tsutsui

Abstract: Recent advancements in machine learning have opened up a significant opportunity in both cloud and edge computing applications. Machine learning is traditionally thought of as a software domain task on cloud computing, whereas edge computing-based design is firmly in a hardware domain. To bridge this gap, real-time processing and limitation of memory and circuit resources on edge devices should be considered. This special session discusses lightweight signal processing and machine learning theories, algorithms, and applications for edge computing. Prospective papers in the special session propose lightweight algorithms for the training of deep neural networks and machine learning, and image processing for embedded applications.

## 3) Deep Learning Systems for Cloud, Fog, and Edge Computing, and Applications, chaired by Jia-Ching Wang

Abstract: Deep learning has achieved great success in numerous perceptual tasks (e.g., object detection, image understanding, and speech recognition). At the same time, the number of end devices, such as IoT (Internet of Things) devices, has dramatically increased. These devices usually aim at some machine learning-based perceptual tasks or applications as they are often directly connected to sensors (e.g., cameras) that continuously capture a large quantity of input data. However, traditional cloud-based infrastructures have been not enough for the demands of the current state of machine learning systems on end devices due to some limitations. Some major issues include the associated communication costs, latency, security, and privacy concerns induced by current cloud-based infrastructures. Therefore, the concepts of fog and edge computing have been recently proposed to alleviate these limitations by moving data processing capabilities closer to the network edge. This special session will focus on all aspects of deep learning network architectures, algorithms, and applications, with particularly emphasizing on exploring recent advances in deep neural networks over the cloud, fog, edge, and end devices.

## 4) High Performance Video Processing and Image Identification, chaired by Prof. Junyong Deng

Abstract: With a continue push for higher coding efficiency, higher resolution, and more sophisticated video applications and high efficient image identification, it has gained more attention on how to improve the performance and energy efficiency of multimedia processing in both industry and academia. This session focuses on, but not limited to, the following areas: 1) algorithm optimization of video processing. 2) innovative communication structure. 3) performance characterization and optimization of video coding. 4) performance characterization and optimization of image identification. 5) advanced computation approach. 6) algorithm, implementation, and application of deep learning.

## Activities

We also had some activities to promote the impact. For example, we invite professors from Macau, Hong Kong and Shanghai to give lectures in Guangzhou, and discuss the recent advancement of IC design; Prof. Zhiyi Yu is invited to give a talk in the 2$^{nd}$ China Symposium on Cognitive and Hybrid Intelligence in Xi'AN, to introduce the design of domain-specific processors.



Fig. 3: We invite professors from Macau, Hong Kong and Shanghai to give lectures



Fig. 4: Prof. Yu is invited to give a talk in the 2$^{nd}$ China Symposium on Cognitive and Hybrid Intelligence

# News about APSIPA ASC 2019

## Prof. Dong Wang

Tsinghua University (China)

http://wangd.cslt.org/

APSIPA ASC 2019 (www.apsipa2019.org) is the 11th annual conference organized by Asia-Pacific Signal and Information Processing Association (APSIPA).  It will be held on November 18-21, 2019 in Lanzhou, China.  The technical program is now available at http://www.apsipa2019.org/TechnicalProgram.html.  Key events are summarized as follows

### 18 Nov 2019 (Monday)

| | |
|---|---|
| 09:30—11:30 | Tutorial 1: Tensor Component Analysis, *Yipeng Liu* |
| | Tutorial 2: Speech Enhancement based on Deep Learning and Intelligibility Evaluation, *Yu Tsao* and *Fei Chen* |
| | AutoWare workshop: *Alexander Carballo* and *Qingguo Zhou* |
| 13:30—15:30 | Tutorial 3: Fundamental and Progress of Deep Learning Based Statistical Parametric Speech Synthesis, *Zhenhua Ling* |
| | Tutorial 4: Few-Shot Learning, Adversarial Learning, and Their Applications, *Jen-Tzung Chien* and *Zhanyu Ma* |
| | AutoWare workshop: *Alexander Carballo* and *Qingguo Zhou* |
| 16:00—18:00 | Tutorial 5: Fundamental and Progress of Immersive Visual Media Communications *Yo-Sung Ho* |
| | Tutorial 6: Signal Enhancement for Consumer Products, *Akihiko Sugiyama* |
| | AutoWare workshop: *Alexander Carballo* and *Qingguo Zhou* |
| 19:00—21:00 | Welcome Reception |

