

Message from editor

Dear ECTI Association members



The year of 2014 just started. I wish all ECTI Association members happiness and success.

In the starting of 8th year of ECTI E-magazine, we are happy to offer ECTI members an article entitled "Cellular Automata-Based Error Correcting Capability" composed by S. Wongthanavasu and J. Ponkaew, paper list of ECTI-EEC Trans (Vol. 12, No.1), reports from conferences (IWAIT 2014, KST 2014, and JICTEE 2014), and call-for-papers of upcoming conferences. Hopefully, all members may enjoy them, and have a good time in the beginning ot the year.

ECTI E-Magazine Editor

Kosin Chamnongthai (King Mongkut's University of Technology Thonburi: KMUTT, Thailand)

In this issue:

ECTI president message	Page 1
Article (Cellular Automata-Based Error Correcting Capability)	Page 2
Paper list of ECTI-EEC Trans (Vol. 12, No. 1)	Page 13
Reports from conferences (IWAIT 2014, KST 2014, JICTEE 2014)	Page 15
Call-for-papers (APSIPA-ASC 2014, ITC-CSCC 2014, ECTI-CON 2014)	Page 25
ECTI Who's Who	Page 28





ECTI President Message:

This coming new year is an important occasion for the association. It is a renewal year for us. The new committees have been elected and will continue to push ECTI forward into the future. I would like to take this opportunity to thank all my colleagues in supporting ECTI. They have been the pillars of our association in the past two years, without them, a lot of activities of our association cannot be successful as they are. Many goals have been fulfilled, and many have remained to be future We have great success in collaborating more with goals. international organizations. Presently, our activities in organizing international conferences are healthy. We also have good progress in stimulating local academic activities. We enrolled many new members. Things seem to be good for us. However, we still need many hands to support ourfuture activities. At this time, the society has turn toward "better, faster, cheaper and more customization". So, we also must adapt and look forward to be a part of that future.



CELLULAR AUTOMATA-BASED ERROR CORRECTING CAPABILITY

S. Wongthanavasu

J. Ponkaew

Department of Computer Science Faculty of Science, Khon Kaen University Khon Kaen 40002, Thailand wongsar@kku.ac.th Faculty of Art & Science Sisaket Rajabhat University Sisaket 33000, Thailand jp.sskru@gmail.com

ABSTRACT

This article reports an error correcting capability (ECC) of an associative memory built around a proposed cellular automata-based model, called Two-class Classifier Cellular Automata with Artificial Point (2C2-GMACA). The 2C2- GMACA aims to improve the performance of Generalized Multiple Attractor Cellular Automata (GMACA) for both recognition rate and time complexity of the multiple ECC. An empirical performance evaluation shows that the proposed 2C2-GMACA is superior to GMACA for both recognition rate and time complexity, especially when a number of bit of noise of ECC increases.

Index Terms— Error correcting capability, cellular automata, support vector machines, GMACA, 2C2-GMACA

1. INTRODUCTION

Cellular Automata (CA) are universal computational machines being introduced by John von Neumann and Stanislaw Ulam [1]. A cellular automaton consists of a group of cells organized in a form of lattice. The states are changed in the discrete time and space. The next state for a cell is considered from local transition function of the present state for that cell and its neighborhood. CA are capable to apply in several areas. In this regard, Generalized Multiple Attractor Cellular Automata (GMACA) [2], [3], [4] is proposed for pattern recognition. It takes an associative memory model [5] for



implementation and was known as the model that provides the best solution to Error Correcting Capability (ECC) for only one bit noise. There are papers investigating ECC using CA. Maji et. al [3] presents GMACA for ECC by using simulated annealing in ordering the rules. In addition, Maji et. al [4] presents the GMACA for the same problem, but carrying out a genetic algorithm for searching for the CA's rules. The drawbacks of GMACA are a very high classification computation, recognition rate, and search space complexities. It generates an extremely large search space in $O(n^n)$, where n is a number of pattern bits for solely one bit noise. Furthermore, recognition rate of GMACA in ECC extremely drops while pattern bits and bit noises increase. This paper proposes Two-class Classifier Generalized Multiple Attractor Cellular Automata with artificial point (2C2-GMACA) to cope with such problems. Following this section, GMACA with ECC, the proposed model, performance evaluation, results and discussions are sequentially presented.

2. AN EVOLUTION OF CELLULAR AUTOMATA

Elementary Cellular Automata (ECA) proposed by Wolfram [6] is the simplest class of one dimension (1d) CA, with n cells,2-states (0 or 1) and 3-neighborhood. The next state (S_i^{t+1}) for the ith cell calculated from the local transition function (f) of the present state (S_i^t) for the ith cell and its nearest neighbors (left (S_{i-1}^t) , right (S_{i+1}^t) and itself (S_i^t)), the equation is given by (1) following:

$$S_{i}^{t+1} = f(S_{i}^{t}, N_{i}^{t})$$

= $f(S_{i}^{t}, S_{i-1}^{t}S_{i}^{t}S_{i+1}^{t})$
= $(\langle R_{i} \rangle, S_{i-1}^{t}S_{i}^{t}S_{i+1}^{t})$ (1)

If a present state (S_i^{t+1}) is considered as a changing state, its neighborhoods are being formed $(S_{i-1}^{t}S_{i}^{t}S_{i+1}^{t})$ and sought the next state (S_i^{t+1}) from the rule $(\langle R_i \rangle)$. Subsequently, the next states (S^{t+1}) of n cells can be expressed in a truth table. The first row lists the possible 8 combinations of the present states for 3-neighborhood cell at time t and the next n rows list the next states for the ithcell at time (t+1) for the n different rules as shown in Fig.1 (a). Simplifying the rule vector for implementation in computer-based systems is quite



difficult in this respect; we thus alternatively proposed a rule matrix (M) to represent the next state of n cells.

