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ECTI President Message:

In the 12 years celebration, the new ECTI association committee has an aim to increase the ECTI members. The committee issues many strategies to provide more and more member benefits. For the next coming year, our members will enjoin not only various conferences organized by ECTI association but also the precious ECTI magazine. We will publish very interesting and highlight topics in all fields of electrical engineering into the magazine to make it a valuable forum for our members. We will move forward to make a very high quality magazine useful for electrical engineers in the world.

For this issue, I would like to express sincere appreciation to all the authors for their excellent contributions and editorial committee members for their great efforts to make this issue very successful. I also look forward to see the growing contribution for the magazine in the future.

Prayoot Akkaraekthalin, KMUTNB

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In this issue:

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[Article]

Applications of Image Processing Technique for Medical Treatment

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ABSTRACT

Biomedical engineering is a field that is important for medical. Many techniques are applied to develop new products for doctors in order to improve their quality of disease diagnosis. An important technique is image processing that is used for developing such kinds of new innovation. In this paper, we raise some applications of image processing techniques that are used for medical treatment as examples. Three applications that will mentions in this paper are pupil tracking for nystagmus system, nose detection for facial expression recognition, animal behavior analysis. We hope that this paper may make the one who is interesting in or concern with biomedical filed more understandable about image processing applications, able to apply image processing knowledge to improve their work, and understandable how to prepare information of each section in research paper.

Keywords: Pupil Extraction, Rat Behavior Analysis, Nose Detection

1. INTRODUCTION

Recently, many high advance technologies are applied to develop new medical products. An important field is image processing technique [1-3]. Medical products that use image processing concern with ophthalmology, aesthetics, or X-Ray radiographs. To launch these advance technology product, many experiments was tested in laboratory. In this paper, we will mention about our research in area of image processing concerning with medical treatment. Three kinds of research mentioned are pupil extraction for nystagmus system, nose detection for facial expression recognition, and animal behavior analysis for new drug test. Several methods have been proposed for such kinds of research.

For pupil extraction, it is significant process for nystagmus diagnosis system. There are three directions of nystagmus: vertical, horizontal and torsional. Doctor diagnoses this disease by observing patient eye movement; however, it is difficult for doctor to observe by bare eye. Therefore, a system for nystagmus diagnosis is needed. For nystagmus diagnosis system, high precise pupil extraction method is most important. Many methods have been proposed for extracting pupil [4-6]. W. Sunu proposed initial centroid and gradient analysis technique for estimating eye position [7]. For pupil detection, window-matching method is based upon an analysis of the grey level pattern around a point of interest and the search for the most similar pattern a frame. This method considers eye movement in horizontal and vertical direction. In case of low occlusion which is the best efficiency, its accuracy is 87.89%. Sh. Tominaga and at el. proposed a method to analyze nystagmus [8]. Daugman's integro-differential operator is applied for searching radius of pupil. Moreover, eye movement in torsional direction is also tracked from iris pattern. However, in process of pupil detection, Daugman's IDO algorithm takes much time to whole image domain. Y. Bei and at el. apply Starburst and ellipse fitting for finding pupil position [9]. The part of pupil is separated by classifying the pixels of the eye image with the gray threshold selection. The accuracy of pupil position is decided by the edge filtering with Sobel operator. Its position is defined by ellipse fitting on pupil edge. Gray threshold is also applied in M. Soltany's method [10]. They proposed a fast pupil-positioning algorithm combining edge detection algorithm and ellipse fitting based on gray projection and circular Hough transform. Gray threshold is selected for separating primary pupil positioning according to its histogram. Exact pupil is defined by Hough transform. M. Soltany's method improves time

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consumption from Y. Bie's method. Th. Charoenpong and at el. proposed a method for pupil extraction [11]. It consists of three processes: primary pupil extraction, noise elimination, and shape estimation. This method aims to tracking pupil movement and is then used for diagnosing nystagmus.

For nose detection for facial expression recognition, nose detection is used to define frontal side of face. It is significant step for recognizing facial expression from 2.5D face data. Facial expression is a factor for observing children with autism spectrum disorder (ASD) interaction. ASD children today is diagnosed and treated by expert pediatrician based on the observation of children's behaviour [12, 13]. ASD children activity which interacts with adults is observed for producing rating of the level of engagement that characterizes the quality of the interaction in order to provide most appropriate treatment. A method including nose detection for facial expression recognition has been proposed in Ref. 14-16. This paper will focus on nose detection method. Many methods have been proposed as follows. Previous works of nose detection research are divided into two groups based on the type of input data: 2D image, and 3D data set. For 2D image input, M. Hassaballah and at el. presented a new method for defining nose region by independent components analysis [17]. The independent components analysis is adopted as subspace classifier to classify the face candidate region to nose or non nose. Six different databases are tested in the experiment. The accuracy obtained from their nose detection method is 91.6% with various head pose between 22.5 to 67.5 degrees turning to left and right. For 3D data set input, a new method for detecting facial feature by time-of-flight (TOF) camera is presented by M. Bohme and at el [18]. A nose detector based on geometric feature with a face detector is applied for identifying nose point. The objective of this method is to prevent false detections outside the area of the face. To detect the nose, geometric features per pixel are computed. Face detection is used to compute the face position features for the nose detection. A classifier based on an axis-aligned bounding box in feature space is used. Pixels whose feature values fall within the box are classified as nose pixel. The error rate of combined classifier that uses both the geometric features and the face detector is 10.4%. However, this method is developed for frontal face data. N. Werghi and at el. detect nose tip from raw 3D triangular mesh facial surface [19]. This method is proposed based on the observation that the regions around some facial landmarks are characterized by low mesh quality. Obviously, triangular facets that correspond to low mesh quality are detected first. The N. Werghi's algorithm extracts central facets on raw facial data, and then nose tip is detected through model-based matching. To test the performance, the frontal face from 3D data scan is used. D. H. Nguyen and at el. presents a nose tip detection method using a novel 3D local shape descriptor called Distance based Fourier (DF) [20]. The DF is used to control the degree of descriptiveness depending on the complexity of object shape. Combing with Support Vector Machine, the DF descriptor proves powerful for nose tip detection. A method proposed by Th. Charoenpong and et al. show satisfactory result for nose detection from 2.5D facial data [21]. This method can detect nose from any viewpoint of face varying from between -45 degree and +45 degree.

