ICITEE 2013

PROGRAM BOOK

2013 International Conference on Information Technology and Electrical Engineering

7-8 October 2013

The Sahid Rich Jogja Hotel

Yogyakarta, Indonesia

Organized by

Department of Electrical Engineering
and Information Technology
Universitas Gadjah Mada, Indonesia

ICITEE 2013 Sponsorships

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Welcome Message from the General Chair

In Honor of the celebration of the 50th Anniversary of the Department of Electrical Engineering and Information Technology, Faculty of Engineering, Universitas Gadjah Mada (UGM), it is my great pleasure to welcome you to Yogyakarta City for the 5th International Conference on Information Technology and Electrical Engineering (ICITEE 2013) on 7-8 October 2013.

ICITEE 2013 is intended as an International Forum for those who wish to share their latest research results, innovative ideas, and experiences in the fields of Information and Communication Technology (ICT) as well as Electrical Engineering. Nowadays, modern technology makes our lives easier. Yet this progress is affecting our climate as a result of the increased carbon dioxide (CO_2) emissions. Under the theme of "Intelligent and Green Technologies for Sustainable Development," the conference is expected to provide opportunities to explore emerging green and intelligent technologies that can contribute to environmental sustainability.

In addition, the conference committee has invited three renowned Keynote speakers, Professor Dr. Tadashi Matsumoto of JAIST, Japan, Emeritus Professor Dr. Susumu Yoshida of Kyoto University and Dr. Eng. Khoirul Anwar of JAIST, Japan. The conference committee also invited Professor Dr. Ramesh Kumar Pokharel of Kyushu University, Japan as Invited speaker to present his current research activities.

This conference is technically co-sponsored by IEEE Indonesia Section and supported by Department of Electrical Engineering and Information Technology UGM.

As a General Chair, I would like to take this opportunity to express my deep appreciation to the organizing committee members for their hard work and contribution throughout this conference. I would also like to thank authors, reviewers, all speakers, and session chairs for their support to ICITEE 2013.

I hope that participants will have a fruitful experience to enjoy the cultural heritage, natural beauty of Yogyakarta, and the taste of traditional Javanese cuisines, coupled with the friendliness of its people.

Finally, I would like to welcome you to ICITEE 2013 and wish you all an enjoyable stay in Yogyakarta.

Sincerely

Dr. I Wayan Mustika, S.T., M.Eng.
General Chair of ICITEE 2013
IEEE UGM Student Branch Counselor

Welcome Message from the TPC Chair

On behalf of the technical program committee (TPC), it is m y pleasure to welcome you to the 5th International Conference on Information Technology and Electrical Engineering (ICITEE 2013). As an annual International conference, ICITEE provides excellent platform to share innovative idea and experiences, exchange information, and explore collaboration among researchers, engineers, and scholars the field of information technology, communications, and electrical engineering.

This year, the ICITEE 2013 Technical Program Committee received 190 paper submissions from about 14 countries throughout the world. All the submitted papers were thoroughly and independently reviewed by at least three reviewers in accordance with standard blind review process. Based on the results of the rigorous review process, 92 papers have been selected. These papers have been grouped into 5 technical sessions, ranging from information technology, communications, power systems, electronics, and control systems. Besides those regular sessions, ICITEE 2013 also features world-class keynote/ plenary speeches and distinghuish-invited speaker that reflect the current research and development trends in green and intelligent technology to achieve environmental sustainability.

We are deeply indebted to all of our TPC members, as well as our volunteer reviewers, who have greatly contributed to the success of the ICITEE 2013. Many thanks should be given to our keynote and invited speakers who will present their work in this conference. In addition, our sincere gratitude should be given to all authors who submitted their works to ICITEE 2013 and hope you will enjoy a wonderful experience in this small traditional city of Indonesia.

Welcome to Yogyakarta, explore a thousand years old temples, enjoy its traditional arts and cultures, taste the varieties of traditional Javanese cuisines, and bring them back with your memories of Yogyakarta and new collaboration opportunities.

With best regards,

Eka Firmansyah, ST., M.Eng, Ph.D
TPC Chair

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General Information

Conference Vanue

The International Conference on Information Technology and Electrical Engineering (ICITEE 2013) will be held during 7-8 October 2013 at the Sahid Rich Jogja Hotel, Yogyakarta, Indonesia. The venue is located on Magelang Road, Km 6 No. 18 Patran, Yogyakarta's main business district.

Conference Registration

Regular conference registration includes admission to all technical sessions, keynote sessions, social programs, seminar kit, program book and proceedings (CD-ROM), gala dinner, coffee breaks and lunches. The official receipt for registration and coupons for lunches and gala dinner are given during conference at the registration desk.

Social Programs

Opening & Welcome Ceremony
Date : Monday, 7 October 2013
Time : 08:20-08:50
Venue : Edelweiss room, on the basement floor of the Sahid Rich Jogja Hotel

Gala Dinner
Date : Monday, 7 October 2013
Time : 18:30-21:30
Venue : Pool side, on the 1st floor of the Sahid Rich Jogja Hotel
Remark : Optional for National Student Registration category

Half-Day Tour

A half-day tour to Borobudur and Mendut Temple is specially organized for ICITEE 2013 participants on 8 October 2013. It is free of charge for International participants but optional for national participants (with additional charge).

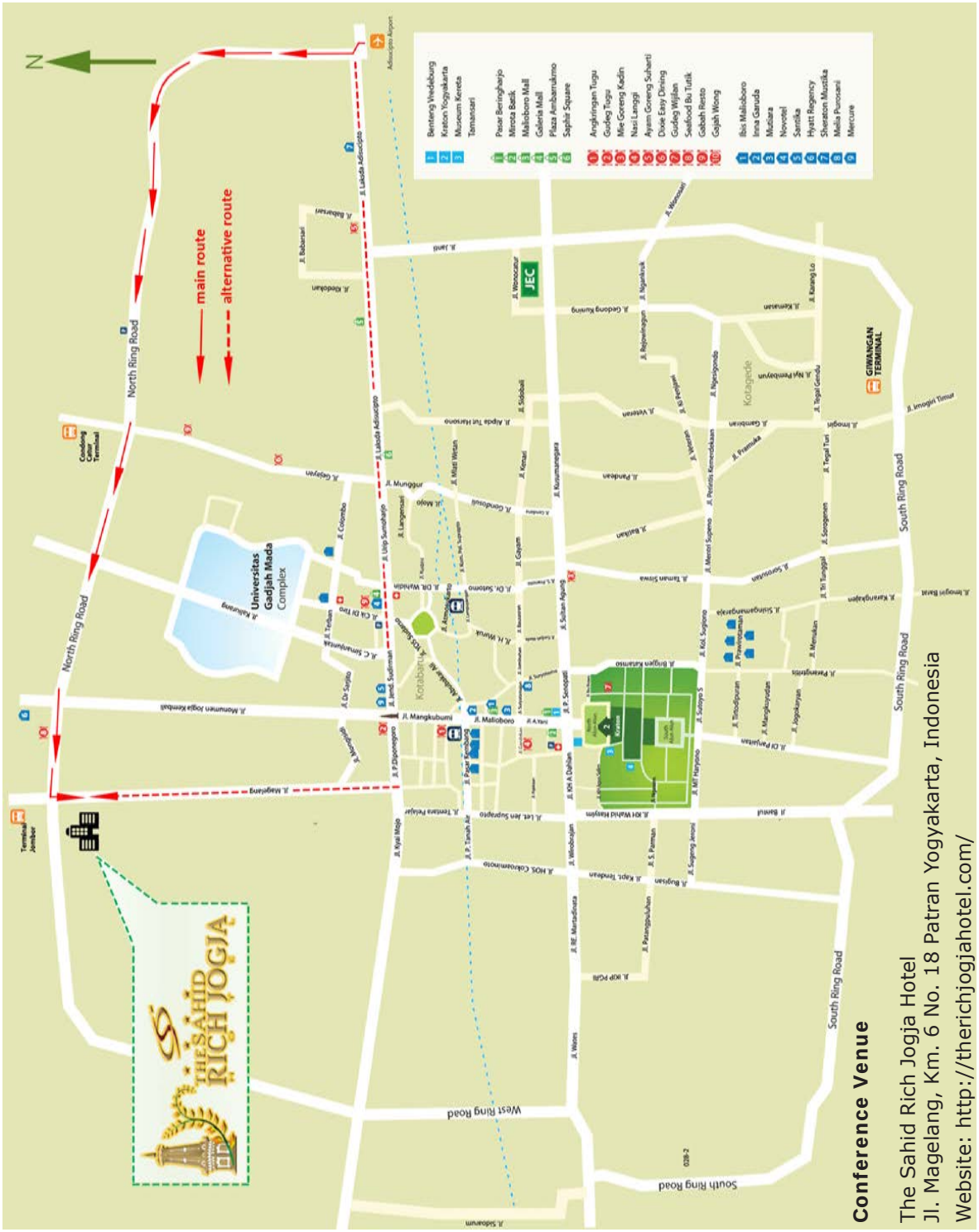
Borobudur

The Borobudur Temple is one of the greatest Buddhist monuments in the world, and was built in the 8th and 9th centuries AD during the reign of the Syailendra Dynasty. The temple's design in Gupta architecture reflects India's influence on the region, yet there are enough indigenous scenes and elements incorporated to make Borobudur uniquely Indonesian. The monument is located in the Kedu Valley, in the southern part of Central Java, at the centre of the island of Java, Indonesia.

Mendut Temple

Mendut Temple is a ninth century Buddhist temple, located in Mendut village, Mungkid sub-district, Magelang Regency, Central Java, Indonesia. Mendut Temple was built in 824 A.D. by King Indera of Syailendra dynasty. The temple is located about three kilometres eastward from Borobudur Temple. Mendut, Borobudur and Pawon Temples, all of which are Buddhist temples, are located in one straight line.