### 19 Nov 2019 (Tuesday)

| | |
|---|---|
| 08:30-09:00 | Open Ceremony |
| 9:00-10:00 | Keynote 1: Transfer Learning: from Bayesian Adaptation to Teacher-Student Modeling, *Chin-Hui Lee* |

### 20 Nov 2019 (Wednesday)

| | |
|---|---|
| 09:00-10:00 | Keynote 2: Digital Retina—Improvement of Cloud Artificial Vision System from Enlighten of HVS Evolution, *Wen Gao* |
| 18:40-19:10 | APSIPA General Assembly |

### 21 Nov 2019 (Thursday)

| | |
|---|---|
| 09:00-10:00 | Keynote 3: Applying Deep Learning in Non-native Spoken English Assessment, *Kate Knill* |
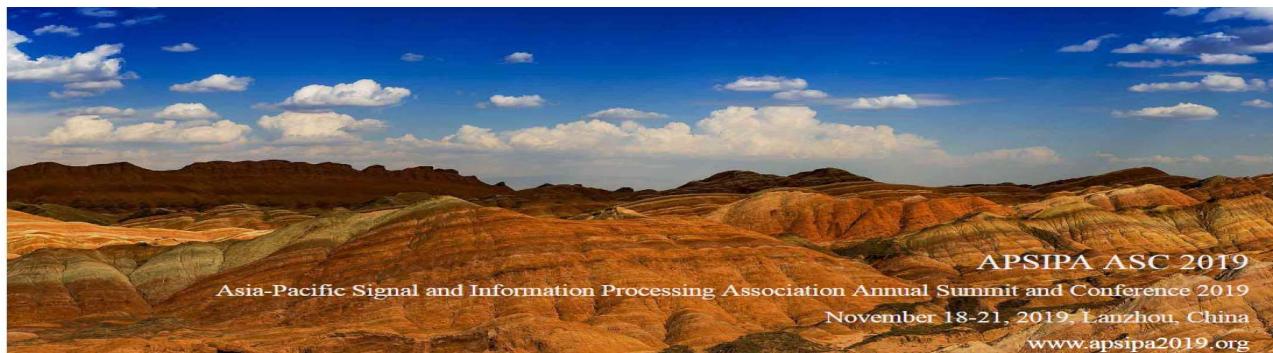
# Latest Articles from APSIPA Transactions on Signal and Information Processing (ATSIP)

- **Residual sign prediction in transform domain for next-generation video coding**
    - Alexey Filippov, Vasily Rufitskiy, Alexander Karabutov, Jianle Chen
    - DOI: https://doi.org/10.1017/ATSIP.2019.6
    - Published online: 11 October 2019, e24

- **Modern trends on quality of experience assessment and future work**
    - Woojae Kim, Sewoong Ahn, Anh-Duc Nguyen, Jinwoo Kim, Jaekyung Kim, Heeseok Oh, Sanghoon Lee
    - DOI: https://doi.org/10.1017/ATSIP.2019.16
    - Published online: 10 October 2019, e23

- **Spectral-spatial feature extraction and supervised classification by MF-KELM classifier on hyperspectral imagery**
    - Wenting Shang, Zebin Wu, Yang Xu, Yan Zhang, Zhihui Wei
    - DOI: https://doi.org/10.1017/ATSIP.2019.15
    - Published online: 20 September 2019, e22