For rat behavior analysis, several researches perform the experiment of rat's behavior for studying effect of new drug on its brain functions [22-25]. Behavioral parameters are measured such as position, duration, scratching and number of different actions. Many systems are developed in order to record these parameters automatically. H. Ishii and *et. al.* [22] present an autonomous experimental setup which measures rat's position, number of grooming and rearing in the open-field. An active tracking camera with high resolution image is used in the system. A food and a water feeding machine are placed in the open-field model. Grooming sensors are embedded in the floor board at each corner.

Rearing sensors are embedded in the wall. A CCD camera and an active tracking camera are fixed above the open-field. I. Ishii and et al [24, 25] proposed a method for extracting scratching pattern of a mouse by using high-speed vision system. This algorithm distinguishes scratching behavior from other. It detects mice scratching by extracting high frequency motion component in frame-to-frame difference images. Short-term pulses are generated in the frame-to-frame difference when a mouse scratches. Based on pulse threshold, duration time is used as criteria for detection. The system effectiveness regard to mice scratching quantification. Th. Charoenpong and at el. proposed method for measuring rat movement and behaviour [26, 27]. Rat distance movement and duration are measured by using background subtraction [26]. Rat body length is used to define rat behaviour between walking and other types of behaviour [27].

Three kinds of research area have been raised as example of image processing applications. To make image processing technique more understandable for research or any innovation, we will explain general process of image processing research. The general process will be used when we do research for any application.

Remaining of the paper is organized as follows: the general process for image processing research, experimental results, discussion and conclusion in last section.

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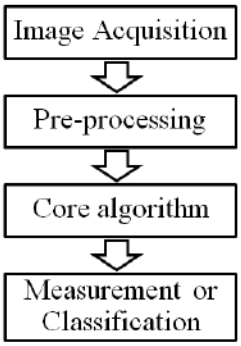

Fig. 1: *General diagram of image processing research*

2. General Diagram for Image Processing Research

In this section, process of the three methods: pupil tracking for nystagmus system, nose detection for facial expression recognition, and rat behavior analysis, will be described. In this paper, we refer to methods in Ref. 11, 21, and 27.

2.1 General Diagram

All methods will be shown in general diagram in Fig. 1. A general diagram of image processing research consists of four steps: image acquisition, pre-processing, core algorithm, and measurement or classification.

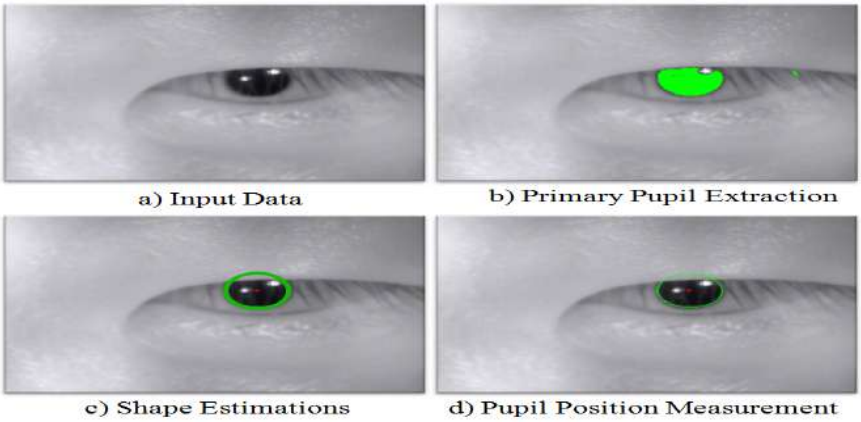

Fig. 2: *Diagram of pupil extraction algorithm [11]*

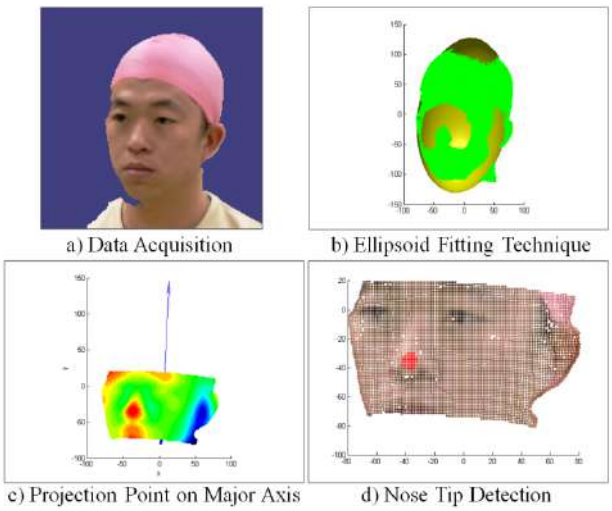

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Fig. 3: *Diagram of nose detection algorithm [21]*

Definition of each step in term of research will be explained in this section. The three research mentioned in previous section will be also shown in diagram.

Diagrams of the three research are shown in Fig. 2-4. Fig. 2 is diagram of pupil extraction [11]. The diagram consists of image acquisition, primary pupil extraction, shape estimation, and pupil position measurement. Fig. 3 is diagram of nose detection [21]. The diagram consists of data acquisition, ellipsoid fitting technique, projection point on major axis, and nose tip detection. Fig. 4 is diagram of rat behavior analysis [27]. The diagram consists of image acquisition, background modeling, feature extraction, and behavior classification. Diagrams of these methods are same with the general diagram in Fig. 1.

2.2 Method Description

To understand each step definition in general diagram, description of each method will be explained in this subsection.

For pupil extraction method, in our previous work [11], we proposed of pupil extraction algorithm by using integrated method. It consists of three processes: primary