Access Map

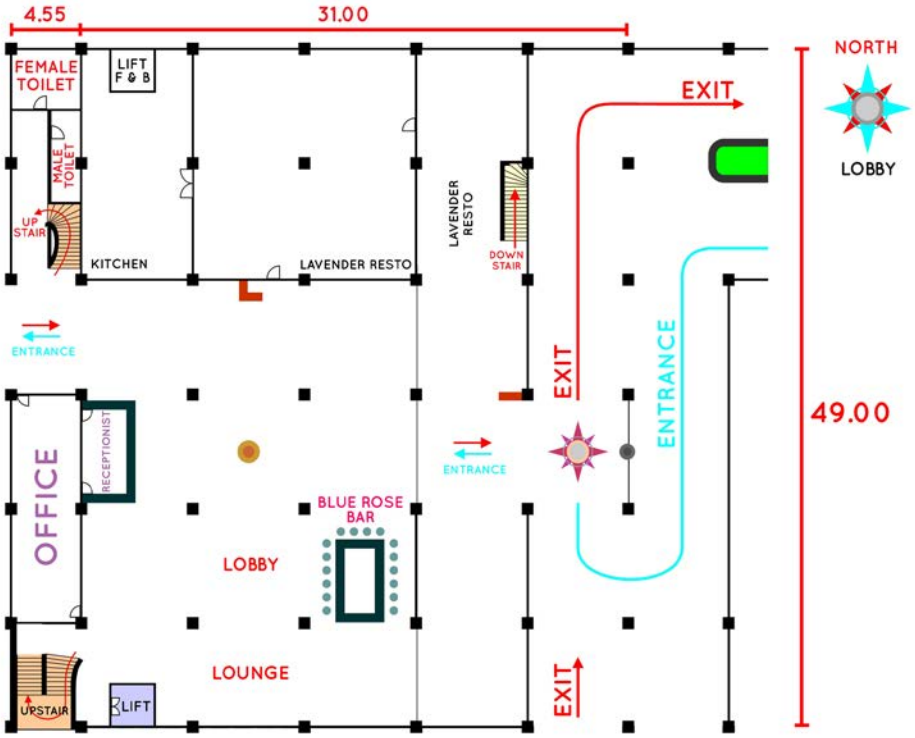


Conference Venue

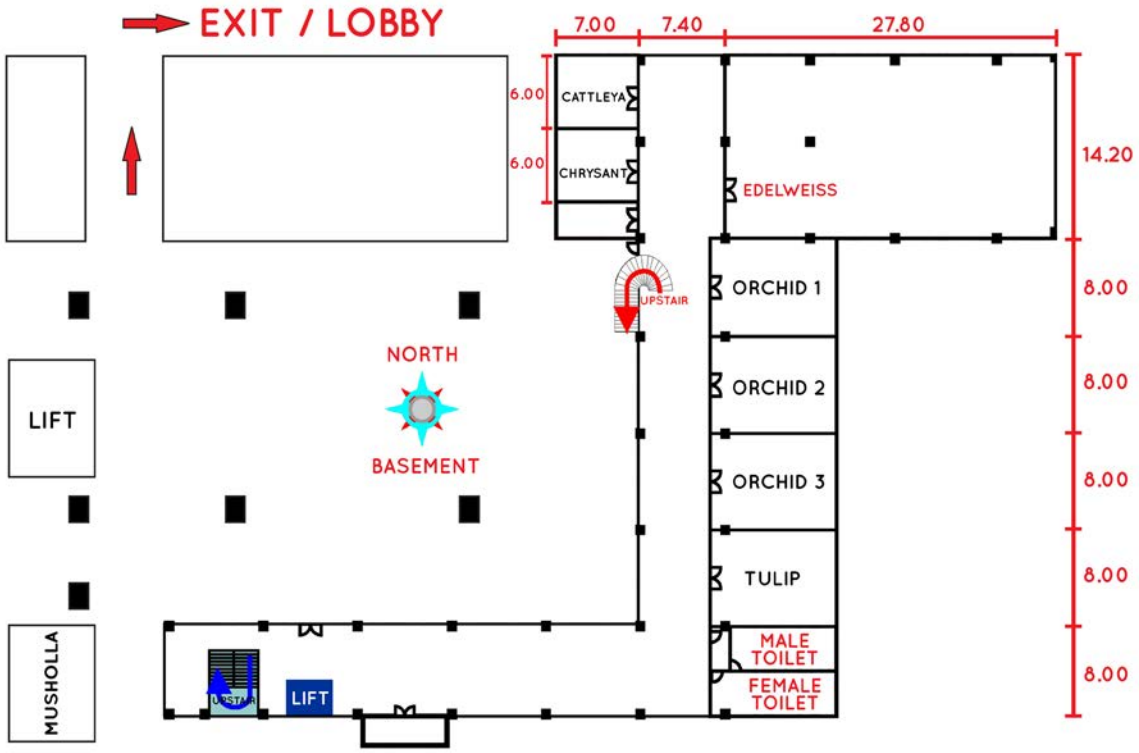
The Sahid Rich Jogja Hotel
Jl. Magelang, Km. 6 No. 18 Patran Yogyakarta, Indonesia
Website: http://therichjogjahotel.com/

Floor Plans

1st Floor Plan



Basement Floor Plan



Program at a Glance

7 October 2013 (Monday)
Venue: The Sahid Rich Jogja Hotel

Time	Program				
07:30-08:20	Registration				
08:20-08:50	Opening & Welcome Ceremony (Edelweiss)				
08:50-09:50	Keynote Speech 1 (Edelweiss) The Challenge on Spectrum Efficiency: Guard Interval Removal with Iterative Decoding Khoirul Anwar, Dr. Eng.				
09:50-10:00	Coffee Break				
10:00-11:00	Keynote Speech 2 (Edelweiss) Paradigm Shift in Turbo Processing: from point-to-point to Network Prof. Tadashi Matsumoto				
11:00-11:10	Photo Session				
	Edelweiss	Orchid 1	Orchid 2	Orchid 3	Chrysant
11:10-12:10	TS-2_1A: Network & Communications 1	TS-1_1B: Information Technology 1	TS-1_1C: Information Technology 2	TS-3_1D: Power Systems 1	TS-4_1E: Electronics 1
12:10-13:30	Lunch Break				
13:30-14:10	**Invited Talk** Prof. Ramesh Kumar Pokharel	TS-1_2B: Information Technology 3	TS-2_2C: Network & Communications 2	TS-3_2D: Power Systems 2	TS-5_2E: Control Systems 1
14:10-15:10	TS-4_2A: Electronics 2				
15:10-15:30	Coffee Break				
15:30-17:50	TS-1_3A: Information Technology 4	TS-1_3B: Information Technology 5	TS-1_3C: Information Technology 6	TS-2_3D: Network & Communications 3	TS-1_3E: Information Technology 7
18:30-21:30	Gala Dinner				

8 October 2013 (Monday)
Venue: The Sahid Rich Jogja Hotel

Time	Program			
07:30-08:20	Registration			
08:20-09:50	Keynote Speech 3 (Orchid) Evolution of ICT and Its Impact on Future Society Emeritus Prof. Susumu Yoshida			
09:50-10:10	Paper Award Ceremony (Orchid)			
10:10-10:30	Coffee Break			
	Orchid 1	Orchid 2	Orchid 3	Chrysant
10:30-12:10	TS-3_4A: Power Systems 3	TS-3_4B: Power Systems 4	TS-1_4C: Information Technology 8	TS-3_4D: Power Systems 5
12:10-13:30	Lunch Break			
13:30-19:30	Tour			

Opening Ceremony

Date: Monday, 7 October 2013

Opening Ceremony			
Time	**Room**	**Title**	**Speaker**
08:20-08:50	Edelweiss	Welcome Address	Dr. I Wayan Mustika (General Chair of ICITEE 2013)
		Congratulatory Address	Head of Dept. of EE&IT UGM
		Congratulatory Address	Rector of UGM

Keynote Sessions and Invited Talk

Date: Monday, 7 October 2013

Keynote Session 1			
Time	**Room**	**Title**	**Speaker**
08:50-09:50	Edelweiss	The Challenge on Spectrum Efficiency: Guard Interval Removal with Iterative Decoding	Khoirul Anwar, Dr. Eng.
Coffee Break			
Keynote Session 2			
10:00-11:00	Edelweiss	Paradigm Shift in Turbo Processing: from point-to-point to Network	Prof. Tadashi Matsumoto

Date: Monday, 7 October 2013

Invited Talk			
Time	**Room**	**Title**	**Speaker**
13:30-14:10	Edelweiss	Present and Future Trends of Green LSI technology for Autonomous Type Sensor Networks	Prof. Ramesh Kumar Pokharel

Date: Tuesday, 8 October 2013

Keynote Session 3			
Time	**Room**	**Title**	**Speaker**
08:20-09:50	Orchid	Evolution of ICT and Its Impact on Future Society	Emeritus Prof. Susumu Yoshida

Keynote Speech 1

The Challenge on Spectrum Efficiency: Guard Interval Removal with Iterative Decoding

Khoirul Anwar, Dr. Eng.
Assistant Professor of Information Theory and Signal Processing Laboratory,
Japan Advanced Institute of Science and Technology (JAIST), Japan.

Abstract

Transmission with high spectrum efficiency is still challenging nowadays for both point-to-point and multi-terminal communication systems. The efficiency can be improved either in time or frequency domain processing. Motivated by the recent development of turbo equalization, where an iterative decoding is involved in, this talk focuses on a spectrum efficient enhancement by completely removing the guard interval (GI). This challenging task is made possible by the use of a priori information provided by the decoder. This talk also provides an analysis from the viewpoint of the extrinsic information transfer (EXIT) curve matching. The doped accumulator lifts up the right most point of the EXIT curve of the equalizer to the (1.0, 1.0) mutual information point, by which we can avoid the intersection between the two curves, resulting in elimination of the error floor in bit error rate (BER) performance. It is also shown that even though very simple short memory convolutional code is used, clear turbo cliff still happens at a threshold signal-to-noise ratio (SNR) relatively close to the Shannon limit. By making turbo equalization concatenated in time domain, called chained turbo equalization (CHATUE), the GI or Cyclic Prefix (CP) can be completely eliminated. It is then shown that the CHATUE system outperforms conventional CP-transmission and/or the other CP-free techniques in terms of bit-error-rate (BER) performance, convergence property, and sensitivity to the Doppler spread. Regarding the computational complexity, in this talk the latest version of the reduced complexity equalization technique, Frequency Domain Soft Cancellation Minimum Mean Square Error (FD/SC-MMSE) turbo equalization, is presented. In this talk, the excellent results of CHATUE algorithm applied on 4G Uplink, single carrier frequency domain multiple access (SC-FDMA), are also presented. It is shown that the CHATUE algorithm is potential for future broadband wireless communication systems since the principle can also be applied for channel estimation.

Biography

Dr. Khoirul Anwar graduated (cum laude) from the department of Electrical Engineering (Telecommunications), Institut Teknologi Bandung (ITB), Bandung, Indonesia in 2000. He received Master and Doctor Degrees from Graduate School of Information Science, Nara Institute of Science and Technology (NAIST) in 2005 and 2008, respectively. Since then, he has been appointed as an assis- tant professor in NAIST. He received best student paper award from the IEEE Radio and Wireless Symposium 2006 (RWS'06), California-USA, Best Paper of Conference held Indonesian Student Association (ISA 2007), Kyoto, Japan in 2007, Best Paper Presenter for the track of Advanced Technology in International conference on Sustainability for Human Security (SUSTAIN), Kyoto October 2011, and Indonesian Diaspora "Award for Innovation", Congress of Indonesian Diaspora, Los Angeles, USA, July 2012. Since September 2008, he is with the School of Information Science, Japan Advanced Institute of Science and Technology (JAIST) as an assistant professor. His research interests are network information theory, error control coding, iterative decoding and signal processing for wireless communications. He has authored around 73 scientific publications in these areas. He serves as a reviewer for a number of main journals and conferences in the area of wireless communications and signal processing. Dr. Anwar is a member of IEEE (information theory society, communications society) and IEICE Japan.