Let M(i,j) represent a rule matrix with an element at the ith (i=0,1,2,...,n-1) row and the jth (j=0,1,2,...,7) column. It denotes a state from the truth table at the rule R_i and the neighborhood configuration j in binary number with the length of 3, shown in Fig.1(a). In this convention, the next state for the ith cell in the equation (1) is represented by M(i,j) as following



where $j = (S_{i-1}^t S_i^t S_{i+1}^t)$ in the decimal number

and the next state for n-cell ECA (S^{t+1}) from the equation (2) is defined in the form of rule matrix M shown following

$$S^{t+1} = (S_0^{t+1}, S_1^{t+1}, ..., S_{n-1}^{t+1})$$

= $(M(0, S_{-1}^t S_0^t S_1^t), M(0, S_0^t S_1^t S_2^t), ..., M(n-1, S_{n-2}^t S_{n-1}^t S_n^t)$
= (M, S^t) (3)



The evolution of ECA is a prototype for pattern classifier which is a basis for further developing of GMACA [3],[4] and 2C2-GMACA.

3. GENERALIZED MULTIPLE ATTRACTOR CELLULAR AUTOMATA WITH ERROR CORRECTING CAPABILITY

GMACA is a hybrid (non-uniform) CA of which each cells has its own rule. It is a non-linear CA involving with NOT, AND, OR, etc., logic function of the 3 neighborhood configurations. A system consists of a set of pivotal points $P=\{P_1,P_2,P_3,..,P_k\}$, a transient state (*P*') and a rule matrix (M). For the evolution of the GMACA, the *P*' will be evolved with the M until it reaches some pivotal point (*P*_i \in *P*) which is a solution to the pattern recognition. The next state of GMACA is calculated by the equation (4).

$$S^{t+1} = \begin{cases} (M, S^t), & \text{if } S^t \notin P \\ S^t & \text{and stop, otherwise} \end{cases}$$
(4)

Given a transient state (*P*), the present state (*S'*) is initialized to *P'*. The next state(*S'*⁺¹) will be generated by the rule matrix M until it reaches some pivotal point ($P_i \in P$). An evolution of GMACA can be represented by a reverse tree called attractor basin which contains cyclic and non-cyclic states. The cyclic state referred to as an attractor cycle. It contains a pivotal point and transient states with cycle length greater than or equal to 1. The non-cyclic state contains transient states. Fig. 1(b) shows GMACA and a particular rule vector. The GMACA is supported with an associative memory for classifier design. It generates all possible patterns (transient states) with the maximum permissible noises (r_{max}) in training phase. Consequently, the GMACA is independent from the number of patterns to be learnt. Currently, ECC in communication system is taken to deal with the GMACA. It provides the best solution (very high recognition rate) when it is trained and tested with maximum permissible noise (r_{max}) equal to 1. Adversely, its recognition rate is extremely decreased when r_{max} is greater than 1. This is the limitation of GMACA for the multiple ECC. In addition, the search space for determining the desired rules, collision rate and complexity of classification are also the severe problem of the GMACA.



4. PROPOSED METHOD

The proposed method, called Two-class Classifier Generalized Multiple Attractor Cellular Automata with artificial point (2C2-GMACA), is a binary classifier system. It classifies a given input (a transient state) into two groups (two attractor basin). The 2C2-GMACA is constructed by two pivotal points and their transient states. The outputs are a rule vector and an artificial point. The rule vector evolves a transient state into the next state, while an artificial point is a parameter of the decision function for interpreting the next state into two attractor basins.



Let P^+ and P^- are pivotal points of the positive and negative attractor basins, respectively. They are designed with a rule matrix (M) and an artificial point (A). Given a transient state (P^+) as an input, it must be classified to be a member of P^+ or P^- . The 2C2-GMACA begins by initializing the present state (S^t) to P^+ . Then, the P^+ will be evolved by the equation (4) to generate a next state (S^{t+1}) . The S^{t+1} is calculated by the binary decision function given in equation (5).

$$f(S^{t+1}, A) = \operatorname{sgn}(\sum_{i=0}^{n} S_i^{t+1}.A_i - \sum_{i=0}^{n} \overline{S_i^{t+1}}.A_i)$$
(5)

Finally, *P* is considered as a member of *P*⁺ if $f(S^{t+1}, A) = +1$, and *P*⁻ if $f(S^{t+1}, A) = -1$. Fig. 2 portrays an example of the 2C2-GMACA process with two attractor basins based on 4-bit pattern and periodic boundary condition.

4.1. Design of 2C2-GMACA Rule Vector

As GMACA rule ordering, it takes a reverse engineering technique [3], [4] to synthesize a desired rule vector. In the proposed method, a voting technique is applied for synthesizing such a rule vector for the two attractor basins. It acquires a rule vector by using a subtraction of two matrices and a majority voting rule (Fig. 2(b) and 2(c)). Each element of the M^+ and M^- represents the number of coincident neighborhoods for the ith cell from two attractor basins (Fig. 2(b)). The time complexity for ordering the desired rule vector is a constant, O(1). However, it is further required for determining an appropriated artificial point by using genetic algorithm. Design of 2C2-GMACA for ordering the rule vector is comprised of three phases as follows:

Phase I: Two pivotal points $\{P_i, P_j\}$, where $P_i \neq P_j$ and $P_i, P_j \in P$, are chosen from the set of pivotal points corresponding with multiclass classification approaches, such as oneversus-one, one-versus-all, etc. Given that, P_i and P_j are pivotal points of the positive (P^+) and negative (P^-) attractor basins, respectively, all transient states of P_i and P_j are generated with the maximum permissible noise (r_{max}) into the leaf nodes. In Fig.2 (a) shows



two attractor basins based on an associative memory, which are generated by Phase I, for 4-bit pattern (n) and "one" maximum permissible noise ($r_{max}=1$). Let $P_i=0000$ and P_j =1111 be patterns to be learnt. Then, they are considered as pivotal points of the positive (\mathbf{P}^+) and negative attractor basin (P^-), respectively. Therefore, the P_i is mapped into

leaf node of the positive attractor basin, while the P_j is mapped into the negative attractor basin. Then, two sets of noisy patterns with one bit noise of the P^+ and P^- are generated resulting in {1000, 0100, 0010, 0001} and {0111, 1011, 1101, 1110}, respectively. They are mapped into leaf nodes of the positive and negative of the attractor basin.