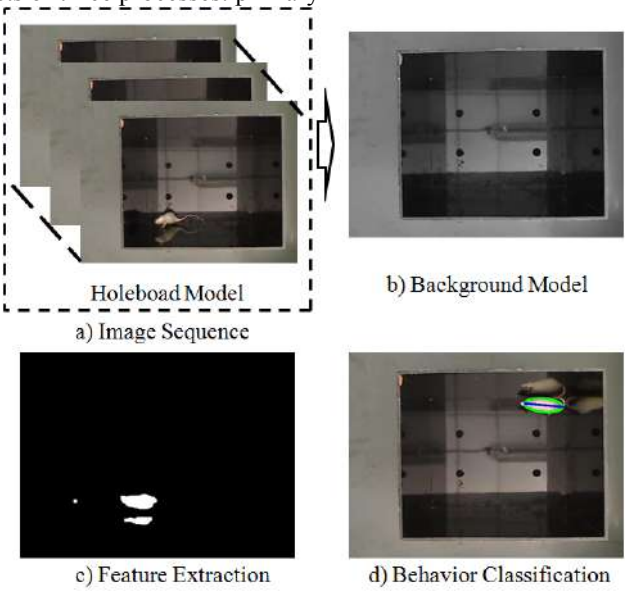

Fig. 4: *Diagram of rat behavior analysis algorithm [27]*

pupil extraction, shape estimation, and pupil position measurement. First, image sequence is used as input of system. Pupil is captured by infrared camera mounted on binocular. Second, primary pupil in a frame is extracted. An adaptive threshold is applied to extraction pupil preliminary. Black blob is defined as primary pupil. However, noise is occurred in the result. To eliminate the noise, Mahalanobis distance techniques is used. In some cases, pupil is occluded by eyelash or eyelid, complete shape of pupil is estimated by ellipse in third step. Fourth, center of pupil is estimated as pupil position. Therefore, we measures eye movement from pupil center.

For nose detection, we propose a new method for localizing the nose tip by using an ellipsoid fitting technique [21]. First, a 2.5D partial face dataset which contains partial face data, captured from any viewpoint between +/-45 degrees, is used for the experiments. Second, the 2.5D facial data is fitted to an ellipsoid. Third, each point on the facial surface is projected onto a major axis to define the nose region on the facial surface. Based on its Euclidean distance from the estimated center of the ellipse to the projected point on the major axis, the nose region is defined. In the final step, the Mahalanobis distance is used to search for the nose tip according to the point which is farthest from the estimated ellipse center.

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For rat behavior analysis, we proposed a new method for classifying a walking behavior in Holeboard model test based on length of rat's body [27]. Webcam is used to record data. The camera is installed over the models. The proposed method consists of three main processes. The first step is a background modeling; K-mean clustering technique is adapted to reconstruct the background. Second step, rat is extracted by means of background subtraction. Third step is an ellipse fitting by least square method. Then a length of rat's body is calculated for classifying rat behaviors. To test performance of the proposed method, classification accuracy is considered. 500 frames from five image sequence data sets are used. Based on pilot test, criterion of rat's body length for classifying walking behavior is 31 pixels. If the length of rat's body is greater than 31, it is indicated

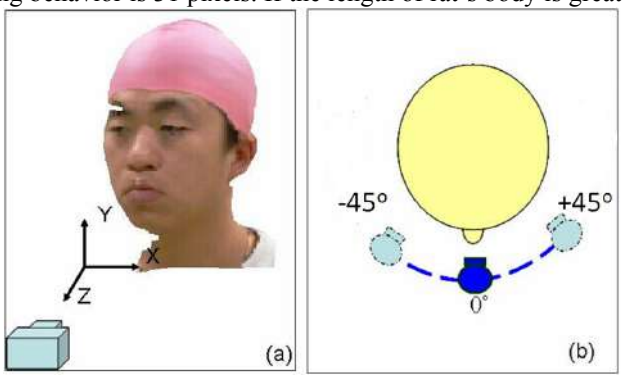

Fig. 5: *Data set acquisition setup for nose detection research [21].*

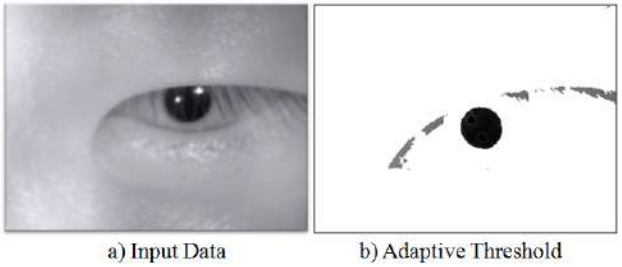

Fig. 6: *Pre-processing step for pupil extraction [11].*

as rat's walking behavior, in the other hand, it is others behaviors.

Now, we have understood how each method works. Next subsection, we will explain definition of each step.

2.3 Definition of Each Step

In this subsection, we will describe definition of each step in Fig. 1, and also explain each step of example methods which corresponds step in general diagram of image processing research.

Image acquisition is a first step of all research in image processing area. This step is to explain how to capture data, how to setup the room environment, how to setup camera, and what image size is. These three areas of research use all types of image data which are still image, range data, and image sequence data. However, to set or explain condition of image acquisition step for research, all information must concerned are similar.

We explain condition to capture the data for pupil extraction as follows [11]. Eye image is captured in dark environment in order to protect subject's concentrate from other light source. Therefore, subject has to wear a mask during capturing. In the dark environment, eye image is captured by using MD-Tech USB infrared camera model MDC-9 mounted on the binocular. The color image has 320x240 pixels in a frame. Frame rate is 30 frames per second. Focus range is 30 mm at least.

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For nose detection [21], input is 2.5D data. The input data is captured using VIVID700 and represented by the data point. The range image size is 200x200 pixels. The color image size is 400x400 pixels. Unfortunately, VIVID700 is not sensitive for the black color like hair, because it uses a laser scanner. This problem was solved by covering the hair with the cap. The input image was captured from any viewpoint around Y axis from

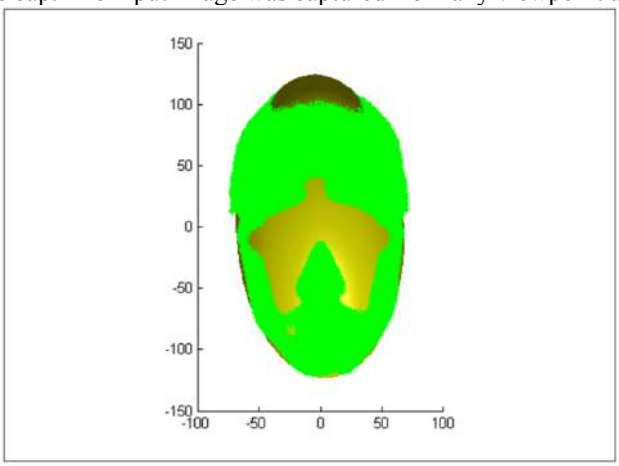
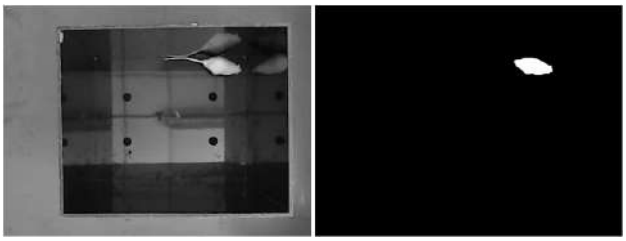


Fig. 7: *Head data with ellipsoid fitting [21].*



a) Input data b) Rat body extraction

Fig. 8: *Pre-processing step for rat behavior analysis [27]*

-45 degree to 45 degree as shown in Fig. 5. Distance from subject to camera is 1.5 meter.