Patents

Patent 1: Transmitter and Receiver (Granted)
Inventors: K. Anwar, T. Hara and K. Ando
"Transmitter and Receiver": for the reduction of power consumption in satellite and mobile communications system. In 2010 the technique in this patent is adopted by the ITU-R standard No. ITU-R S.1878 "Multi-carrier Based Transmission Techniques for Satellite Systems". Also noted in ITU-R
S.2173 (07/2010) "Multi-carrier based transmission techniques". This patent is mainly based on the paper:

- Khoirul Anwar et al., "A New Design of Carrier Interferometry OFDM with FFT as Spreading Codes", RWS 2006, pp. 543-546, California, Jan 2006.
- The detail of the patent can be found, for example, in: http://www.freepatentsonline.com/7804764.html.

Patent 2: Chained Turbo Equalization (CHATUE)
Inventors: T. Matsumoto and K. Anwar
Chained Turbo Equalization for Block Transmission (CHATUE): for block transmission without guard interval (GI). This patent is mainly based on this paper:

- K. Anwar, H. Zhou and T. Matsumoto, "Chained Turbo Equalization for Block Transmission without Guard Interval", IEEE VTC2010-Spring, Taiwan, pp. 1-5, June 2010.

Invention Report: Uplink SC-FDMA (4G) without CP/GI
Inventors: Z. Hui, K. Anwar and T. Matsumoto
CHATUE for Uplink 4G SC-FDMA: this technique is dedicated for single carrier frequency division multiplexing (SC-FDMA) 4G system with insufficient or completely without guard interval. The detail of this paper is mainly from the idea and results of this paper:

- H. Zhou, K. Anwar and T. Matsumoto, "Chained Turbo Equalization for SC-FDMA Systems without Cyclic Prefix", IEEE Globecom 2010 Workshop on Broadband Single Carrier and Frequency Domain Communications, Dec. 2010.

Invention Report: Chained Turbo Equalization for "sparse" delay profile
Inventors: Y. Takano, K. Anwar and T. Matsumoto
This CHATUE is referred as CHATUE-2 since it uses some different fundamental concepts. The basic concept of CHATUE-2 has been detailed explained in this paper:

- Y. Takano, K. Anwar and T. Matsumoto, "Spectrally Efficient Frame Format-Aided Turbo Equalization with Channel Estimation", (under review) IEEE Transactions on Vehicular Technology (submitted on May 23, 2012).

Invention Report: Chained Turbo Estimation (CHATES)
Inventors: Y. Takano, K. Anwar and T. Matsumoto
This techniq ue is important for implementation of CHATUE algorithm since in practice the channel is unknown. The details of this invention have also been described in the above paper.

Keynote Speech 2

Paradigm Shift in Turbo Processing: from point-to-point to Network

Prof. Tadashi Matsumoto
IEEE Fellow and Professor of Information Theory and Signal Processing Laboratory,
Japan Advanced Institute of Science and Technology (JAIST), Japan.

Abstract

A goal of this talk is to provide audience with the knowledge about the relationship between the relay systems and the Distributed Coding techniques for correlated sources. First of all, it is shown that performance of the conventional decode-and-forward system can significantly be improved by performing another interleaving at the relay, with which the resulting network structure is equivalent to distributed turbo code. Furthermore, since the knowledge about the bit error probability of the source-relay node can be used as the correlation between the two frames, one from the source, and the other from the relay, we can well exploit the Slepian-Wolf theorem; With the utilization of the theorem, the relay can forward the frame even though it detects errors in the information part, and the destination can recover the data losslessly. Then, this talk further expands the idea, from lossless-link-design-based to lossy-based. In this part, we assume that none of the relays at the final stage has no errors in the information parts of the frames. This category of the problems belongs to Distributed Lossy Coding, represented by the Chief Executive Officer (CEO) problem, in Network Information Theory. Even in this situation, still the destination can recover the data with the distortion level lower than specified. This talk introduces conceptual bases of the lossless (Slepian Wolf) and lossy-link-design–based network design, and provides basic ideas for signal detection algorithms for the both cases based on the turbo principle. Results of initial simulations conducted to evaluate the performances of the detection/decoding techniques for several simple network models are also presented. The major applications of the system concept introduced in this keynote speech are Wireless Mesh Networks, Wireless Sensor Networks, Wireless Machine-to-Machine networks, Wireless Internet-of-Things, and Densely Populated Wireless Networks, as well as Rapid Construction of Monitoring Systems in Devastated Public Facilities, such as Fukushima.

Biography

Tadashi "Tad" Matsumoto is a professor at Information Theory and Signal Processing Laboratory, Japan Advanced Institute of Science and Technology (JAIST). Before moving in to JAIST, he served as a professor at Center for Wireless Communications (CWC), University of Oulu, Finland, for 5 years, and for the last one year, he also served as a guest professor at Ilmenau University of Technology, Germany, funded by the MERCATOR German visiting professorship program, while also keeping his position at CWC.
Although his academic background is mainly in the area of wireless mobile communications, in general, the highest focus has been given to the research on iterative (Turbo) processing for equalization and multi-user detection in broadband mobile communications and information theoretic convergence property analysis of the techniques for the last 5 years. Presently, industries related to mobile communications are facing to unprecedented difficulties in having clear vision of future systems as well as of technological trends towards the goal. Amid such chaotic situation, one thing which is clear now is that the model of system development, lead in most cases by behemoth-like operators, is no longer workable, and the related industries need new scenarios allowing them to create new system concepts and technologies that are not merely the extensions of current systems' supporting technologies. Now, a big chance has come to the academia, where we can play crucial roles in making substantial scientific contributions to the industry!

Keynote Speech 3

Evolution of ICT and Its Impact on Future Society

Emeritus Prof. Susumu Yoshida
Kyoto University, Japan

Abstract

Information and communications technologies (ICT) have made significant progress during the last several decades. They have not only revolutionized the way of communications but also influenced a lot to the way of life all over the world. In particular, optical fibers and cellular wireless technologies have contributed a lot to spread the network worldwide and to interconnect almost everyone in the world. Already the cellular phone subscription exceeded 6 billion out of 7 billion world population, and is approaching to the 100 % penetration in the world. Then, the Internet together with computer technologies has changed the traditional circuit switched network to the packet switched network which opened the way to various media, letting everyone send/receive whatever information to anyone, regardless of time and location. Currently, further research is ongoing to make the network more broadened and flexible with significantly higher capacity. On the other hand, network applications are more and more expanding. Cloud Computing, Big Data and Green Communications are buzz words showing the present and the future directions. Nowadays, these ICT technologies are believed to be inevitable and to play key roles to revolutionize our way of life and to make the sustainable world, including smart city (town) concepts, global environmental preservation, intelligent transportation systems, healthcare and telemedicine, education, various industries including agriculture, etc. to name a few. As a prerequisite, the networks must be disaster-resilient, which is a very important lesson learned from the Great East-Japan Earthquake. In this presentation, evolution of ICT technologies is reviewed and current and future trends are discussed. Then, their impact on future society will be discussed by introducing various applications.

Biography

Susumu Yoshida received the B.E., M.E. and Ph.D. degrees all in electrical engineering from Kyoto University, Kyoto, Japan in 1971, 1973 and 1978, respectively. Since 1973, he had been with the Faculty of Engineering of Kyoto University and was a full professor there since 1992. In March 2013, he retired from Kyoto University after working for 40 years, and currently he is an Emeritus Professor of Kyoto University.
At the university, he had been mainly engaged in the research of wireless personal communications. He was a guest editor of IEEE J-SAC on Wireless Local Communications published in April and May 1996. He served as a General Co-Chair of IEEE VTC 2012-Spring, Yokohama and a General Chair of the APWCS 2012, Kyoto. He served as a President of the Institute of Electronics, Information and Communication Engineers (IEICE) from May 2012 till May 2013. Currently, he is a Council Member of Science Council of Japan, Information and Communications Council of Ministry of Internal Affairs and Communications of Japan, etc. He received several awards including the IEICE Achievement Award, IEICE Best Paper Award and Ericsson Telecommunication Award in 1993, 2011 and 2007, respectively.

Invited Talk

Present and Future Trends of Green LSI technology for Autonomous Type Sensor Networks

Prof. Ramesh Kumar Pokharel
Kyushu University, Japan

Abstract

With advance technology, the data volume is growing expo nentially and handling such "big data" for transmission and processing is challenging. Innovations in both software and hardware platforms are desired. Wireless technology is inherent to capture those data and transferring them to the data center continuously. For this, autonomous type sensor networks such as a sensor network to monitor infrastructure demands ultra-low power LSI and energy harvesting technology for maintenance free system often called green system. In this lecture, technology for ultra-low power electronics using integration of CMOS and MEMS technology will be presented and brief explanation of energy harvesting system will be presented. More specifically, presentation will be focused to make a vision to develop a battery-less wireless sensor node and a maintenance-free ultrafast wireless transmitting system.

Biography

Ramesh K. Pokharel received the M. E. and Doctorate degrees from the University of Tokyo, Japan in 2000 and 2003, respectively all in electrical engineering. He had short academic and industrial experiences in Nepal before he joined the University of Tokyo in 1997 as a research student. He had been a post-doctoral research fellow with the Department of Electrical Engineering and Electronics, Aoyama Gakuin University, Japan from April 2003 to March 2005. In April 2005, he joined the Department of Electronics, Graduate School of Information Science and Electrical Engineering, Kyushu University, and since September 2010, he has been a Professor at the Center for Japan-Egypt Cooperation in Science and Technology, Kyushu University. His current research interests include the low cost RFIC and analog circuits for microwave and millimeter wave wireless communications, on-chip signal integrity issues, and on-chip meta-materials in CMOS. He is a member of the IEEE. Dr. Pokharel was a recipient of the Monbukagakusho Scholarship of the Japanese Government from 1997-2003, and an excellent COE research presentation award from the University of Tokyo in 2003.