Phase II: This phase is illustrated in Fig. 2(b). As shown, two matrices M^+ and M^- with size |nx8| are given. It is derived from the positive and negative attractor basins. Let $M^+(i, j)$ and $M^-(i, j)$ be an element of the matrix M^+ and M^- , respectively, where i = 0,1,2,...,n-1 and j = 0,1,2,...,7. Thus, $M^+(i, j)$ is the number of nodes from the positive attractor basin using 3-neighborhood $(S_{i-1}^tS_i^tS_{i+1}^t)$ for the ith cell of the nodes falling into at the ith row and jth column. So, the is for the negative attractor basin.

Phase III: This phase aims at determining a rule vector shown in Fig.2(c). For computing purpose, M is employed to evolve a given transient state into a new state. An element of M(i,j) is created from the comparison between the $M^+(i,j)$ and $M^-(i,j)$ where i=0,1,2,...,n-1 and j=0,1,2,...,7 under the following majority voting rule:

- **1)** If $M^+(i, j) > M^-(i, j)$, the element M(i, j) of the M is "1".
- 2) If $M^+(i, j) \le M^-(i, j)$, the element M(i, j) of the M is "0".

4.2. Design of 2C2-GMACA Artificial Point

Following the rule vector, artificial points with the same size as n-bit pattern to be learnt are searched using the heuristic search. In this regard, the search space is a number of possible patterns of n bits from 000...000 to 111....111. That is, the complexity in this regard is $O(2^n)$. In this paper, a genetic algorithm (GA) is chosen to implement. The fitness function of the GA is calculated using a true positive (TP) and a false positive (FP) from the confusion matrix [7] and given in the equation (6).



 $Fitness = 1 - \frac{TP}{TP + FP}$

Table I. Evolution time of GMACA and 2C2-GMACA to synthesize the rule vectors.

(6)

Training	Percentage of Recognition						
Noise	For n=15,k=5						
(r _{max})	r=1		r=1 r=2		r=3		
	GMACA	2C2- GMACA	GMACA	2C2- GMACA	GMACA	2C2- GMACA	
1	82.13	100	66.32	85.68	44.12	66.32	
2	80.13	100	65.65	98.70	42.15	86.02	
3	79.57	100	65.42	100	41.23	98.18	
Training	Percentage of Recognition						
Noise	For n=35,k=15						
(r _{max})	r	=1	r=2		r=3		
	GMACA	2C2- GMACA	GMACA	2C2- GMACA	GMACA	2C2- GMACA	
1	82.45	100	65.13	94.17	50.24	85.51	
2	80.65	100	60.12	100	46.78	97.43	
3	80.02	100	59.35	100	44.75	100	

Time complexity of the 2C2-GMACA for ordering the desired rule vector is O(1) and the search space complexity of artificial points is $O(2^n)$ independent on the maximum permissible noise (r_{max}) . The GMACA with a reverse engineering technique provides the complexity of $O(n^n)$ for 1 bit noise only, and combinatorial explosion when r_{max} increases.

วารสารอิเล็กทรอนิกส์ ECTI

CTI e-magazine

SN: 2286-7074

5. EXPERIMENTAL RESULTS

GMACA provides the recognition rate opposite to general models of pattern recognition and 2C2-GMACA. That is, if it is trained with more various patterns (high r_{max}), the recognition rate will not be higher. It is a result that a high r_{max} generates a large amount of transient states which caused the genetic algorithm takes a tremendous time to construct an appropriate attractor basin which is synthesized to be a rule vector. This directly affects the recognition performance. Table I and II show empirical experimental results in comparison between GMACA and 2C2-GMACA for recognition rate and evolution time, respectively. With different training noises, size of noise(r), bits pattern (n) and numbers of learnt pattern (k), the proposed 2C2-GMACA provides the outstanding recognition rate superior to GMACA. In addition, the 2C2-GMACA is also extremely superior to GMACA in time complexity for synthesizing the rule vectors.

	Value of k	Maximum Permissible Noise (r _{max})	Time (sec)		
CA size (n)			GMACA	2C2-GMACA	
15	5	1	16.20	0.95	
		2	135.16	2.87	
		3	714.15	24.06	
35	15	1	621.21	217.00	
		2	1226.13	272.00	
		3	7523.00	800.00	

 Table II. Evolution time of GMACA and 2C2-GMACA to synthesize the rule vectors.

6. CONCLUSIONS AND DISCUSSIONS

This article models the multiple ECC problem using a universal computational machine, called cellular automata. The proposed 2C2-GMACA for multiple error correcting capability shows the success of a CA-based binary classifier. 2C2-GMACA improves the



performance of GMACA for both recognition rate and time complexity of multiple error correcting code problem. For performance evaluation, the empirical experimentation shows that it is superior to GMACA. This encourages us continue finding an extension to deal with other recognition tasks, language recognition for example in comparison with state of the art methods, as well as determining the reduction of complexity. We hope to report our findings in the near future.

7. REFERENCES

[1] Neumann, J.V., The theory of self-reproducing Automata, In: A.W., Burks (ed.), Univ. of Illinois Press, Urbana, 1966.

[2] M. Chady and R. Poli, "Evolution of Cellular-AutomatonBased Associative Memories," Tech. Rep. CSRP-97-15, pp.1-8, May 1997.