For rat behavior analysis [27], image sequence is captured by using Logitech webcam pro9000. It is placed above the models 1.5 meters. Image size is 640x480 pixels. Frame rate is 30 frames per second.

Pre-processing is step using techniques to prepare data for core algorithm step.

For pupil extraction, primary pupil is needed in pre-processing step. Based on variation in illumination of each area in an image, a threshold value which is vary according to lighting condition for individual area is prefer. An adaptive method proposed by D. Bredley [28] is applied in pupil extraction method [11].

For nose detection, As human head profile is similar to oval, ellipsoid is fitted to the head data. Data distribution of head is represented as three axes of ellipsoid [29] as shown in Fig. 7. Major axis is used to detection nose in core algorithm step.

For rat behaviour analysis, this step consists of two techniques: background modelling, and feature extraction; to extract rat body as shown in Fig. 8.

Core algorithm is main processing that is significant for satisfactory result.

For pupil extraction, the shape estimation algorithm by using ellipse is adopted to complete pupil shape. Position of pupil is represented as its center.

For nose detection, Mahalanobis distance is important technique. It is used to search for nose tip according

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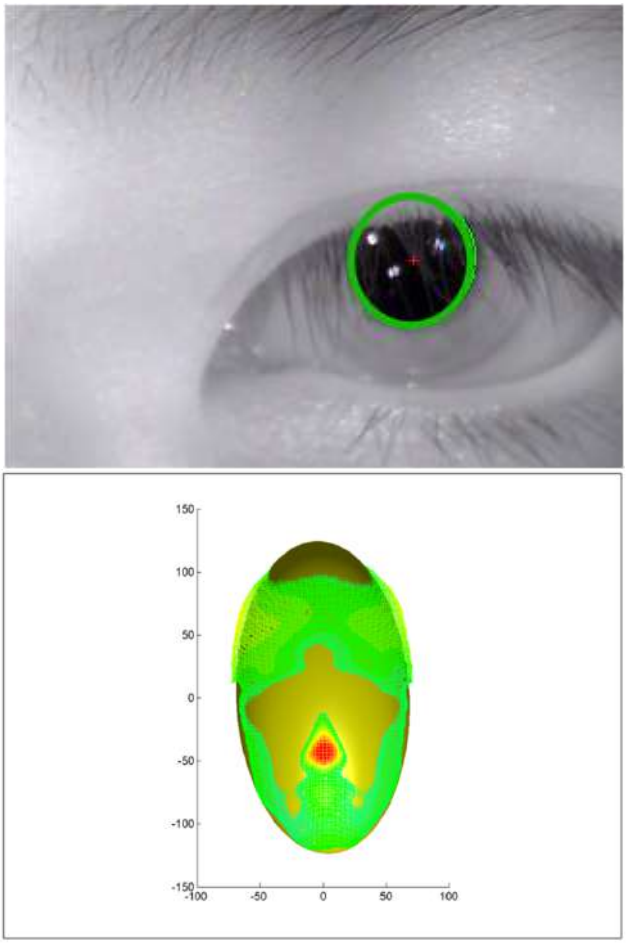

Fig. 9: *Pupil extraction result [11]*

Fig. 10: *Nose tip detection result. The red region is defined as nose tip [21].*

to the point on face which is farthest from the estimated ellipse center.

For rat behavior analysis, ellipse fitting is used to estimate rat body length. Major axis is represented as rat body length. We measure rat body length along major axis.

Measurement or classification step is final step to judge the output.

For pupil extraction, pupil position in each frame is tracking. Eye movement is output of pupil extraction method.

For nose detection, detection method is used in this research. Nose tip is detected by Mahalanobis distance.

For rat behaviour analysis, rat body length is used as a parameter to compare with criterion. If it is longer than criterion, rat behavior is judged as walking behavior, in another way, it is judged as other behaviors.

3. Experimental Results and Discussion

In this section, we will explain what kinds of information should be given in experimental results section, and what we should discuss in discussion subsection.

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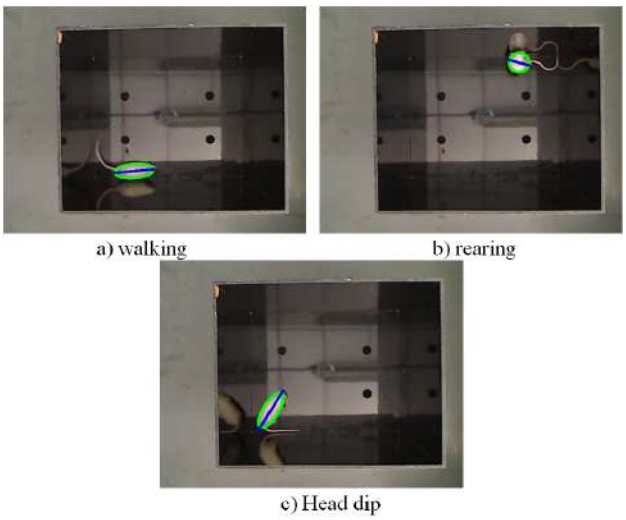

Fig. 11: *Rat behavior classification [27]*

Information that we should explain in experimental results section is about a process to evaluate performance, number of subject, measurement parameters, and how many results are good or not good. Especially, in image processing research, image result should be also shown.

We will use experimental results in our previous method as examples for experimental results section.

For pupil extraction [11], performance of pupil extraction method is evaluated and represented in term of accuracy and precision. Accuracy is computed by mean of Eq. 1 [11]. 1869 frames from 9 subjects are used in this experiment.

$$SuccessRate = Samples - Error$$

$$Accuracy(\%) = \frac{SuccessRate}{Samples} x100\% \quad (1)$$

Pupil extraction that is defined as error is one of the following conditions,

- there is noise occurred,
- only partial pupil region is detected,
- another feature is segmented including in the result.