Technical Sessions

Date	Time	Edelweiss	Orchid 1	Orchid 2	Orchid 3	Chrysant
10/07 Mon	11:10-12:10	TS-2_1A: Network & Communications 1	TS-1_1B: Information Technology 1	TS-1_1C: Information Technology 2	TS-3_1D: Power Systems 1	TS-4_1E: Electronics 1
	13:30-14:10	**Invited Talk** Prof. Ramesh Kumar Pokharel	TS-1_2B: Information Technology 3	TS-2_2C: Network & Communications 2	TS-3_2D: Power Systems 2	TS-5_2E: Control Systems 1
	14:10-15:10	TS-4_2A: Electronics 2				
	15:30-17:50	TS-1_3A: Information Technology 4	TS-1_3B: Information Technology 5	TS-1_3C: Information Technology 6	TS-2_3D: Network & Communications 3	TS-1_3E: Information Technology 7
10/08 Tue	10:30-12:10	-	TS-3_4A: Power Systems 3	TS-3_4B: Power Systems 4	TS-1_4C: Information Technology 8	TS-3_4D: Power Systems 5

Paper Abstracts

TS-2_1A: Wireless Communications, Networking, and Vehicular Technology 1

Monday, 07 October 11:10-12:10 Edelweiss

1 Load Distribution using Modified RED for Multipath TCP Communication

Sumet Prabhavat, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang, Bangkok; Ruttikorn Varakulsiripunth, Faculty of Information Technology, Thai-Nichi Institute of Technology, Bangkok; Satoshi Utsumi, Yasushi Kato, Tsuruoka National College of Technology, Yamagata

Abstract-Demand for large bandwidth network connections is growing continuously while network connections via multiple paths can exist because of high degree of connectivity. Utilization of the multiple paths is an economical solution for provisioning large network capacity to meet the users' requirements but it brings about key issues such as load imbalance (causing a large queue and buffer overflow at a gateway) and packet reordering problems that have significant impacts on TCP connections. In this paper, we propose a load distribution model for TCP transmission, called Load Distribution over Multipath with Extended Drop Slope Random Early Detection (LDM/ExRED). LDM/ExRED takes advantages of RED mechanism to maintain a small queue, avoid buffer overflow at a gateway, and mitigate packet reordering problem. In addition, it reduces peak buffer occupancy by using our modified RED (i.e., ExRED). Our work will be evaluated and compared to the other existing models by simulations under realistic traffic conditions.

2 A Game-Theoretic Approach for Dynamic Spectrum Sharing in Cognitive Radio Networks

Komang Wahyu Trisna, Universitas Gadjah Mada; I Wayan Mustika, Universitas Gadjah Mada; Widyawan Widyawan, Selo Sulistyo, Universitas Gadjah Mada

Abstract-In a spectrum sharing system, lower-priority users are allowed to spatially reuse the spectrum allocated to higher-priority users as long as they do not disrupt communications of the latter. Therefore, to improve spectrum utilization, an important requirement for the former users is to manage the interference and ensure that the latter users can maintain reliable communications. This paper presents a game theoretic framework to model the dynamic spectrum sharing in cognitive radio networks. First, a utility function that captures the selfish and cooperative behavior of the lower-priority users to manage the interference by selecting the best channel with minimal intra- and inter-system interference is defined. Next, based on the defined utility function, the proposed framework can be formulated as a potential game; thus, the convergence to a Nash equilibrium point is ensured as long as the best response dynamic is adopted. At the equilibrium point, power allocation algorithm is proposed such that the interference to higher-priority users can be maintained below the maximum allowable level. The simulation results show the convergence of the proposed potential game and the performance improvement of higher-priority users in terms of SINR and outage probability.

3 Performance Comparison of IEEE 1609.4/802.11p and 802.11e with EDCA Implementation in MAC Sublayer

Doan Perdana, University of Indonesia; Riri Fitri Sari, University of Indonesia

Abstract-One of the most challenging issues in IEEE 1609.4 is the assurance of Quality of Service (QoS), i.e. to improve throughput and reduce delay in the sublayer Medium Access Control (MAC) IEEE 1609.4. The prioritization of each service package, using Enhanced Distributed Channel Access (EDCA) at the MAC sublayer is designed based on the IEEE 802.11e with some modifications to the transmission parameters.
In this paper, we evaluate the throughput and delay performance with EDCA implementation on the IEEE MAC sub layer 1609.4/802.11p based on simulation. Our work also evaluate the performance of the service differentiation capability of the IEEE1609.4/802.11p, in terms of throughput and queuing delay, compared to that IEEE 802.11e. On this work, we use ns 2.34 simulator to evaluate the performance of the MAC sub layer IEEE 1609.4.
From the simulation and based on channel performance, it was found that the delay performance based on IEEE1609.4/802.11p standard has been degraded 13.87%, and the throughput is 57.49% better compared with IEEE 802.11e standard. Otherwise, based on the prioritization of each service package on IEEE1609.4/802.11p standard, we found that the queuing delay of AC1 and SCH3 (CWmin = 3 and CWmax = 14) in IEEE1609.4/802.11p is much larger than the rest of the AC queues.

TS-1_1B: Software Engineering, Services, and Information Technology 1

Monday, 07 October 11:10-12:10 Orchid 1

1 Design and Implementation of Gaze Tracking Headgear for Nvidia 3D Vision®

Sunu Wibirama, Tokai University; Kazuhiko Hamamoto, Tokai University

Abstract-The usage of Nvidia 3D Vision R is increasing rapidly, ranging from gaming to research purposes. However, researchers in human computer interaction and virtual reality are constrained by hardware configuration since current com-mercial gaze tracking systems are not specifically designed to be used with Nvidia 3D Vision R . In this paper, we present a novel prototype of gaze tracking headgear which can be used appropriately with Nvidia 3D Vision R . We explain design consideration and detail implementation of our gaze tracking headgear. We also evaluate our gaze tracking system by measuring gaze accuracy on stereoscopic display. Experimental result shows that the average gaze estimation error is less than one degree visual angle.

2 A Parametric Motion Concatenation Method Using Cubic Bezier Interpolation

Nopparit, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang; Natapon Pantuwong, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang; Masanori Sugimoto, Hokkaido University

Abstract-This paper presents a novel motion concatenation method for parametric motion synthesis techniques. First, motion groups are created based on the actions in each motion. We then extract all of the parameters that control the synthesized motions.

To connect the motion groups, we propose a motion concatenation algorithm based on cubic Bezier´ interpolation that can be used to connect any pair of motions. All of the poses are pre-calculated before interpolation, so that the concatenated motions can be synthesized rapidly during the concatenation phase. Although there is no intersection region between the parameter spaces, the proposed method guarantees that transitions between motions can be generated for any consecutive motions, which is a problem found in existing methods.

3 Extended Baker Map Using Scan Patterns for Image Encryption

Hung Anh Pham, King Mongkut's Institute of Technology Ladkrabang; Pitikhate Sooraksa, King Mongkut's Institute of Technology Ladkrabang; Kitdakorn Klomkarn, King Mongkut's Institute of Technology Ladkrabang

Abstract-In this paper, an improvement on free-size image encryption scheme using Baker map combining Scan patterns is proposed. The generalized discrete chaotic Baker map uses sequences of parameters generated by chaotic Gauss map to divide image matrix into boxes. Scrambling method is done by using Scan patterns in each boxes of chaotic Baker map. After scrambling method, chaotic 3-D Chen system is selected to do the pixel transformation. Through the experiments, the security of proposed scheme is tested by introducing keys analysis, entropy analysis, statistical analysis, and processing time so that the scheme achieves high encryption efficiency

TS-1_1C: Software Engineering, Services, and Information Technology 2

Monday, 07 October 11:10-12:10 Orchid 2

1 Distance Learning Lifecycle Management: An Agile Approach to Manage the Lifecycle of a Distance Learning

Ridi Ferdiana, Universitas Gadjah Mada

Abstract-The limitations of learning interaction on distance learning produces a variety of challenges. One of the major challenges in distance learning is to convince that distance learning produces the same quality as the conventional learning. The challenge can be solved if an organization has an implementation policy of distance learning. But in fact, a distance learning is only a limited e-learning software with digitized materials. This paper will propose a standard implementation policy called Distance Learning Lifecycle Management (DLLM). DLLM integrates Computer Supported Collaborative Learning (CSCL) concept and instructional design with the agile values. As a result, DLLM will guide any organization to manage and maintain the lifecycle of distance learning dynamically.

2 Efficiency Factor and Risk Factor Based User Case Point Test Effort Estimation Model Compatible with Agile Software Development

Abu Wahid Md Masud Parvez, RMIT

Abstract-In software outsourcing industry, to win a contract, outsourcing companies need to consider the price that they will introduce to customers. Therefore, estimation has played an important role in any type of software project and as well as for test projects. Particularly, the estimation of testing has been more critical and magnitude as companies need to present or bid their prices on the project to win the outsourcing contract. Wrong estimation can negatively affect the company sales in both ways. On the one side, the profit margin could be reduced or hurt when the bidding is less than that real effort. On the other side, the company could lose the project when the bidding is higher than that of competitors. Therefore, it is extremely necessary to apply economic and systematic estimation model or process to enhance the accuracy in estimation. The integration of highly skilled workforce and accurate test effort estimation software will provide significant benefits to companies. Up to now, there are various existing models of test effort estimation, yet use case point estimation is one of the most popular models in the agile software development industry. The present paper aims to investigate the use case point estimation model. Following the analysis, we have developed two important elements namely, efficiency and risk factor based on a new layer in the model developed by us. The benefit of the new model is to increase the performance and effectiveness of the use case point estimation model.

3 Integration of DEMATEL and ANP Methods for Calculate The Weight of Characteristics Software Quality Based Model ISO 9126

Sugiyanto, Institut Teknologi Sepuluh Nopember (ITS); Siti Rochimah, Institut Teknologi Sepuluh Nopember (ITS)

Abstract-One of the difficulties that occur in the model is to decide the weights of quality characteristics. This is due to the interrelations existence among the quality factors based model ISO 9126. Each of these characteristics can influence or even contradict each other. The interrelations existence among the factors affects the weight of characteristics software quality, and will affect the software quality calculation. Therefore, researchers will integrate DEMATEL and ANP methods for calculate the weight of characteristics software quality based model ISO 9126. DEMATEL method used to calculate sum of influences for each characteristics model ISO 9126, while the ANP method used to calculate local weights and global weight for each sub characteristics model ISO 9126. Results from this study is the value of local weights for each of the characteristics of ISO 9126, and global weights for each sub characteristics ISO 9126 which represent the level of importance of the characteristics and sub characteristics ISO 9126.