[3] P. Maji, N. Ganguly, and P.P. Chaudhuri, "Error correcting capability of cellular automata based associative memory,"IEEE Transactions on System, Man and Cybernetics , 33 (4), pp. 466-480, 2003.

[4] P. Maji, and P.P. Chaudhuri, "Non-uniform cellular automata based associative memory: Evolutionary design and basin of attraction,"Information Sciences, 178(10), pp. 2315-2336, 2008.

[5] J. Buhmann, R. Divko, and K.Schulter, "Associative memory with high information content," Physical Review A, 39(5), pp.

2689-2692, 1989.

[6] Wolfram, S., Cellular Automata and Complexity, Westview Press, pp. 159–202, 2002.

[7] D. Simon, and D. L. Simon, "Analytic Confusion Matrix Bounds for Fault Detection and Isolation Using a Sum-of-SquaredResiduals Approach," IEEE Transactions on Reliability, 59(2), pp. 287–296, 2010.



Paper List of ECTI-EEC Trans., Vol. 12, No. 1, Feb-2014 issue

(http://www.ecti-thailand.org/paper/journal_viewlist/59)

Regular Paper :

1. Utilizing the Cuckoo Optimization Algorithm for Selective Harmonic Elimination Strategy in the Cascaded Multilevel Inverter

A. Ajami, B. Mohammadzadeh, and M. R. J. Oskuee

2. Design of an Implantable Antenna Feasibility Study for Continuous Glucose Monitoring

P. Soontornpipit

3. Comparison and Optimal Design of SSSC Controller Based on ICA and PSO for Power System Dynamic Stability Improvement

A. Ajami, B. Mohammadzadeh, R. Gholizadeh, R. R. Ahrabi

- 4. Vertical Beamforming Influence on Cellular Networks *P. Chaipanya, M. Uthansakul, and P. Uthansakul*
- Performance Analysis of MU-MIMO Systems Using HMRS Technique for Various Transmission Modes *T. Khomyat, P. Uthansakul, and M. Uthansakul*
- 6. The Optimum Number of Nodes and Radius for Distributed Beamforming Networks *P. Sriploy, P. Uthansakul and M. Uthansakul*

Special Section Paper form ECTI-2013 :

- 1. Aggregating Method of Induction Motor Group Using Energy Conservation Law *P. Aree*
- 2. Investigation on Partial Discharge of Power Cable Termination Defects using High Frequency Current Transformer
 - C. Suwanasri, T. Suwanasri, and P. Fuangpian
- 3. Robust digital control for interleaved PFC boost converter using approximate 2DOF current controller
 - Y. Adachi, K. Higuchi, T. Sato, and K. Chamnongthai
- 4. Integrated Magnetic Circuits for Differential-mode and Common-mode Chokes of EMI Filters

V. Tarateeraseth

5. Detection of Premature Ventricular Contraction for Real-Time Applications *S. Ittatirut*, *A. Lek-uthai and A. Teeramongkonrasmee*



- 6. A Novel Two-Dimensional Coding for Bit-Patterned Media Recording System A. Arrayangkool, C. Warisarn, and P. Kovintavewat
- Performance Analysis of Modified STBC Scheme for Cooperative MIMO Communications
 T. Chanpuek, P. Uthansakul and M. Uthansakul
- A Dynamic Offset Value based on Fuzzy Logic Systems for Cell Range Expansion in Heterogeneous Networks
 A. Daeinabi and K. Sandrasegaran

Special Section Paper form EDSSC-2013 :

- Factorial Hidden Markov Model analysis of Random Telegraph Noise in Resistive Random Access Memories *F. M. Puglisi, P. Pavan*
- 2. 2.4-GHz Band Ultra-Low-Voltage LC-VCO IC in 130-nm CMOS X. Yang, K. Xu, W. Wang, Y. Uchida, T. Yoshimasu



Report from IWAIT 2014

2014 International Workshop on Advanced Image Technology

The International Workshop on Advanced Image Technology (IWAIT) is the well-known international workshop that gathers researchers, professors, students and interested persons in the field of advanced image technology. Previous IWAIT conferences have been held annually since 1998 in Eastern and South Eastern Asian countries such as Korea, Taiwan, Japan, Singapore, Thailand, Malaysia, Indonesia and Vietnam. The 17th IWAIT was held at the Sukosol Hotel, Bangkok, Thailand, on January 6-8, 2014. Visit the official website at http://www.iwait2014.org/IWAIT 2014 was organized by the Department of Electronic and Telecommunication Engineering, Faculty of Engineering, King Mongkut's University of Technology Thonburi (KMUTT) and also technically supported by the Institute of Electronics, Information and Communication Engineers (IEICE), the Institute of Image Information and Television Engineers (ITE), the Korean Society of Broadcast Engineers (KSBE), and Thailand Convention & Exhibition Bureau (TCEB)



IWAIT 2014 Statistics

- 145 papers submitted from 9 countries
- 131 papers accepted (acceptance rate of 90%)
- 15 oral sessions (3 parallel sessions)
- 4 keynote speakers
- 3 invited speakers
- 2 poster sessions
- 191 participants from 8 countries attended to the workshop
- 9 best paper awards



IWAIT 2014 Best Paper Awards

"Fast Geometric Complementarity Matching in Protein-Protein Docking" Liu Hui, Lin Feng, Lee Yong Tsui, Qian Kemao and Seah Hock Soon

"A Semi-blind Watermarking for DIBR **3**D Images An Attempt to Show Hardness of Watermarking in **3**D Image Contents" Bo-Ra Kim, Yoon-Hyuk Lee, Youn-Joo Kim, Dong-Wook Kim, Yong-Ho Seo and Hy Choi

"Moving Object Detection Using Entropy based on the Time Axis" Jae-Ho kwak and Whoi-Yul Kim