Accuracy rate of this pupil extraction method is 94.06%. Precision is measured by Euclidian Distance. The Euclidian Distance is 1.92 pixels of error. This method show better performance comparing with Ref. [30]. Result of pupil extraction is shown in Fig. 9.

For nose detection [21], the 5 viewpoints of 22 people were captured starting from -45 degree to 45 degree around Y axis with step 22.5 degree. Four facial expressions tested were angry, smile, normal, and surprise. The total number of test samples was 486. Accuracy of the nose tip detection is 65.02%. Nose tip detection result is shown in Fig. 10.

For rat behavior analysis [27], five-hundred images are selected from every a period of time in five minutes image sequence. The result judged by the proposed method is compared with experimenter judgment. Rat behavior is distinguished into two classes: one is walking rat, another is other behavior. Correct classification accuracy of rat walking is 72.52%. Result of rat behavior classification is shown in Fig. 11.

In discussion subsection, cause of error should be discussed, and shown in term of percentage error. It will be useful when other researcher will make the decision to improve weak point of existing method.

4. Conclusion

In this paper, we aim to explain method for image processing research in form of general diagram. Three kinds of research in area of medical treatment are shown as example for image processing applications. Though

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the paper, we also explain definition of each section in research paper, and what we should describe in each section. We hope that this paper may make the one who is interesting in or concern with biomedical filed more understandable about image processing applications, able to apply image processing knowledge to improve their work, and understandable how to prepare information of each section in research paper.

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THEEKAPUN CHAROENPONG

He received his BEng degree in electronics engineering from King Mongkut's Institute of Technology Ladkrabang, Thailand, in 2001, MEng degree in electronics and information engineering from King Mongkut's University of Technology Thonburi, Thailand, in 2005 and a D.Eng. degree in Graduate School of Engineering, University of Fukui, Japan, in 2008. Now, he works as an assistant professor at Biomedical Engineering Program, Faculty of Engineering, Srinakharinwiroj University, Thailand. His research is in area of image processing and computer vision for both of two dimensional and three dimensional data.

Paper List of ECTI-EEC Trans., Vol.12 , No. 2, Aug-2014 issue

http://www.ecti-thailand.org/paper/journal/ECTI-EEC

1) T. Thanasaksiri , “Improving The Lightning Performance of Overhead Distribution and Sub-transmission Lines Applying Additional Underbuilt Shield Wire.”

2) N. Fuengwarodsakul, “Overcurrent Protection with Semiconductor Device Protection for Li-Ion Battery Management System in Electric Bicycles.”

3) D. Azizian, and M. Bigdeli, “Leakage Inductance Calculations in Different Geometries of Traction Transformers.”

4) F. J. Arnold, M. S. Gonçalves, L. L. Bravo-Roger, and S. S. Mühlen, “Electric Impedance of Piezoelectric Ceramics under Acoustic Loads”.

5) S. N. Ravadanegh, B. Mohammadzadeh, and R. Gholizadeh, “Optimal Designing of SSSC Based Supplementary Controller for LFO Damping of Power System Using COA.”

6) C. Charoenlarpnopparut, “Performance Evaluation of 2D Image Transmission System with 2D Interleaver under Severe Burst Error Environment.”

7) T.Chanpuek, P. Uthansakul, and M. Uthansakul, “Performance Analysis of Modified STBC Scheme for Cooperative MIMO Communications.”

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Report from Conferences and Workshops

1. Seminar on Conference Paper Writing at NUOL, Vientiane, Laos

The delegates of ECTI including Prayoot Akkaraekthalin, Somsak Choomchauy, Sathaporn Promwong, and Kosin Chamnongthai visited NUOL (National University of Laos) at Vientiane, Laos on July 7, 2014, and organize a seminar on conference paper writing. More than 20 Laotian lecturers and students attended the seminar. The delegates had a chance to discuss with the dean of engineering faculty and vice president in academic affairs.

Reported by Kosin Chamnongthai (KMUTT)

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2. Professor Roadshow

ECTI association has set up a program to encourage Thai lecturers to plan forward professor position. In 2014, Prof. Monai Krairiksh, Prof. Prayoot Akkaraekthalin, and Prof. Kosin Chamnongthai organized a seminar in professor roadshow at computer engineering department, Chiangmai University on June 19, 2014, and plan to visit Bangkok University on Oct 14, 2014, Prince Songkla University on Dec 18, 2014, and Mahasarakam University on Jan 20, 2014.

Reported by Kosin Chamnongthai (KMUTT)

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3. ITC-CSCC 2014 (reported by Chiranut Sa-ngiamsak, KKU)

Written by:
Assoc.Prof.Piya Kovintavewat (NPRU)

Edited by:
Asst.Prof.Chiranut Sa-ngiamsak (KKU)

Inside this issue:

"***After 3 Political Punches, The 29th ITC-CSCC still stands with grace and determination to succeed***" That was the message from me, the general chair during the opening ceremony. This conference is the first conference that I served as the general chair and possibly one of the toughest time in my life as the first female general chair and possibly the youngest one for ITC-CSCC. The first punch was the big demonstration in Bangkok and following by the declaration of the state of emergency then we relocated the venue to Phuket. The second punch was the martial law and the third one was the coup d'état. There were the period that I called it as the Tsunami for ITC-CSCC2014. The decision to handle the situation was crucial and the support from all parties were "the water in the desert". Finally, we as a team delivered the 29th ITC-CSCC 2014 in the Phuket Graceland Resort and Spa, Phuket, Thailand during July 1-4, 2014.


A nice view at the ITC-CSCC conference venue

A wonderful Call for Papers

In 2001, the ITC-CSCC was held in Phuket, Thailand which was the first time to be held in a place other than Korea and Japan. In 2014 the 29th ITC-CSCC was destined to Phuket once again.

Generally, the ITC-CSCC conference has been set and rotated in three countries: Korea, Japan and Thailand.

Currently, the ITC-CSCC is sponsored by the IEICE, the IEEK, and the Electrical Engineering/Electronics, Computer, Telecommunications and Information (ECTI) Association, Thailand.