TS-3_1D: Power Systems 1

Monday, 07 October 11:10-12:10 Orchid 3

1 Modeling Wind Power Plants in Harmonic Resonance Study - A Case Study in Thailand

Huan Chu Xuan, Chulalongkorn University; Thavatchai Tayjasanant, Chulalongkorn University

Abstract-Harmonic resonance phenomenon is a problem paid attention significantly from utilities and system engineers for many years. Nowadays, wind power is the leading renewable source, which is considered as the solution for a clean and sustainable

resource; however, this integration of wind power plants into grids brings challenges for harmonic resonance study. This paper compares available methods and their pros and cons for modeling wind power plants in harmonic resonance study. Simulation results are verified with actual measurement data to present the performance among these methods. From the verification, the paper suggests the suitable method for modeling wind power plants in harmonic resonance study.

2 Design of a Portable Pico Linear Permanent Magnet Generator for Wave Energy Conversion

Mohd Aizuddin Firdaus Mohmad Hamim, Universiti Teknologi PETRONAS; Taib Ibrahim, Universiti Teknologi PETRONAS; Nursyarizal Mohd Nor, Universiti Teknologi PETRONAS

Abstract-This paper presents the design and modeling of a portable pico linear permanent magnet generator for the application of wave energy conversion system. Two types of generator technology namely the rotary and linear are identified but due to the high maintenance and low efficiency of rotary, linear generator is preferable. Three linear permanent magnet generator designs with different types of permanent magnet shape have been proposed. Preliminary results for the air gap distribution and open circuit test are demonstrated and discussed are shown to be as expected.

3 A Novel Second-Order Model of Induction Motor Loads

Pichai Aree, Thammasat University

Abstract-In power system dynamic studies, it is necessary to represent induction motor loads with a standard reduced order model in order to reduce computational requirements. A third-order model, neglecting the stator transients, is often used. In this paper, the third-order model is further simplified into two second-order models, called as slip-flux-magnitude and slip-flux-angle models. The model derivations are given in detail. The dynamic responses of both models are compared with the higher third-order model for the cases of small and large horse power induction motor loads. The study results show that the slip-flux-angle model gives better approximation of the third-order model.

TS-4_1E: Electronics, Circuits, and Systems 1

Monday, 07 October 11:10-12:10 Chrysant

1 Performance Comparison of Asymmetric Drain/Source Topology in Nanoscale Double Gate Vertical MOSFET

Munawar Riyadi, Diponegoro University

Abstract-Double Gate MOSFET structure is a promising architecture for advanced devices in nanometer regime. This paper elaborates the asymmetric topology of Vertical Double Gate MOSFET (VDGM) with ORI method as source/drain fabricating technique using numerical analysis approach. The electrical characteristics of the drain-on-top (DOT) and source-on-top (SOT) topology were analyzed, especially in the sub-threshold performance, to observe the short channel effect (SCE) of the device. The result shows that silicon pillar thickness reduction enhance the DIBL performance, while the threshold voltage roll-off change in nearly the same degree with the thickness variation. The floating body effect will likely occur for thicker silicon pillar in SOT, as the drain's depletion layer creates deeper barrier between substrate and pillar region. The performance comparison of sub-threshold slope revealed better SCE control for DOT topology in the lower silicon thickness for short channel length up to 30 nm.

2 Design of Capacitance Measurement Circuit for Data Acquisition System ECVT

Arbai Yusuf, Ctech Labs; Wahyu Widada, Ctech Labs; Warsito Purwo Taruno, Ctech Labs

Abstract-In this research, we proposed a capacitance measurement circuit Electrical Capacitance Volume Tomography (ECVT) to perform three-dimensional image visualization. The ECVT system is consists of three main parts i.e. sensor, data acquisition system, and computer. Data acquisition system is composed of capacitance measurement circuit and microcontroller to measure an unknown capacitance inside the sensor, collect data and send it to the computer. Further, these data is used to reconstruct 3D image. The design of the circuit used a sine wave 14.6 Vp-pand 2.5 MHz of frequency injected to the electrode pair to measure an unknown capacitance inside the sensor. An experiment is performed using simulated phantom using sensor having the form of a half-sphere with combined triangular and rectangular shapes. The system is able to measure a capacitance value as low as four femto-Farads with 0.34% margin error.

3 Blind and Lighting Control to Maintain Comfort Light Intensity of The Classroom Utilizing Microcontroller ATmega8535

I Gusti L. Wahyudi Indrawan, President University; Arthur Silitonga, President University

Abstract-A stable light intensity level of a classroom can actually be obtained by integrating automatic lamp brightness controller with automatic blind system. A brightness controller of the lamp, especially incandescent type can be developed by adopting the principle of phase firing angle. It should be implemented in such a way so that the firing angle is set precisely to keep the classroom's light intensity stays in a steady level. Next, the opening and closing process of the blind can also be done using stepper motor which will be controlled automatically by a microcontroller through a hardware driver. This is intended to take the advantage of light contribution from the outside instead of directly switching on or brightening the lamp.

TS-4_2A: Electronics, Circuits, and Systems 2

Monday, 07 October 14.10-15:10 Edelweiss

1 Novel Soft-switching Forward Converter based on Coupled Inductor

En-Hui Chu, Northeastern University; Hong Wang, Northeastern University; Yin-Yin Wang, Northeastern University

Abstract-A interleaved two-transistor forward pulse-width modulation (PWM) DC-DC converter based on coupled inductor is presented. Compared with the conventional interleaved two-transistor forward PWM DC-DC converter, this converter can realize zero-voltage switching for the leading switches and approximately zero-current switching for the lagging switches by the secondary side auxiliary circuit, lossless snubber capacitors and transformer leakage inductance. So the voltage and current peak of the main switches and circulating current loss of the circuit can be effectively reduced, increasing the overall efficiency. The converter employs a simple auxiliary circuit that consists of neither lossy components nor active switches. The circulating current of auxiliary circuit can be adaptively regulated according to the load conditions. The voltage amplitude of holding capacitor, which can adjusts the commutation time, can be continuously regulated by varying the turns ratio of the coupled inductor. The change of the turns ratio not increases voltage stress of main switches and secondary rectifier diodes. This paper analyses the operation principle and soft switching implementation condition of new type converter according to the equivalent circuits in different operation modes. The effectiveness of the proposed converter was illustrated by the simulation results.

2 Asynchronous Delta-Sigma Modulator with Multiple-Valued Output

Arif Abdul Mannan, University of Miyazaki; Hiroki Tamura, University of Miyazaki; Koichi Tanno, University of Miyazaki

Abstract-In this paper, a continuous-time asynchronous delta-sigma (ΔΣ) modulator (ADSM) is proposed. The proposed circuit is multiple-valued output. The circuit is consists of hysteresis comparator, operational transconductance amplifier, and digital-to-analog circuits. Next, an example circuit of 5-level ADSM is discussed and simulated. An analog-to-digital converter consisted of the 5-level ADMS and multiple-valued logic decoder and digital counter is presented and simulated. All of the proposed circuits are simulated in transistors level through HSPICE with set of 2.0μm CMOS process parameters. Detailed simulation results are shown in this paper.

3 Another Approach to Ensure the Oscillation Stability of Sinusoidal Oscillator

Dzuhri Radityo Utomo, Departement of Electrical Engineering and Information Technology, Universitas Gadjah Mada

Abstract-Another approach to design a sinusoidal oscillator is proposed. This design is proposed to improve the oscillation stability of sinusoidal oscillator. The ideal model of this oscillator does not have any specific oscillation criterion. This property ensures the oscillation stability of this oscillator. Any changes in oscillation frequency does not violate the oscillation stability. This oscillator design can be implemented using op-amps and passive components. But the characteristics of op-amps influence the oscillator, thus change the characteristics of this oscillator. So a more realistic model is needed to predict the behaviour of this oscillator circuit more accurately. The realistic model is built by considering the characteristics of op-amps. Based on this model, a gain adjustment is needed by this circuit. Without any proper adjustment, a stable oscillation does not occur in this circuit. The realistic model is also used to predict the oscillation frequency of this oscillator and it produces a result that is similar to the simulation result.

TS-1_2B: Software Engineering, Services, and Information Technology 3

Monday, 07 October 13.30-15:10 Orchid 1

1 Analysis of Factors Influencing the Mobile Technology Acceptance for Library Information Services: Conceptual Model

Singha Chaveesuk, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand; Sununthar Vongjaturapat, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand; Nopporn Chotikakamthorn, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand

Abstract-Increasing powerful mobile technology, for example tablet devices, empower learners to seek information not only at home but also in mobile learning scenarios, virtually anywhere and anytime. However, the variety of library material types such as e-books, e-journals, images, audio and movies, require different levels of human- computer interaction. Moreover, the different library material types may be subject to different usability constraints. Thus, it is important for the academic library to look at how student use their mobile technology for library information services. This paper aims to propose a theoretical model for academic institutes and telecommunication service providers by addressing the following question: What are the key determinant factors for the mobile technology acceptance in using library information services? How the patron' s perspective and technical perspective are integrated in the process of mobile technology acceptance for library information services? We extend the extending Unified Theory of Acceptance and Use of Technology model (UTAUT2) to the context of library information services by examining the moderating role of library material type. Adapting the UTAUT2 model requires re-specification to suit a specific information system as well as including integration variables namely technology characteristics, task characteristics and attitude. The contribution of the model is a design guideline for the mobile technology function that is consistent with the library information services. Especially, for more better service management and delivery.

2 Development of a Conceptual Model of E-commerce Adoption for SMEs in Indonesia

Evi Triandini, STMIK STIKOM Bali; Arif Djunaidy, Institut Teknologi Sepuluh Nopember; Daniel Siahaan, Institut Teknologi Sepuluh Nopember

Abstract-E-commerce adoption provides many benefits for small and medium enterprises. In Indonesia, adoption of e-commerce by SMEs is still in low level because they meet such several prob-lems to adopt e-commerce as difficulty to learn and use e-com-merce, to understand the role of e-commerce, etc. Based on the literature review, a conceptual model that is capable of measur-ing the adoption level of e-commerce is proposed. The model□that consists of both functional and non-functional requirements of an e-commerce□can be used as a framework for raising their e-commerce adoption level.

3 Bank Envi: Thailand's First Online Social Network For Environment

Todsaporn Chantarasukree, Khon Kaen University; Sumonta Kasemvilas, Khon Kaen University

Abstract-Creating Green Application for Social Network which applies for the environment in Thailand is another way of promoting environment solutions and save energy and the environment. Bank Envi is Thailand's first online social network for environment which was developed by following the principles mentioned above and projects which uses the Bank Envi Platform. This Platform consists of 3 layers namely: Application Layer, Process Layer and Resource Layer. This application consists of Bank Envi Real time Weather, Storm Path, Real Time Environment Problem Detect and Bank Envi Alert Environment Problem. The first time this project used was from 2011 to 2013 have user one thousand more than and growing every month. Environment problems in Thailand are divided into soil, water, wind, fire, forest, pollution and others. The results show that causes of environmental problems are pollution 35%, water 20%, forest 10%, fire 10%, soil 5% and other problems 20%.