"Interactive and Procedural Modeling of Featured Chinese Architecture" Chun-Yen Huang, Hung-Wei Hsu and Wen-Kai Tai

"Ball Tracking in Team Sports by Focusing on Ball Holder Candidates" Junji Kurano, Taiki Yamamoto, Hirokatsu Kataoka, Masaki Hayashi and Yoshimitsu Aoki

"Extended Joint Bilateral Filtering for Color Noise Reduction and Super Resolution" Naofumi Wada, Masato Kazui and Miki Haseyama

"A Highly Accurate Photometric Compensation by Considering Indirect Reflected Light"

Takuya Yoshida and Naoki Hashimoto

"Object Tracking and Image Restoration in the Dark" Hayato Kuroda and Takashi Komuro

"A Lossless Compression Method Using Histogram Packing for HDR Images in OpenEXR Format"

Taku Odaka, Wannida Sae-Tang, Masaaki Fujiyoshi, Hiroyuki Kobayashi, Masahiro Iwahashi and Hitoshi Kiya



WAIT 2014 Events

IWAIT 2014 keynote speech were given by 4 distinguished professors.

The first talk was given by Prof. Jing-Ming Guo from National Taiwan University of Science and Technology, Taiwan, on the topic "Former Developemnts and Future Possibilities of the Digital Halftoning".

The second talk was given by Prof. Hideo Saito from Keio University, Japan, on the topic "Towards Practical Applications of Mixed and Augmented Reality Based on Computer Vision".

The third talk was given by Prof. Thanarat Horprasert Chalidabhongse from Chulalongkorn University, Thailand, on the topic "Background Subtraction - A Quick-and-Dirty Way to Segment Moving Objects in a Video"

The fourth talk was given by **Prof. Pau-Choo (Julia) Chung** from National Cheng Kung University, Taiwan, on the topic "Intelligent Sensing for Healthcare Applications"



IWAIT 2014 Banquet was held at **Suan Pakkad Palace Museum**, the traditional Thai style opened in 1952, combining of fine arts and ancient artifacts.



วกรสารอิเล็กทรอนิกส์ ECTI

CTI e-magazine

Report from Conference on Information and Communication Technology, Electronic and Electrical Engineering (JICTEE2014)

SN: 2286-707

The Joint International Conference on Information and Communication Technology, Electronic and Electrical Engineering (JICTEE) was the Greater Mekong Sub-region (GMS) forum for researchers, developers, designers and engineers from both industry and academia to exchange ideas in the active fields of theory, design and implementation of ICT, Electronic and Electrical Engineering. The conference focuses on emerging and sustainable technologies to support global development along with equality in society and environmental preservation. First time in Thailand as an International forum, JICTEE 2014 was hosted by Mae Fah Luang University (MFU) and Chiang Rai College (CRU) and it was held at the Mantrini Hotel, Chiang Rai, Thailand, during March 5-8, 2014. The official website of JICTEE2014 is www.jictee2014.org

JICTEE2014 was organized by the School of Information Technology, Mae Fah Luang University (MFU) and Faculty of Engineering, Chiang Rai College (CRU). Additionally, JICTEE2014 also was technically supported by King Mongkuts' University of Technology Thonburi (KMUTT) and King Mongkuts' Institute of Technology Ladkrabang (KMITL), and all other network universities of MFU and CRU. JICTEE2014 also had the sponsorships from 3 software companies in Thailand including Naga Software, Mak Media and Epsilon consultant. Additionally, JICTEE 2014 has been approved for inclusion in the IEEE's Conference Publication Program. All presented papers will finally be included in IEEE Xplore.

JICTEE2014 Statistics

- 117 papers submitted from 8 countries
- 75 papers accepted (acceptance rate of 64%)
- 15 oral sessions (3 parallel sessions)
- 5 keynote speakers
- 71 participants from 5 countries attended to the workshop

2 best paper awards



JICTEE2014 Best Paper Awards

Two best paper awards are presented at JICTEE2014.

- 1. Title: Enhance Neuro-Fuzzy System for Classification Using Dynamic Clustering Authors: Poonarin Wongchomphu and Narissara Eiamkanitchat
- 2. Title: Performance of Log-MAP Algorithm for Graph-Based Detections on The 2-D Interference Channel

Authors: Thanomsak Sopon, Pornchai Supnithi, and Kasin Vichienchom



JICTEE2014 Events

The open ceremony speeches were given by the vice president of Mae Fah Luang University, Assoc. Prof. Dr. Chayaporn Wattanasiri and one of the conference chair, Dr. Surapong Uttama.





Prof. Ramjee Prasad Center for TeleInFrastructure, Denmark Title: Next Generation Revolution

Prof. Hiroshi Matsuno Yamaguchi University, Japan Title: A development of disaster information system using wireless technologies

Prof. Sansanee Auephanwiriyakul Chiangmai University, Thailand Title: Fuzzy Set Theory in Information Technology

Prof. Nopasit Chakpitak Chiangmai University, Thailand Title: Smart City

Prof. Suttichai Premrudeepreechacharn Chiangmai University, Thailand Title: Microgrid















JICTEE2014 Welcome and Banquet Party

The welcome and banquet party were conducted at the Mantrini Hotel, Chiang Rai with the historical atmosphere of the Lanna Empire.





Report from KST 2014

The 6th - 2014 International Conference on Knowledge and Smart Technology

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. The 6^{th} KST was held at the Tao-Thong Hotel, Burapha University, Thailand on January 30 – 31, 2014. Visit the official website at http://www.kst-thailand.org/

KST 2014 was organized by 10 departments from 8 institutes including Burapha University, Chulalongkorn University, Sripatum University at Chonburi, Khon Kaen University, King Mongkut's University of Technology Thonburi, Assumption University, Prince of Songkla University and Rajmangala University of Technology Tawan-Ok, Chantaburi Campus

In addition, the KST 2014 was also technically supported by the Institute of Electrical and Electronics Engineers (IEEE), the Institute of Electrical and Electronics Engineers Thailand Section (IEEE Thailand Section), and Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association of Thailand (ECTI Thailand). Moreover, KST 2014 conference had been sponsored by National Electronics and Computer Technology Center (NECTEC) and National Broadcasting and Telecommunications Commission (NBTC).