Chiranut Sa-ngiamsak

The General Chair of The 29th ITC-CSCC 2014


General Chair, Prof. Chiranut Sa-ngimsak, Khon Kaen University, Thailand, and her team during the Welcome Reception

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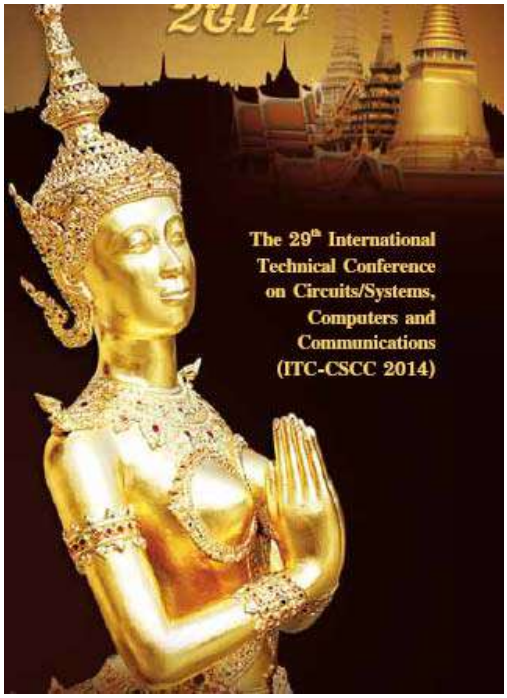

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The Opening Speech given by Honorary Prof. Sawasd Tantaratana, followed by the two keynote speakers, i.e., Prof. Masaharu Imai and Dr. Alan B. Johnston.

Keynote Speakers

Prof. Masaharu Imai
Osaka University, Japan

Topic: *"The Role of Information, Communication and Electronic Technologies in the Future Medical/ Healthcare Systems"*

Dr. Alan B. Johnston
Vice President of Recording Heads Development, Seagate Technology, USA

Topic:*"Hard Disk Drives – The Backbone of Data Storage"*

Dr. Hwang Seung Ku
Senior Vice President of ETRI, Korea

Topic: *"A Perspective on Big Data Revolution and its Enabling Technologies"*

Prof. David Banjerdpongchai
Chulalongkorn University, Thailand

Topic: *"Convex optimization approach to robust iterative learning control for linear systems subject to parametric uncertainties"*

Technical Programs

ITC-CSCC 2014 was carried out in three days. The total number of registered papers is **308** papers (i.e., 284 oral and 24 poster papers) from 9 different countries, namely, Thailand (140), Korea (82), Japan (72), Taiwan (1), Laos (1), Saudi Arabia (2), India (1), Iran (8), and Austria (1). In addition, there are 48 sessions and they were categorized into 36 regular and 12 special sessions. The topic of special sessions includes:

- Modern Localization Technologies: From radio to light wave and their emerging
- Signal Processing for Digital Data Storage
- Information and Communication Systems for Safe and Secure Life

Oral Presentation

- Hybrid wired/wireless networks for next generation broadband communication systems
- Mathematical Systems Science and its Applications
- Advanced System Level Synthesis and Optimization Technologies for VLSI Design
- Wireless Network and Future Internet
- Wireless Sensor Networks and Applications on Industrial, Agriculture, and Health care
- Biomedical Engineering and Applications
- Digital Filter and Its Modern Applications
- Life Media and Social Media Technology for Daily Life
- Mobile Apps for Edutainment and Modern Lifestyle

Certificates of Author Participation

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Best Paper Awards

Prof. Cheon Won Choi gives the best paper award to a student.

In this conference, the awards for the best ITC-CSCC 2013 papers go to:

- "*Architecture for Sealed Wafer-scale Mask ROM for Longterm Digital Data Preservation*" by S. Matsuda, T. Imagawa, H. Tsutsui, T. Sato, Y. Nakamura, and H. Ochi (Kyoto University and Ritsumeikan University, Japan)
- "*Degree Distribution Optimization of Fountain Codes for Intermediate-state Users*" by Y. Suh, B. Ahn, I. K. Sohn, and J. Heo (Korea University, Korea)
- "*Magnetic Interaction of Magnetic Nano-dot Arrays at Areal Density over* 1 Tb/in^2" by W. Tipcharoen, A. Kaewrawang, C. Sa-Ngiamsak, N. Prapasawad, A. Sirilaratiwat, and K. Tonmitra (Khon Kaen University, Thailand)
- "*Performance Evaluation of Structured Topologies in Service Overlay Networks*" by P. Boonyopakorn and P. Meesad (King Mongkut's University of Technology, Thailand)
- "*Quantification of Video Authenticity by Considering Video Editing Operations through Visual Quality Assessment*" by M. Penkov, T. Ogawa, and M. Haseyama (Hokkaido University, Japan)
- "*Throughput Analysis of Generic MAC Scheme in Energy Harvesting Wireless Sensor Networks*" by P. S. Ghang, I. Jun, J. K. Park, J. Kim, and C. W. Choi (Dankook University, Korea)


Prof. Lunchakorn Wuttisittikulkij serves as an MC for the best paper award and the travel grant ceremonies.

Student Travel Grants

In this year, we offer 15 student travel grants (Upto 250 US dollars each) to assist students who attended and presented their papers at ITC-CSCC 2014. Here are the students who get


Prof. Prayoot Akkaraekthalin gives a travel grant to students

Osaka City University, Japan
- Junichi Tomiyama

Yamaguchi University, Japan
- Yuan Qu

Khon Kaen University, Thailand
- Pamin Rangsikunpum
- Chaluemwut Noyunsan
- Naruemon Wannawong
- Kotchakorn Pituso

King Mongkut Institute's of Techonology Ladkrabang, Thailand
- Malanh Phetsavong

Suranaree University of Technology, Thailand
- Ayodeji Oluwasola Daramola

Panyapiwat Institute of Management, Thailand
- Supatta Viriyavisuthisakul
- Su-amporn Parnsup

Chulalongkorn University, Thailand
- Jaroonrut Prinyakupt
- Tiwaporn Pliensak
- Ambar Bajpai
- Muhammad Saadi

Mahidol University, Thailand
- Jidapa Hansawangkit


What a fantastic VIP dinner (July 2, 2014)


IAC/ICC/IOC during Grand Banquet (July 3, 2014)

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Popular Vote for Poster Awards

There are 24 Poster papers presented in this ITC-CSCC conference. To encourage the Poster session, we prepare a popular vote for poster award. The 1st winner received an external 1 TB hard disk drive from sponsored by Dr.Alan B. Johnston, Seagate Technology. Furthermore, the 2nd - 5th winners will also receive a 8 GB flash drives provided ITC-CSCC.