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- **Special issue on deep learning based detection and recognition for perceptual tasks with applications**
    - Li-Wei Kang
    - DOI: https://doi.org/10.1017/ATSIP.2019.13
    - Published online: 29 July 2019, e21

- **Deep-learning-based macro-pixel synthesis and lossless coding of light field images**
    - Ionut Schiopu, Adrian Munteanu
    - DOI: https://doi.org/10.1017/ATSIP.2019.14
    - Published online: 17 July 2019, e20

- **Evaluating word embedding models: methods and experimental results**
    - Bin Wang, Angela Wang, Fenxiao Chen, Yuncheng Wang, C.-C. Jay Kuo
    - DOI: https://doi.org/10.1017/ATSIP.2019.12
    - Published online: 8 July 2019, e19

# Most Read Articles from ATSIP

*https://www.cambridge.org/core/journals/apsipa-transactions-on-signal-and-information-processing/most-read*

- **An overview of channel coding for 5G NR cellular communications**
    - Jung Hyun Bae, Ahmed Abotabl, Hsien-Ping Lin, Kee-Bong Song, Jungwon Lee
    - DOI: https://doi.org/10.1017/ATSIP.2019.10
    - Published online: 24 June 2019, e17

- **A review of blind source separation methods: two converging routes to ILRMA originating from ICA and NMF**
    - Hiroshi Sawada, Nobutaka Ono, Hirokazu Kameoka, Daichi Kitamura, Hiroshi Saruwatari
    - DOI: https://doi.org/10.1017/atsip.2019.5
    - Published online: 14 May 2019, e12

- **A tutorial survey of architectures, algorithms and applications for deep learning**
    - Li Deng
    - DOI: https://doi.org/10.1017/atsip.2013.9
    - Published online: 22 January 2014, e2

# Most Cited Articles from ATSIP

*https://www.cambridge.org/core/journals/apsipa-transactions-on-signal-and-information-processing/most-cited*

- **A tutorial survey of architectures, algorithms and applications for deep learning**
    - Li Deng
    - DOI: https://doi.org/10.1017/atsip.2013.9
    - Published online: 22 January 2014, e2

- **An overview on video forensics**
    - Simone Milani, Marco Fontani, Paolo Bestagini, Mauro Barni, Alessandro Piva, Marco Tagliasacchi, Stefano Tubaro
    - DOI: https://doi.org/10.1017/ATSIP.2012.2
    - Published online: 28 August 2012, e2

- **Recent advances on active noise control: open issues and innovative applications**
    - Yoshinobu Kajikawa, Woon-Seng Gan, Sen M. Kuo
    - DOI: https://doi.org/10.1017/ATSIP.2012.4
    - Published online: 28 August 2012, e3

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## Membership Benefits:

- Links to highly qualified people within the organization to develop research, technology, teaching, and career
- Discount fee on APSIPA conferences
- Reduced subscription fee for APSIPA journals
- Access to information about the international activities in signal and information processing such as conferences, continuing education, short courses, seminars, distinguished lecture series, student internships, scholarships, job listings, publication venues, and mentorships

To motivate APSIPA members to participate in APSIPA conferences, the registration for the 11th APSIPA conference implies an automatic renewal of APSIPA membership up to the end of December 2020.

You may join as:

- Student Membership: Student members are those who are enrolled full time in universities, institutes, or any accredited degree
- Full Membership: Full members are individuals interested in being part of the APSIPA mission to excel signal and information processing field. They are eligible to vote, hold positions in APSIPA association, and contribute to serve as editorial board and program committee members in APSIPA journals and conferences
- **Life Membership**: Full members may choose to subscribe as life members pending on paying the discount fee of life membership. Early-bird registration fee is available for life members at all times when registering for APSIPA ASC

| Type of membership | Fees in US$ | Fees in HK$ |
|---|---|---|
| Student Membership | 10 (per annual) | 78 (per annual) |
| Full Membership | 30 (per annual) | 234 (per annual) |
| Life Membership | 300 (a one-off fee) | 2340 (a one-off fee) |