Prof. Sompol Phongthai President of Burapha University in KST 2014 opening ceremony

KST 2014 Statistics

- 45 papers submitted from 11 countries
- 22 papers accepted (acceptance rate of 48.89%)
- 24 Thai papers submitted and 13 papers accepted (acceptance rate of 54.17%)
- 7 oral sessions (3 parallel sessions)
- 1 Special Session in "Cognitive Characteristics of Human Vision"
- 1 keynote speakers
- 250 participants from 8 countries attended to the conference

KST 2014 Events

KST 2014 keynote speech was given by **Professor Dr. Katsumi Watanabe** from University of Tokyo, Japan, on the topic "Cognitive Characteristics of Human Vision: A tutorial ".

Special Session on "Cognitive Characteristics of Human Vision" organized by **Professor Dr.Katsumi Watanabe** from University of Tokyo, Japan.





KST 2014 Banquet was held at **Tao-Thong Hotel**, **Burapha University**, on January 29, 2014





Asia-Pacific Signal and Information Processing Association Annual Summit and Conference 2014 December 9-12, 2014, Chiang Mai, Thailand

APSUPA ASC 2014

1st Call for Papers

Welcome to the APSTPA Annual Summit and Conference 2014 located in Chiang Mai, the most culturally significant city in northern Thailand Chiang Mai is a former capital of the Kingdom of Lanna (1296-1766) and is well known of historic temples, arresting scenic beauty, distinctive festivals, temperate fruits and invigorating coal season climate. The sixth annual conference is organized by Asia-Pacific Signal and Information Processing Association (APSTPA) 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 APSTPA concerns all aspects of signals and informations, networking, computing, system design, security, implementation, and technology with any pheators to scientific, engineering, and social areas.

Organizer

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 (EKG, MEG, EKG, EMG, etc.) Biologically-inspired Signal Processing
 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 Embedde d Systems 24 Vide of 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/u deo Processing 3.3 Image/u deo 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) Speech Processing: Analysis, Coding, Synthesis, Recognition and Understanding
 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 Architec ture 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 Senal Processing for Emerging Applications 6 Wireless Communications and Networking (WCN) 6.1 Wireless Communications: Physical Layer 6.2 Whreless Communications and Networking: Ad hoc and Sensor Networks, MAC, Whreless Routing and Cross-layer Design 6.3 Wheless Networking Access Network and Core Network 6.4 Security and Cryptography 6.5 Denices 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 angle track out presentation and short papers will be mostly for poster presentation. The conference proceedings of the main conference will be published, available and maintained at the APSIPA website. Important Date s
 Submission of Proposals for Special Sessions, Forum, Panel & Tutorial Sessions
 May9, 2014

 Submission of Full and Short Papers
 June 6, 2014

 Submission of Papers in Special Sessions
 July 4, 2014
 Notification of Papers Acceptance Submission of Camera ReadyPapers Aug. 29, 2014 Sep. 26, 2014 Author Registration Deadline Sep. 26, 2014. Dec. 6, 2014 Dec. 9-12, 2014 Tutonal Sesa on Date Summit and Conference Date

Electrical Engineering /Electronics, Computer, Telecommunic and Information Technology (ECTI) Association of Timland Academic Span sor Asia-Pacific Signal and Information Processing Accountion Asia-Pasifi (APSIPA) Organizing Committees Org and 2ng Corlination Costs Honorasy Corlination Costs State AirFani, Tekyo Imitike of Ecchardogy, Jayan K., Jiao Jia, Umarsaky of Machael, USA Prayoot Alla achthain KMUTHE, Thailand General Corlination KMUTHE, Thailand C. C., Joy Kuo, Umsoniky of Southean Coldonia, USA Hi ohi Kay, Toly Old Encyclicka Umionity, Jayan Technical Program Co-Chains The Olicopy, Oxla Umiosniky, Jayan Pomelan Sopaith, KMUTH, Tinakad Himeh-Ming Hung Bittional Chino Tang Umisensity, Teinan Androny Kub, Umarsaky of Hawaa ti Manoo, USA Ti ko Halloong, Wasda Umisensity, Jayan Colmog Hisin Wu H thional Cheng Kang Umisensity, Teinan Androny Kub Ulu Hensiton Johnson Jaya Chang Hisin Wu H thional Cheng Kang Umisensity, Teinan Y delanan Wangwasit, Mihi di Umrensity, Tinakad Orosz An HKUT, Hong Kong Tomaki Ohtwik Keiso Umisensity, Jayan Forum Co-Chamos Ha any Co-Chairs Forum Co-Chains Automo Outsy, University of Scuthern California, USA Wheel A blub, The University of Auchkad, New Za had Home: Clau, Hi tisaal Tuiwan University Tuiwan Voango A that wijd, Asymptotica University, Thaihad Panel Secure Co-Chain Mark Ling IIS, Academia Sinita, Taisan Li Deng, Microsoft Research, USA Jaco Hung, San Yel Son University, China Kazua Takeda, Magoa University, Luan Special Semion Co-Chan Minoro Olada, Han Institute of Science and Techn Ministra Olina, Ban Interne et Scence auf Technology, Japa Gan Woon Seng Nama ny Technological University. Sing por Malynajos Chaleak edg. III Kla aggus Inlia Tutonal Section Co-Chaos Tutonal Section Co Churn Kenneth Ian, The Horg Korg Polytochnic University, Horg Korg Tablien Tanah, WAT Japan Tabus Kawalan, Koolo Universita Japan Sumeisus 198, A*STAB, Sagapon D. H. Su, C. C. Te bug Kawan Samai Su BR, At STAB, Sagayan Publicity Co-Claim Y obiolitik Totion University, Jepan Y obius Hag Gasargis Institute of Science and Technology, Koss Thomas Ray Zhang Tingim University Claim Chang Min Lee, Wa tional Sun Yitteen University, Tinan Challe Charconkryncopenty, The meanet University, Tinkan Publication Co-Claim Y obiench Co-Claim Y obiench Kejin Sa, Kimse University, Jepan Miy on Theore support Chargensi University, Taskan Pinancial Chain Rojepan Sampana, Rangkok University, Taskan Miring Chain Press & obring Jr. 1, Fasteri Local Armange meet Chars Sutisfiai Panmaleopoch chars Chargoni University, Taskad Samak University, Chargoni University Taskad Schopcon Pornwoog XMITI, Taskad General Scoretanes Wes you Chencharit KMUTI, Taskad Boomean Kavelanmaniyong KMUTI, Taskad ECT Association