Popular vote (1st winner)

◊ "*3D Sign Language Dictionary Web System for Hearing Impaired People*", by S. Suwannawong, V. Tunbuheng, and D. Tancharoen (Panyapiwat Institute of Management, Thailand)

Popular vote (2nd - 5th winners)

◊ "*A Design of Low Dropout Voltage Regulator with Wide Input Range and Fast Settling Time for Wireless Charge Receiver*" by J. H. Kang, H. Abbasizadeh, H. G. Park, and K. Y. Lee (SungKyunKwan University)

◊ "*Automatic GO Games Recording System*" by S. Buranasomphob and P. Sanguansat (Panyapiwat Institute of Management)

◊ "*A Design of Over and Reverse Voltage Protection Circuit with Low Voltage Drop for Automotive Applications*" by S. H. Cho, C. Lee, and K. Y. Lee (Sungkyunkwan University)

◊ "*A high-accuracy and low-loss current sensing method for an Application processor*" by C. Jo, J. Ock, H. Lee, S. Son, H. Kim, S. Cho, J. A. Jang, J. Lee, and K. Y. Lee (Sungkyunkwan University)

Prof. Prayoot Akkaraekthalin received a 100,000 baht for sponsorshop from Dr.Alan B. Johnston, Seagate Technology, USA.

Activities at the Registration Desk

Registration

In this conference, there are three different registration types, namely, regular registration, student registration, and free registration. The total number of registrations is 358 registrations, which can be categorized into 209 oversea registrations and 149 Thailand registrations.

Registration Type			
Overseas	**Regular**	**Student**	**Free**
209	164	35	10
Thai	**Regular**	**Student**	**Free**
149	96	48	5
358	**260**	**83**	**15**

All types of registration include the access to all sessions, coffee breaks, and conference program. The registered authors will automatically receive a 1-year ECTI Membership or 1-year ECTI Membership Extension if they have already been ECTI members.

Special Tutorials and Workshop

Prof. Shinichiro Haruyama
Keio University, Japan

Title: "*Visible Light Communications*"

Dr.Teerawat Issariyakul
TOT Public Company Limited, Thailand

Title: "*Speakers Must Know–How Steve Jobs Deliver His Message to Audience*"

Prof.Kosin Chamnongthai
King Mongkut's University of Technology Thonburi, Thailand

Title: "How to write International Journals"

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Three winners who correctly answered the question from Dr. Alan B. Johnston, a keynote speaker, received a 1 TB wireless hard disk drive.

A lot of participants enjoy a wonderful Thai dance during Grand Banquet

Dr. Hwang Seung Ku, a keynote speaker, got a token of appreciation from Prof. Young Shik Moon

The next ITC-CSCC conference will be held in **Yonsei University**, Seoul, Korea from June 29 to July 2, 2015.

Attractions

Chosun Dynasty Palace

Ehwa Univ. Shopping Street

Hongdae Club, Fashion, Arts

ITC-CSCC 2016

The ITC-CSCC conference of the year 2016 is planned to be organized in Okinawa, Japan. The final details will be announced during the next ITC-CSCC 2015 conference.

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2015 – 7th International Conference on Knowledge and Smart Technology (*KST*)

January 28-31, 2015. Faculty of Informatics, Burapha University, Chon Buri, THAILAND.

"Entertainment Technology for Life"

Call for papers

KST international conference has been established with the aim in mind that a sustainable community will be achieved through continuous studies and share resources. The conference will be held annually in Burapha University which located in the Eastern part of Thailand. It provides a central forum for experts and developers to promote, share, and discuss various issues and developments in the broad field of Computational Intelligence, Intelligent Application, Intelligent Computer Networks and Systems, and Emerging Intelligent Technologies. KST international conference will provide an opportunity for young researchers to demonstrate their talent and interesting research ideas. The conference will benefit people who are actively involved in research related to computational intelligence and its applications. Accepted papers will be published in the KST-2015 Conference Proceedings. Presented and selected papers will be included in IEEEXplore®. Selected papers will be proposed for further extension before publishing in ECTI-Transaction on Computer and Information Technology (ECTI-CIT).

The list of topics of interest includes (but not limited to)

Computational Intelligence
- Artificial Immune Systems
- Bayesian Networks
- Cognitive Systems
- Computational neuroscience
- Data Analysis and Pattern Recognition
- DNA Computing
- Expert Systems
- Fuzzy Techniques and Systems
- Genetic Algorithms and Evolutionary Computing
- Knowledge-Based Systems (Knowledge Acquisition, Knowledge Discovery and Data Mining, Knowledge Representation and Management)
- Machine Learning
- Microarray Data Analysis
- Neural Networks
- Ubiquitous Computing

Intelligent Applications
- Bioinformatics using Intelligent & Machine Learning Techniques
- Fault Diagnosis
- Financial & Stock Market Monitoring and Prediction
- Geographical Information System
- Image & Signal and Time Series Processing
- Intelligent Disaster Warning System
- Intelligent Web-based Systems
- Machine & Computer Vision
- Medical & Diagnostic Systems
- Natural Language Processing
- Speech Processing and Synthesis

Intelligent Computer Networks and Systems
- Ad Hoc Networks
- Cloud and Grid Computing
- Computer Architecture
- Computer Simulation and Modeling
- Computer and Network Security
- Computer and Network Applications
- Computer Network and Communication
- Embedded Systems
- Network Management and Analysis
- Network Protocol and Architecture
- Mobile Computing and Systems
- Future Internet
- Parallel and Distributed Computing
- Pervasive and Mobile Computing
- Wireless Sensor Networks
- Wireless Networks and Communications

Emerging Intelligent Technologies
- Artificial Intelligence and Information Agents on the Internet
- Artificial Life
- Blind Source Separation
- Business Intelligence Systems
- Cognitive Interfaces
- Context-aware and Affective (Emotional) Computing
- Human-centered Computing
- Intelligent Operating Systems
- Intelligent Agents and Multi-Agent Systems
- Intelligent Tutoring Systems
- Intelligent User Interfaces
- Intelligent Web Mining & Applications
- Intelligent Web Personalization
- Semantic Web
- Multi- Media Intelligent Information Systems

Important Dates

Call for Special Session Proposal	July 15, 2014
Notification of Special Session	September 1, 2014
Full paper submission	October 1, 2014
Notification of acceptance	November 30, 2014
Registration	December 15, 2014
Camera-ready submission	December 15, 2014

Paper Submission

Full paper submission in English is expected. All manuscripts must be prepared in the standard IEEE Conference Proceedings format and limited to the maximum of 6 pages of A4 form in PDF format. Please use 10 points and Time New Roman font. The authors' names and affiliations, postal addresses, telephones, fax numbers and e-mail addresses must be omitted from the submitted manuscripts. Each manuscript must contain an abstract of about 100 words.