4 Assessment of Service Maturity of "Kartu Jakarta Sehat" Application System

Muhammad Fathir Gumilang, Swiss German University; Kho I Eng, Swiss German University; Maulahikmah Galinium, Swiss German University

Abstract-Kartu Jakarta Sehat (KJS) or "Jakarta Health Card" is implemented in the era of Joko Widodo and Basuki Purnama government. KJS "Jakarta Health Card" is a health insurance program proposed by local government of DKI Jakarta through Jamkesda Dinas Kesehatan Province DKI Jakarta to the community in the form of medical treatment. Jakarta Health Card uses EDC (Electronic Data Capture) to make integration with clinic and hospital in Jakarta. This card is used to save the medical data of every patient who hold the card. The research is conducted to obtain information about the usage of KJS or "Jakarta Health Card" . The method to get the information is by interview the respondents and spread out the questionnaire to the clinics between the sub-district health center and urban health center in certain area of Central Jakarta. COBIT Framework is used to measure KJS "Jakarta Health Card" maturity, effectiveness and application system by calculating Maturity level. The purpose of this research is to measure maturity level system KJS with result DS1 (3.25), DS2 (1.73), DS5 (3.33), DS7 (1.87).

5 Tech Review: Game Platform for Upgrading Counting Ability On Preschool Children Assessment of Service Maturity of "Kartu Jakarta Sehat" Application System

Endah Sudarmilah, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada and Informatics Department, Universitas Muhammadiyah Surakarta; Ridi Ferdiana, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada; Lukito Edi Nugroho, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada; Adhi Susanto, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada; Neila Ramdhani, Faculty of Psychology, Universitas Gadjah Mada

Abstract-One of difficulties in learning mathematics (counting) can be overcome by providing a relaxed and fun learning for preschoolers. Games can be used as an alternative solution. This study was conducted as a pilot project for reviewing the Kodu, Unity 3D and Construct 2 game platform for this purpose. The method used is the classification, review/evaluation, prototyping and analysis. Tech Review of these game platforms will be discussed as a result in this paper.

TS-2_2C: Wireless Communications, Networking, and Vehicular Technology 2

Monday, 07 October 13.30-15:10 Orchid 2

1 A Fixed Backoff-time Switching Method for Wireless Mesh Networks: Design and Linux Implementation

Sritrusta Sukaridhoto, Electronics Engineering Polytechnic Institute Surabaya; Nobuo Funabiki, Okayama University; Dadet Pramadihanto, Electronics Engineering Polytechnic Institute Surabaya; Zainal Arief, Electronics Engineering Polytechnic Institute Surabaya

Abstract-As a flexible and cost-e□cient scalable Internet access network, we have studied architectures, protocols, and design optimizations of the Wireless Internet-access Mesh NET-work (WIMNET). WIMNET is composed of wirelessly connected access points (APs), where any host can basically access to the Internet through multihop communications between APs with IEEE 802.11 standard. In WIMNET, undesirable situations can often happen such that some links dominate the bandwidth while others become insu□cient due to the limited shared bandwidth. However, the contention resolution mechanism using a random backo□-time in the CSMA CA protocol of 802.11 standards is not su□cient for handling real-time tra□c in multihop wireless communications. Previously, we have proposed the concept of the CSMA-based Fixed Backo□ time Switching (CSMA-FBS) method for WIMNET to improve the performance by giving necessary link activation chances for multi-hop communications. We implemented our proposal on the QualNet simulator, and verify its e□ectiveness through simulations. In this paper, we present an implementation of the FBS method in Linux kernel to show its practicality and investigate the performance in a real network. Our design consists of implementations or modifications of the five programs: Kernel configuration, Debugfs, Minstrel, iw, and FBSdaemon.

2 Study and Design of the Video for Resource Limited Mobile Communication

Andik Setyono, Universitas Dian Nuswantoro; Sendi Novianto, Universitas Dian Nuswantoro

Abstract-Multimedia files such as image, audio, and video are in general very large in size. The limitations of the current mobile communications technology with respect to media storage and bandwidth make transmission of large-size multimedia files very difficult. In this paper, we explore the use of compression technique along with video coding for designing a video transmission framework which can be applied in mobile communication networks such as GPRS or UMTS which have limited bandwidth. We develop applications for video transmission on a mobile client-server system using streaming technique. We present the simulation

and experiment results of the video streaming process implemented in a peer-to-peer environment using video coding with different protocols such as HTTP, RTP and RSTP. The proposed framework is then applied to develop a mobile telemedicine system.

3 Performance Evaluation of ZigBee based Wireless Sensor Network for Monitoring Patients' Pulse Status

Muhammad Niswar, Hasanuddin University; Amil A. Ilham, Hasanuddin University; Rhiza Sadjaj, Hasanuddin University; Elyas Palantei, Hasanuddin University; Indra Bayu, Hasanuddin University; Zaenab Muslimin, Hasanuddin University; Puput Dani Prasetyo Adi, Hasanuddin University; Tajuddin Waris, Hasanuddin University; Andani Ahmad, Hasanuddin University

Abstract-Recently, the wireless sensor network has been widely deployed for medical care purpose. We have developed a wireless sensor network that can monitor the patients' pulse status for triage purpose, so that a medical team can monitor remotely the health condition of patient and they can treat the patient based on severity of patients' health condition. We developed an electronic triage operating as a sensor node (SN) tagged in patient's arm. The SN consists of microcontroller ATmega328P, ZigBee and pulse sensor to detect patient's pulse. Operating as an electronic triage, the pulse rate from sensor is classified into three categories of severe conditions, i.e., major, minor, and normal status by the microcontroller in SN and sent to the coordinator node (CN) through ZigBee interface. Our system can be deployed in emergency room, triage room, pre/post-op surgery in hospital as well as in disaster area. This paper aims to evaluate the performance of the ZigBee-based wireless sensor network that we developed. We evaluate the effective distance between CN and SN to deliver patients' pulse rate via ZigBee as well as the effective number of SNs that can be accommodated by single CN. The experimental results shown that the effective distance between CN and SN to deliver the pulse rate data is less than 30 meters and the maximum number of SNs can be accommodated by a single CN is 3 (three) nodes.

4 An Analysis Comparison of AODV UU and Batmand Performance for Mobile AD-HOC Network

Muflich Putera Prathama, Institut Teknologi Telkom; Istikmal, Institut Teknologi Telkom; Sofia Naning Hertiana, Institut Teknologi Telkom

Abstract-Nowadays, technology tends to be developed to wireless technology. One of factors affects that development is mobile capability offered by the system to users. One of current wireless technology is mobile ad-hoc network. Important feature of mobile ad-hoc network implementation is routing protocol such as AODV and BATMAN. Implementing AODV and BATMAN in real life is by using AODV UU and BATMAN Daemon. In this paper, four nodes are implemented to evaluate both routing protocols in mobile ad-hoc network. For mobile scenario, source node moves with velocity about three km/h back and forth to destination node. Sending and receiving files in system is using Distributed Internet Traffic Generator (DITG). Analyzed parameters in this system are average packets loss percentages, average throughput, and average jitter. Implementation of no movement scenario shows that average packets loss percentage ranges from 0% to 3.358%, average throughput ranges from 393.1821813 Kbps to 409.9955152 Kbps, and average jitter ranges from 0.00052182 s to 0.00604264 s. In addition, implementation of source node movement scenario shows that average packets loss percentage ranges from 0.002% to 4.276%, average throughput ranges from 386.6820413 Kbps to 409.8114591 Kbps, average jitter ranges from 0.00202616 s to 0.00609198 s.

5 Barker Code Radar Simulation for Target Range Detection using Software Defined Radio

Jumail Soba, School of Electrical Engineering and Informatics, Institut Teknologi Bandung; Achmad Munir, School of Electrical Engineering and Informatics, Institut Teknologi Bandung; Andriyan Bayu Suksmono, School of Electrical Engineering and Informatics, Institut Teknologi Bandung

Abstract-This paper present simulation of radar using Barker code signal to provide pulse compression. Barker code is the most well-known phase coding for pulse compression techniques. Pulse compression techniques has been known can provide solution for range resolution and detection range problem. Radar using Barker code simulated using software-defined radio, GNU Radio. Using GNU Radio give flexibility in operation, lower costs, faster in the realization of the design and easier to use. Radar signal processing for received signal performed on MATLAB. Radar used to detect range of the target which simulated by delaying the signal. This radar using Barker code length of 13. PRI 1.3x10-2 using for this radar, which give maximum unambiguous range 1950 km. Barker code signal of transmitter delayed 3000, 5000 and 10000 samples for simulation of target. Radar can detect the target as seen from the results of the signal processing done on matlab.

TS-3_2D: Power Systems 2

Monday, 07 October 13.30-15:10 Orchid 3

1 1 MWp Grid Connected PV Systems in the Village of Kayubihi Bali; Review on Location's Characteristics and Its Technical Specifications

I N Satya Kumara, Udayana University; Wayan Ariastina, Udayana University; Wayan Sukerayasa, Udayana University; Ida Ayu Dwi Giriantari, Udayana University

Abstract-Bali is one of the small islands in Indonesia with total land area of 6,800 square kilometers and with population of around four million people. The island's economy is mainly driven by its tourism industry that leads to annual growth of 6.8%. The life and economy is supported by electric power system with 696 MW generating capacity but at peak time already operating at 679 MW which forces industries to operate their own captive powers. This condition requires swift and effective response from the authority to improve the generating capacity of the local power system so it can continue to support the regional development. Bali has no fossil based resources hence fuel for the power plants need to be externally sourced but with the dwindling capacity of the nation's conventional energy resources together

with the prospect of global warming therefore solution has been directed on renewable generation. As tropical island which is in close vicinity of the equator line, Bali has abundant quantity of sun power. The sun insolation index is estimated between 5 to 6 kWh per square meter everyday. And also, photovoltaic system is suited for urgent power demand as it can be built in relatively short time and with advantage of being environmentally friendly. These general facts have led to to the installation of 1 MWp grid connected photovoltaic systems in the village of Kayubihi by the Ministry of Energy and Mineral Sources. The system is currently the largest PV system in Indonesia and connected to the 20 kV distribution network. The report presented on this paper is the review on natural and social characteristics of the location and technical specification of the hardware system. This information are useful in analyzing performance of the photovoltaic system particularly on energy production, reliability of system and components, tariff calculation and investment, as well as developing model for the running of remote PV system based on partnership between local government and university.