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# Summary of Links

- APSIPA ASC 2019: http://www.apsipa2019.org

- APSIPA Winter School 2019: http://www.apsipa2019.org/WinterSchool.html

- APSIPA Transaction on Signal and Information Processing: http://journals.cambridge.org/sip

- Paper Submission to APSIPA Transaction on Signal and Information Processing: http://mc.manuscriptcentral.com/apsipa

- APSIPA Industrial Activities: http://www.apsipa.org/industrial.htm

- APSIPA Friend's Lab: http://www.apsipa.org/friendlab/FriendLabs.htm.

- APSIPA Membership Registration/Renewal: http://www.apsipa.org/reg.asp

- APSIPA Magazine: http://www.apsipa.org/doc/magazine/apsipa_magazine2018.pdf

- APSIPA Photo Gallery: http://www.apsipa.org/photo/photo.htm

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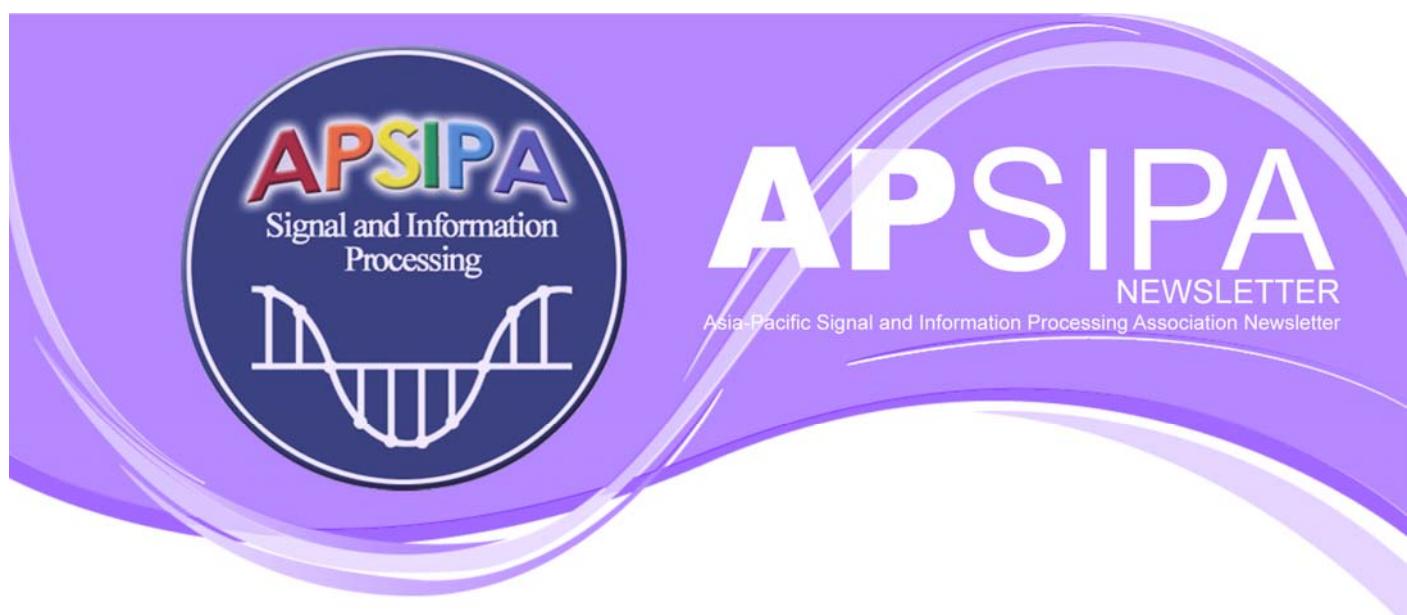


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