Conference site is **http://www.kst-thailand.org/**

Online submission site is **http://www.edas.info/N18217**

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Hua Hin, Thailand June 24 – 26, 2015

ECTI-CON 2015 is the twelfth annual international conference organized by Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI) Association, Thailand. The conference aims to provide an international platform to present technological advances, launch new ideas and showcase research work in the field of electrical engineering, electronics, computer, telecommunications and information technology. Accepted papers will be published in the Proceedings of ECTI-CON 2015 and will be submitted for inclusion into IEEE Xplore. Acceptance will be based on quality, relevance and originality.

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Area 8) Signal Processing:
Signal Processing Theory, Digital Signal Processing Algorithms, Digital Filter Design & Implementation, Array Processing, Adaptive Signal Processing, Audio, Speech, and Language Processing, Image and Video Processing, Medical Signal Processing & Medical Imaging;
Special sessions:
The aim of special sessions is to provide researchers with an opportunity to present their their latest, cutting-edge research within specific fields relevant to the theme of the conference. Prospective organizers should submit proposals to the General Secretary via

Paper submission:
- Prospective authors are invited to submit original full papers **without author's names and affiliations, in English**, of 4-6 pages in standard IEEE two-column format only, reporting their original work and results, applications, and/or implementation in one or more of the listed topics.
- Papers must be submitted only by internet through the submission system of the conference website.
- At least one author of each accepted paper **MUST** register and present paper at the conference in order for the paper to be included in the program. The program will be submitted for inclusion into IEEE Xplore.

Important dates:
- Full paper submission: Jan 31, 2015
- Notification of acceptance: Apr 30, 2015
- Camera-ready paper submission: May 15, 2015
- Authors and Early-bird registration: May 15, 2015

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Asia-Pacific Signal and Information Processing Association Annual Summit and Conference 2014

December 9-12, 2014, Siem Reap, city of Angkor Wat, Cambodia
http://www.apsipa2014.org/

APSIPA ASC 2014

Call for Papers

Welcome to the APSIPA Annual Summit and Conference 2014 located in Siem Reap, city of Angkor Wat, the capital city in northwestern of Cambodia, and a popular resort town as the gateway to Angkor temples region. Siem Reap has colonial and Chinese-style architecture in the Old French Quarter. In the city, there are museums, traditional Apsara dance performances, silk farms, fishing villages and a bird sanctuary near the Tonle Sap Lake. The sixth annual conference is organized by Asia-Pacific Signal and Information Processing Association (APSIPA) aiming to promote research and education on signal processing, information technology and communications. The annual conference was previously held in Japan (2009), Singapore (2010), China (2011), USA (2012) and Taiwan (2013). The field of interest of APSIPA concerns all aspects of signals and information including processing, recognition, classification, communications, networking, computing, system design, security, implementation, and technology with applications to scientific, engineering, and social areas.

The regular technical program tracks and topics of interest include (but not limited to):

1 Biomedical Signal Processing and Systems (BioSiPS)
- 1.1 Biomedical Imaging
- 1.2 Modeling and Processing of Physiological Signals (EEG, MEG, EKG, EMG, etc.)
- 1.3 Biologically-inspired Signal Processing
- 1.4 Medical Informatics and Healthcare Systems
- 1.5 Genomic and Proteomic Signal Processing

2 Signal Processing Systems: Design and Implementation (SPS)
- 2.1 Nanoelectronics and Gigascale Systems
- 2.2 VLSI Systems and Applications
- 2.3 Embedded Systems
- 2.4 Video Processing and Coding
- 2.5 Signal Processing Systems for Data Communication

3 Image, Video, and Multimedia (IVM)
- 3.1 Image/video Coding
- 3.2 3D image/video Processing
- 3.3 Image/video Segmentation and Recognition
- 3.4 Multimedia Indexing, Search and Retrieval
- 3.5 Image/video Forensics, Security and Human Biometrics
- 3.6 Graphics and Animation
- 3.7 Multimedia Systems and Applications

4 Speech, Language, and Audio (SLA)
- 4.1 Speech Processing: Analysis, Coding, Synthesis, Recognition and Understanding
- 4.2 Natural Language Processing: Translation, Information Retrieval, Dialogue
- 4.3 Audio Processing: Coding, Source Separation, Echo Cancellation, Noise Suppression
- 4.4 Music Processing

5 Signal and Information Processing Theory and Methods (SIPTM)
- 5.1 Signal Representation, Transforms and Fast Algorithms
- 5.2 Time Frequency and Time Scale Signal Analysis
- 5.3 Digital Filters and Filter Banks
- 5.4 DSP Architecture
- 5.5 Statistical Signal Processing
- 5.6 Adaptive Systems and Active Noise Control
- 5.7 Sparse Signal Processing
- 5.8 Signal Processing for Communications
- 5.9 Signal Processing for Energy Systems
- 5.10 Signal Processing for Emerging Applications

6 Wireless Communications and Networking (WCN)
- 6.1 Wireless Communications: Physical Layer
- 6.2 Wireless Communications and Networking: Ad-hoc and Sensor Networks, MAC, Wireless Routing and Cross-layer Design
- 6.3 Wireless Networking: Access Network and Core Network
- 6.4 Security and Cryptography
- 6.5 Devices and Hardware

Submission of Papers

Prospective authors are invited to submit either full papers, up to 10 pages in length, or short papers up to 4 pages in length, where full papers will be for the single-track oral presentation and short papers will be mostly for poster presentation. Conference content will be submitted for inclusion into IEEE *Xplore* as well as other Abstracting and Indexing (A&I) databases.

Important Dates

Submission of Proposals for Special Sessions, Forum, Panel & Tutorial Sessions	~~May 9, 2014~~	June 6, 2014
Submission of Full and Short Papers	~~June 6, 2014~~	July 4, 2014
Submission of Papers in Special Sessions	July 4, 2014	
Notification of Papers Acceptance	Aug. 29, 2014	
Submission of Camera Ready Papers	Sep. 26, 2014	
Author Registration Deadline	Sep. 26, 2014	
Tutorial Session Date	Dec. 9, 2014	
Summit and Conference Dates	Dec. 9-12, 2014	

E-mail : secretary@apsipa2014.org

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