2 Dynamic DC Optimal Power Flow Using Quadratic Programming

Rony Seto Wibowo, Institut Teknologi Sepuluh Nopember; Ontoseno Penangsang, Institut Teknologi Sepuluh Nopember; Adi Soeprijanto, Institut Teknologi Sepuluh Nopember

Abstract-This paper proposes a quadratic programming for solving the dynamic direct current optimal power flow (DDCOPF). The DDCOPF solves OPF with multi load levels in which ramp rate of committed units become coupling between two series load levels. To overcome this problem, a very large matrix may be required. The more number of load levels are considered, the larger matrix will be used. Consequently, it may take long computation time to solve.Therefore, the DC load flow is preferable than AC load flow. To show the effectiveness of the proposed approach, IEEE 14 bus test system is used. In addition, application of the proposed approach to real system Jawa Bali 500 kV 25-bus is presented.

3 Dynamic Response Analysis of Permanent Magnet Synchronous Motor Drives for City Electric Car

Abdullah Assegaf, STEI – ITB; Agus Purwadi, STEI – ITB

Abstract-In the next few years, electric cars will be one of the main vehicles in transportation system and are designed to meet the requirement of high efficiency and clean energy vehicles. Since the force to propel electric vehicles comes only from electric motor, the profile of tractive effort -speed of the vehicles is determined by the torque – speed profile of the motor. The torque – speed of the electric motor consists of constant torque and constant power region, but the driving pattern in urban area has often forced the electric motor into the constant torque operation area. In this paper, the dynamic response of the PMSM under constant torque operation of city electric car is presented. The mathematical and Matlab/Simulink model of PMSM are derived and constructed, the dynamic response of the motor for city electric car under start-go mode will be obtained from simulation results. The dynamic response of torque and speed are then analyzed.

4 Comparative Study of Electric Generator Drive Engine Performance by Various Types of Fuel

Yandri, Tanjungpura University; Seno D. Panjaitan, Tanjungpura University

Abstract-This paper discusses the performance of gasoline generator set (genset) by using gasoline, LPG, and biogas as the fuel. Combustion engine of the gasoline genset was modified in order to be able to operate using LPG and biogas fuels. A 850 W, 220 V, 50 Hz, single phase generator drive engine has been used in the experiment using 100-W and 200-W bulbs as the electrical loads. Five variables were compared based on the types of fuel and variations of load: fuel consumption (FC), specific fuel consumption (SFC), input energy (thermal energy), output energy (electrical energy), and thermal efficiency. As the results, SFC of the biogas was lower than gasoline and LPG. For 100-W bulb as the load, SFC of the gasoline, LPG, and biogas were 4.5294 kg/kWh, 2 kg/kWh, and 0.68 kg/kWh respectively. While 200-W bulb, SFC of the gasoline, LPG, and biogas were 2.2883 kg/kWh, 1.0742 kg/kWh, and 0.6476 kg/kWh respectively. In addition, the thermal efficiency of biogas was higher than gasoline and LPG. For 100-W bulb as the load, thermal efficiency by using gasoline, LPG, and biogas were 1.6741 %, 3.5884 %, and 10.5710 % respectively. For 200-W bulb, the thermal efficiency by using gasoline, LPG, and biogas were 3.3137 %, 6.6811 %, and 11.0996 % respectively.

5 Study of Excitation and Governor Control Effects of Superconducting Generator with High Response Excitation on the Stability of a SMIB Power System

Adjeroud Faiza, Department of Electrical Engineering, University of Sétif 1, Algeria; Djahli Farid, Department of Electronics, University of Sétif 1, Algeria.; Mayouf Abdelhalim, DIMMER Laboratory, University of Djelfa, Algeria; Devers Thierry, Department of Industrial Engineering and Maintenance, University of Orléans, France

Abstract-Superconducting generators (SCGs) are recently expected to substitute conventional machines in modern power systems. They are known for their many advantages such as light weight, small size and high efficiency. Self-excited SCGs, with high response excitation effect, have supplementary property that may be used for enhancing transient power system stability. Hence, the control of this type of generators becomes increasingly important. Because of the long time constant of the SCG, the control of excitation only is not sufficient. In this paper, we study the enhancement of the power system stability by implementing power system stabilizer (PSS) into the excitation (EPSS) and/or turbine governor (GPSS) systems of the SCG with high response excitation. Non-linear simulation results of a single machine infinite-bus power system, under different operating conditions, show the effectiveness of using exciter-based stabilizer in conjunction with the governor stabilizer (EGPSS).

TS-5_2E: Control Systems 1

Monday, 07 October 13.30-15:10 Chrysant

1 Controlling of Non-Minimum Phase Micro Hydro Power Plant Based on Adaptive

B-Spline Neural Network

Iwan Setiawan, Electrical Engineering, ITS; Ardyono Priyadi, Electrical Engineering, ITS; Mauridhi Purnomo, Electrical Engineering, ITS

Abstract-Hydro power plant is a power generation system that have non-minimum phase model showing initial inverse response characteristic. For span of broad electrical load regulation, conventional non adaptive control techniques, such as PI and PID control would degrade the performance of this power generation system. To ensure the stability of Hydro power plant for severe load variations, we need a kind of controller that has adaptive capability. On the other hand, the utilization of conventional adaptive techniques such as Self Tuning Regulator and Model Reference Adaptive Controller will be diverge to control plants showing non-minimum phase mode. In this paper, the implementation of adaptive intelligence control based on B-Spline neural network along with forward controller for controlling micro hydro power plant will be presented. Based on its characteristic, this adaptive control technique could be implemented directly without any prior training phase. From the simulation studies, the proposed scheme results fast transient response to load variations compared to traditional PI control and also very stable in responding to severe disturbance.

2 Study of Fuzzy Logic Control and Power System Stabilizers Effect on the Stability Enhancement of a SMIB Power System

Adjeroud Faiza, Department of Electrical Engineering, University of Sétif 1, Algeria; Djahli Farid, Department of Electronics, University of Sétif 1, Algeria.; Mayouf Abdelhalim, DIMMER Laboratory, University of Djelfa, Algeria; Devers Thierry, Department of Industrial Engineering and Maintenance, University of Orléans, France

Abstract-In a previous work, power system stabilizers (PSS) have been employed in the Excitation and/or in the turbine Governor systems (EPSS, GPSS and EGPSS) for improving more the stability of a Single Machine Infinite-Bus power system (SMIB). Basing on obtained results, the employment of PSS both in excitation and governor systems (EGPSS) has improved more the system stability. In order to more enhance stability and overcome the drawbacks of conventional PSS, we studies in this paper the effect of the implementation of the fuzzy logic controller (FLC) into the excitation and/or turbine governor systems (FLCE, FLCG, FLCEG). Obtained results, by nonlinear simulation using Matlab/Simulink of a SMIB, show the effectiveness of using Fuzzy logic controller both in excitation and governor systems (FLCEG) for large and small disturbances. Our results concern: rotor angle (□), terminal voltage (Vt), electrical torque (Te) and speed deviation (□ω) for the four cases: open loop (without PSS), EPSS, GPSS and EGPSS.

3 OCP Based Decentralized Data Filtering For Autonomous Vehicles

Nanang Syahroni, Politeknik Elektronika Negeri Surabaya

Abstract-In this paper, an online decentralized multisensor data fusion algorithm facilitated by middleware networked using CORBA event channel is proposed, in order to deal with simplifying problem in sensor registration and fusion for vehicle state estimation. The networked based navigation concept for Autonomous Underwater Vehicle (AUV) using several sensors is presented. A simulation of various application scenarios are considered by choosing several parameters of UKF, i.e. weighting constant for sigma points and square root matrix. Normalized mean-square error (MSE) of Monte Carlo simulations are computed and reported in the simulation results. Furthermore, the middleware infrastructure based on Open Control Platform (OCP) to support the interconnection between the whole filter structures also reported.

4 Robust Residual Generation for Actuator Fault Isolation A Case Study: Magnetic-Tape-Drive MIMO System

Samiadji Herdjunanto, Universitas Gadjah Mada; Adhi Susanto, Department of Electrical Engineering and Information Technology, Faculty of Engineering, Gadjah Mada University; Oyas Wahyunggoro, Department of Electrical Engineering and Information Technology, Faculty of Engineering, Gadjah Mada University

Abstract-This paper concerns with robust residuals generation such that the designed signatures can be used to isolate actuator faults simultaneously and is not sensitive to exponential autocorrelation stochastic disturbance signal which contaminates one of plant's inputs. The proposed solution of this problem consists of two stages. The first stage is to derive an internal model of stochastic disturbance signal. The internal model is then augmented to the original plant's model so that a new plant's model is obtained. The second stage is to generate a transformation matrix such that each original feature vector of actuator fault is converted into the corresponding designed directional residual with its vector direction as its signature. Based on the designed of signature vectors the modes of residual actuator fault can be decoupled one from others and robust to the stochastic disturbance signal. The transformation matrix is constructed row by row in order each row can block the disturbance signal so that strict robustness can be achieved. To demonstrate the effectiveness of the method a simulation study on a Magnetic –Tape-Drive MIMO system which has multi input and multi output is excuted. The result shows that the method has been successfully implemented.

TS-1_3A: Software Engineering, Services, and Information Technology 4

Monday, 07 October 15.30-17:50 Edelweiss

1 A Kinetic Energy-based Feature for Unsupervised Motion Clustering

Suthasinee Nopparit, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang; Natapon Pantuwong, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang; Masanori Sugimoto, Hokkaido University

Abstract-Motion databases usually contain sequences of movements and searching these vast databases is not an easy task. Motion clustering can reduce this difficulty by grouping sample movements into various motion groups containing similar actions. The pose distance is often used as a feature during motion-clustering tasks. However, the main weakness of

this strategy is its computational complexity. Query motions are also required to cluster motion sequences. To address these problems, we propose a motion-clustering algorithm based on the use of kinetic energy to cluster sample motions. Our method does not require query motions during the clustering process, so the clustering results can be generated without supervision. Our experimental results confirmed that our proposed method delivered comparable performance to pose distance-based methods, while its computational complexity was significantly lower than that of existing methods.

2 Content-Dependent Spatio-Temporal Video Watermarking using 3-Dimensional Discrete Cosine Transform

Iwan Setyawan, Satya Wacana Christian University; Ivanna Timotius, Satya Wacana Christian University

Abstract-In this paper we propose a content-dependent spatio-temporal watermarking scheme for digital videos. Content dependency is achieved by incorporating the hash of the video sequence into the watermark. The video sequence is treated as a 3-dimensional spatio-temporal signal for the purposes of video hash computation and watermark embedding and detection. Our experiments show that the video hash algorithm has good discriminating power and robustness against various attacks. The watermark is also shown in the experiments to have good robustness against a variety of attacks, in particular when the watermark is copied from one video sequence to another.