. 12:

THE

ttp://www.apsipa2014.org/

E-mail: ceg@apsipa2014.ocg

25

IEEE

Signal Processing Society



1st Call for Papers -CSCC 2014

The 29th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2014)

July 1-4, 2014 Bangkok, Thailand

With the great success of the International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC) as the world leading conference devoted to the advancement of high technologies in Circuits/Systems, Computers and Communications, we would like to invite all the scholars and experts around the world to attend the 29th ITC-CSCC 2014 to be hosted in "the City of Angels", Bangkok, Thailand.

Topics

Chiranul Sampiamsak

Pisit Vanichcharamt

Piya Kevintavewat

Phaophak Sirisuk

Chaodit Aswaku

Chaiyachet Saivichit

Nitthite Chirdehoo

itkasom Ngarmnil

en Samperns

stration Cha

Priongsak Keeratiwintakom

Keatisak Scipimanwal

Datchakorn Tancharoen

Lanchskom Wuttisittikulkij

The conference is open to researchers from all regions of the world. Participation from Asia Pacific region is particularly encouraged. Proposals for special sessions are welcome. Papers with original work in all aspects of Circuits/Systems, Computers and Communications are invited. Topics include, but not limited to, the followings

Computers

Circuits & Systems

- Analog Circuits Computer Aided Design
- Inteiligent Transportation Systems & Technology
- Linear / Nonlinear Systems
- Medical Electronics &
- Circuits
- Modem Control Neural Networks
- Power Electronics &
- Circuits RF Circuits
- Semicenductor Devices &
- Technology Sensors & Related Circuits
- Verification & Testing
- VLSI Design

Submission of Papers

Communications

- Artificial Intelligence Biccomputing Computer Systems & Applications
- Computer Vision Face Detection & Recognition
- Image Coding & Analysis Image Processing Internet Technology &
- Applications Motion Analysis Multimedia Service & Technology Object Extraction &
- Technology Security Watermarking

Prospective authors are invited to submit original paper(s) of either MS Word or PDF format written in English. Abstract is limited to two pages of text and figures. Abstract can be submitted on the official website. If you have any trouble in paper preparation and online submission, please contact the conference secretariat.

Proceedings and Publications

All registered participants are provided with conference proceedings. Moreover, authors of the accepted papers are encouraged to submit full-length manuscripts to IEEK JSTS (Korea), IEICE Transactions (Japan), ECTI Transactions (Thailand), or Engineering Journal (Thailand). Papers passed through the standard review procedures of the IEEK JSTS and IEICE Transactions will be published in regular issues while ECTI Transactions and Engineering Journal will be published in special issues. The authors (or their institute) are requested to pay the publication charge for the IEICE Transactions when their paper is accepted.

Important Dates

Deadline for proposal of special session: Submission of Two-Page Extended Abstract: Notification of Acceptance: Submission of Camera Ready Paper:

March 1, 2014 April 1, 2014 May 9, 2014 June 1, 2014

Contact: secretary@itc-cscc2014.org, http://www.itc-cscc2014

ECT 竭 대안전자공악회

Anterna & Wave Propagation Audio / Speech Signal Processing

- Circuits & Components for Communications
- IP Networks & QoS
- MIMO & Space-Time Codes
- Multimedia Communications
- Mobile & Wireless Communications Network Management & Design
- Optical Communications &
- Components Radar / Remote Sensing
- Communication Signal Processing
- UWB
- Visual Communications
- Underwater Communications
- Ubiquitous Networks
 - Wireless Sensor Networks



ECTI-CON 2014 Nakhon Ratchasima, Thailand May 14-17, 2014

ECTI-CON 2014 is the eleventh 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 2014 and will be available via IEEE Xplore. Acceptance will be based on quality, relevance and originality.













Committee ECTI - CON 2014 Advisory Committe Monai Krairiksh (KMITL) Prabhas Chongstitvatana (CU) Rangsan Wongsan (SUT)

Steering Committee

Tomoaki Sato (Hirosaki U, Japan) Yoshihiro Matsui (TNCT, Japan) Keu Yamada (Gunma U, Japa Prayoot Akkersekthelin (KMUTNB) Naruemon Wattanapongsakorn (KMUTT) Tuptim Angkaew (CU) Kosin Chamnongthai (KMUTT)

eneral Chairs Prayoot Akkaraskthalin (KMUTNB) Chutima Prommak (SUT)

General Co-Chair Somaak Vanit-Anunchai (SUT)

General Secretary Wipawee Hattagam (SUT)

Special session Chairs Yoshihiro Matsui (TNCT, Japan) Thanatchai Kulworawanichpond (SUT)

Exhibition and Sponsor Chairs Rangsan Tongta (SUT) Chanchai Thongsopa (SUT) Prayoth Kumsawat (SUT)

Publicity Chairs Kou Yamada (Gunma U, Japan)

Kongpol Areerak (SUT) Kongpan Areerak (SUT)

TPC Chair David Banjerdporigchai (CU)

TPC Co-chairs Kamol Kasmarungsi (NECTEC) Boon Hee Soong (NTU, Singapore)

International Technical Committee Liew Soung Yue (UTAR, Malaysia) Aduwati Sali (UPM, Malaysia) Jishua Chen (Seimens, China) Tomoki Watanabe (TIT, Japan) Kazushi Nakano (UEC, Japan) Lin Liu (UNISA, Australia) Hoi-Shun Antony Lui (UQ, Australia) Konstanty Bialkowski (UQ, Australia) Kesom Weaver (U of Southampton, UK) Dan Juncu (Cambridge Consultants, UK) Sarah Lee (Mango Solutions, UK) Woon Hau Chin (Toshiba Lab, UK Kenedy Aliila Greyson (DIT, Tanzania) Xieobing Hou (CCSU, USA)

Shuju Wu (CCSU, USA) Chatree Sanoprachathanarak (NetApp, USA)

Call for Papers:

The program of ECTI-CON 2014 will consist of regular technical sessions and special sessions. Topics of interest for submission include, but are not restricted to:

Area 1) Device, Circuits and Systems: Semiconductor Devices, Analog Circuits, Digital Circuits, Mixed Signal Circuits, Nonlinear Circuits and Systems, Sensing and Sensor Networks, Filters and Data Conversion Circuits, RF and Wireless Circuits, Photonic and Optoelectronic Circuits, Low Power Design and VLSI Physical Design, Biomedical Circuits, Assembly and Packaging Technologies, Test and Reliability, Advanced Technologies (i.e. MEMS and Nano-electronic Devices, Metamaterials), Agritronics. Embedded Systems:

Area 2) Computers: Computer Architecture, Computational Biology and Bioinformatics, Knowledge and Data Engineering, Learning Technologies, Multimedia Services and Technologies, Mobile Comput ing, Paralle/Distributed Computing and Grid Computing, Pattern Analysis and Machine Intelligence, Software Engineering, Visualization and Computer Graphics;

Area 3) Information Technology: IT Bio/Medical Engineering, Bioinformatics and Applications, Ontology, Business and Information Systems, Information Security and Forensics, Information Retrieval, Data Mining, Knowledge Management, Electronic Commerce, Health and Medical Informatics, Hybrid Information Technology

Area 4) Communication Systems: Communication Theory and Information Theory, Antenna and Propagation, Microwave Theory and Techniques, Modulation, Cooling, Channel Analysis, Network Design, Network Protocols, Networks Management, Optical Cor nunications, Wirelass/Mobile Communications & Technologies, Green Wireless Networks, Green Radio;

Area 5) Controls: Control Theory and Apolications, Adaptive and Learning Control Systems, Fuzzy and Neural Control, Mechatronics, Manufacturing Control Systems and Applications, Process Control Systems, Robotics and Automation;

Area 6) Electrical Power Systems: Power Engineering and Power Systems, Electromagnetic Compatibility, Energy Conversion, High Voltage Engineering and Insulation, Power Delivery, Illumination, Renewable/Alternative Energy, Energy Policy and Planning;

Area 7) Power Electronics: Power devices and components, Power Quality Control, Harmonic Analysis and Compensations, Switching Circuits and Power Converters, Motors and Drives, Smart Grid, Distribution Generation and Electrical Vehicles, Photovoltaic Materials and Solar Cells,

Area8) 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;

Paper Submission: The review process of ECTI-CON2014 is "double-blind". Therefore, papers must be submitted without author's names and affiliations appearing in the manuscripts submitted for review. Prospective authors are invited to submit original full papers without author's names and alfiliations, in English, of four to six (4-6) gages in standard IEEE two-column formationly, reporting their original work and results, applications and/or implementation in one or more of the listed topics. Paper format (Doc/ LaTeX] can be downloaded at http://www.ecticon2014.org

Important dates

- Full paper submission due date: January 6, 2014
- Notification of acceptance: March 6, 2014 Camera-ready paper submission: April 1, 2014
- Authors and Early-bird registration: April 1, 2014

Contact Address:

- School of Telecommunication Engineering Suranaree University of Technology Nakhon Ratchasima, Thailand 30000 Tel: +66 4422 4392. Fax: +66 4422 4603
- Institute of Engineering EGUL IEEE



Website: http://www.ecticon2014.org. http://www.facebook.com/EdiCon2014



ECTI Who's Who

President: Prabhas Chongstitvatana (CU)

Advisory Board: Monai Krairiksh (KMITL)

Vice President: Prayoot Akkaraekthalin (KMUTNB)

Board Committee:

Apirat Siritaratiwat (KKU) Chiranut Sa-ngiamsak (KKU) Jukkrit Tagapanij (MUT) Pornchai Supnithi (KMITL) Rujipan Sampanna (BU) Somsak Choomchuay (KMITL) Surachai Chaitusaney (CU) Titipong Lertwiriyaprapa (KMUTNB)

TC (Electrical Engineering)

Suttichai Premrudeepreechacharn (CMU)

TC (Electronics) Karel Sterckx (BU)

TC (Computers) Putchong Uthayopas (KU)

TC (Telecommunications) Kamol Kaemarungsi (NECTEC)

TC (Information Technology) Kosin Chamnongthai (KMUTT)

TC (System Control) David Banjerdpongchai (CU)

TC (Signal Processing) Vorapoj Patanavijit (ABAC) Secretary: Pairin Kaewkuay

Headquater:

ECTI Association Sirindhon International Institute of Technology 131 Moo 5 Tiwanon Rd.,Bangkadi Pathumthani 12000,Thailand Tel: 02-5012578 E-mail: ecti.secretary@gmail.com