3 Clustering Top 10 Malware/Bots based on Temporal Behavior

Chaxiong Yukonhiatou, International College, King Mongkut's Institute of Technology Ladkrabang, Thailand; Surin Kittitornkun, Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand; Hiroaki Kikuchi, Meiji University

Abstract-Malware can be spread over the Internet via especially download mechanism to the victim computers. This work tries to cluster malware/bots download behavior of Top-10 malware based on 2010 and 2011 CCC (Cyber Clean Center) datasets. The datasets contain more than one million download logs collected from several independent honeypots in Japan to observe malware/bot traffic and activities. Although the daily and hourly patterns are quite similar in 2010, those of 2011 are quite dif-ferent. As a result, the proposed Integral Correlation Coefficient can cluster 3 and 4 groups of Top-10 malware/bots in 2010 and 2011, respectively.

4 Prediction of Reference Evapotranspiration with Missing Data in Thailand

Kitsuchart Pasupa, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang; Ek Thamwiwatthana, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang

Abstract-Artificial Neural Networks (ANNs) has been used in prediction of reference evapotranspiration for a recent decade. Its performance is competitive to a widely used method the so-called "Penman-Monteith" method. In this study, we aim to estimate the crop evapotranspiration by ANNs from climatic data in Thailand and compare the performance with the Penman-Monteith method. As missing data is inevitable, we also included the missing data situation into the study. This can be solved by expectation-maximization algorithm. The accuracy of the prediction decreases when the amount of missing values increases. Furthermore, we exploit the feature selection in the study. It shows that sunshine duration is the most important feature followed by temperature and wide speed, respectively.

5 Selecting the Suitable Solution Strategies for Classes of Graph Coloring Instances Using Data Mining

Nur Insani, Yogyakarta State University; Kate Smith-Miles, Monash University; Davaatseren Baatar, Monash University

Abstract-The Maximal Independent Set (MIS) formulation tackles the graph coloring problem (GCP) as the partitioning of vertices of a graph into a minimum number of maximal independent sets as each MIS can be assigned a unique color. Mehrotra and Trick [5] solved the MIS formulation with an exact IP approach, but they were restricted to solving smaller or easier instances. For harder instances, it might be impossible to get the optimal solution within a reasonable computation time. We develop a heuristic algorithm, hoping that we can solve these problems in more reasonable time. However, though heuristics can find a near-optimal solution extremely fast compared to the exact approaches, there is still significant variations in performance that can only be explained by the fact that certain structures or properties in graphs may be better suited to some heuristics more than others. Selecting the best algorithm on average across all instances does not help us pick the best one for a particular instance. The need to understand how the best heuristic for a particular class of instance depends on these graph properties is an important issue. In this research, we use data mining to select the best solution strategies for classes of graph coloring instances.

6 Merging Thai Herb Information from Heterogeneous Data Sources based on Word

Phakphoom Chainapaporn, King Mongkut's Institute of Technology Ladkrabang; Ponrudee Netisopakul, King Mongkut's Institute of Technology Ladkrabang

Abstract-This paper proposes two processes for merging Thai Herb information obtained from heterogeneous data sources. The objective is to combine different formats of Thai herb information into one consistent representation. The processes are implemented in a Sourcing and Merging Agent (SMA) of a Multi-Agent Thai Herb Recommendation system (MA_THR). The first process aims to find and merge the same Thai herb with different names. The second process aims to find synonyms of symptoms. Experiments give 93% accuracy of merging Thai herb information using names and 97% accuracy of finding the similarity between symptoms.

7 Using Estimated Arithmetic Means of Accuracies to Select Features for Face-based Gender Classification

Ivanna Timotius, Satya Wacana Christian University; Iwan Setyawan, Universitas Kristen Satya Wacana

***Abstract*-**Selecting the appropriate features is essential in building a good classifier. This paper aims to use the approach of estimating the arithmetic means of accuracies (ameans) in selecting the features used in a face-based gender classification. In a face-based gender classification, there are many pixels of the input image that may not aid the classification process, such as those belonging to the background. The experiments show that this approach outperforms the approach based on mean difference especially on the data having relatively high variance by up to 2.14%. Compared to the classifier which does not use any feature selection approach, implementing the feature selection approach based on ameans estimation in a gender classification problem increases the accuracy by up to 7.86%. The experiments also show that the face-based gender classifications rely on the presence of long hair on subjects in the images to make their decision.

TS-1_3B: Software Engineering, Services, and Information Technology 5

Monday, 07 October 15.30-17:50 Orchid 1

1 Two-Level Feature Selection for Naive Bayes with Kernel Density Estimation on Question Classification of Bloom's Cognitive Level

Catur Supriyanto, Universitas Dian Nuswantoro; Norazah Yusof, Universiti Teknologi Malaysia; Bowo Nurhadiono, Universitas Dian Nuswantoro; Sukardi, College of Computing and Informatics Adhi Guna

***Abstract*-**This paper proposes a two-level feature selection to improves Naïve Bayes with kernel density estimation. The performance of the proposed feature selection is evaluated on question item set based on Bloom's cognitive levels. This two-level feature selection contains of filter and wrapper based feature selection. This paper uses chi square and information gain as the filter based feature selection and forward feature selection and backward feature elimination as the wrapper based feature selection. The result shows that the two-level feature selection improves the Naïve Bayes with kernel density estimation. The combination of chi square and backward feature elimination give more optimal quality than the other combination.

2 Hand Gesture Recognition Using Optimized Neural Network Shape Fitting On ARM11

Heri Setiawan, Satya Wacana Christian University; Iwan Setyawan, Satya Wacana Christian University; Saptadi Nugroho, Satya Wacana Christian University

***Abstract*-**Various methods of hand gesture recognition have been proposed in the literature, with high recognition rate. But implementing these methods in embedded system is still challenging since image processing applications needs a high-performance processor. In this paper, a hand gesture recognition system is implemented on a system with an OK6410B board. This board has a processor that runs at 532 MHz, which is relatively high for a small processor. The hand gesture recognition method proposed in this paper is based on the Neural Network Shape Fitting. In this paper we propose some modifications to this method. The modifications were pixel randomizing during the initialization step, addition of several neurons in the iterations, using lookup table for distance measurement and simplification of the finger detection. These modifications yielded a faster processing time (0.95s on the OK6410B) and a higher recognition rate (94.44% using still images as input and 84.53% using live input from a webcam).

3 Student Classification for Academic Performance Prediction using Neuro Fuzzy

Indriana Hidayah, Electrical Engineering and Information Technology, Gadjah Mada University; Adhistya Erna Permanasari, Electrical Engineering and Information Technology, Gadjah Mada University; Ratwastuti, Electrical Engineering and Information Technology, Gadjah Mada University; Ning Ratwastuti, Electrical Engineering and Information Technology, Gadjah Mada University

***Abstract*-**Conventional classroom is still the main learning method applied in undergraduate program of Electrical Engineering and Information Technology Department, Gadjah Mada University. There are several problems in this method, such as large amount of students and limited number of meetings, hence, difficult to understand each student. Student classification is a way to solve the problem by mapping the condition of students based on certain parameters. Many methods have been applied to classify students that are based on IF-THEN rules and pattern recognition. However, many studies were done on intelligent tutoring systems and e-learning systems, not in a conventional classroom. Moreover, there are no researches that measure basic values by considering intelligence and non-intelligence performances. In this work, a student classification model was developed by applying neuro fuzzy concept; a combination of fuzzy's IF-THEN rules and neural network's ability to learn, so this method has the ability to learn from the generated rules to produce the best classification model. The model can be used to predict students' academic performance. Data were processed using ANFIS Editor-Matlab Fuzzy Logic. The results showed that combination of three parameter values -interest, talent, and motivation- is the best model for students classification, which has training RMSE value 0.12301 and testing average RMSE value 0.25611.

4 Refactoring Rules Effect of Class Cohesion on High–Level Design

Arwin Halim, STMIK Mikroskil; Petrus Mursanto, Universitas Indonesia

***Abstract*-**Various refactoring rules and their impact on class cohesion at high-level designs have been investigated. Early measurement and improvement of internal quality attributes such as cohesion, allows developers to avoid extensive review, frequent modification and rewriting of specifications, designs, and source codes. The impact of refactoring is obtained by comparing class cohesion of a design before and after refactoring applied. A set of class cohesion metrics that suits four properties of a good class cohesion metric was chosen based on theoretical analysis and supported by empirical evidence. We found that refactoring rules does not always improve class cohesion values.

5 Rapid Nitrogen Determination of Soybean Leaves Using Mobile Application

Marcelinus A.S. Adhiwibawa, Ma Chung Research Center for Photosynthetic Pigments, Universitas Ma Chung; Christian Tantono, Dept. of Information Technology, Universitas Ma Chung; Kestrilia R. Prilianti, Dept.

of Information Technology, Universitas Ma Chung; Monika N.U. Prihastyanti, Ma Chung Research Center for Photosynthetic Pigments, Universitas Ma Chung; Leenawaty Limantara, Ma Chung Research Center for Photosynthetic Pigments, Universitas Ma Chung; Tatas H.P Brotosudarmo, Ma Chung Research Center for Photosynthetic Pigments, Universitas Ma Chung

Abstract-Nitrogen is one of the important nutrients elements for the growth of soybean plants. In this paper we propose mobile application that can be used nondestructively to estimate the nitrogen content of soybean leaves. We named this software "Mata Daun". The primary concept of this software is to relate the RGB (Red, Green, Blue) value of the captured soybean image with its nitrogen content. Furthermore, the captured image is processed into Enhanced Color Visibility (ECV) index using digital image processing method for the ease of software algorithm process. Calibration process and field trial were conducted to found the relation between ECV index and soybean leaves nitrogen content. The calibration result showed that the nitrogen readings by this application had a fairly strong relationship (R2 =0.70) with the soybean leaves nitrogen content (Agriexpert CCN-6000 readings). The field test result also gave the same strong positive relationship between predicted and real soybean leaves nitrogen content (R2 =0.93).

6 Fermicidae Swarm System

Thammarat Taengtang, King Mongkut's Institute of Technology Ladkrabang; Witthaya Sitthivet, King Mongkut's Institute of Technology Ladkrabang; Kitti Paithoonwattanakij, King Mongkut's Institute of Technology Ladkrabang

Abstract-Improved an ant colony by firefly algorithm, in this paper is proposed the method that is interwoven between ant colony optimization and firefly algorithm to increase efficiency of solving the traveling salesmen problem it is called that Fermicidae swarm system (FSS). It uses relationship between pheromone and distance which is attractiveness and absorption coefficient. This method is based on ant colony optimization which state transition rule of ant colony is improved by adding detection, which is a condition of distances. The performance of FSS is divided into two parts: the speed and tour length of a result. A speedy result of FSS is faster than ACS and tour length of FSS is near the best result.

7 Semantic Interrelation in Distributed System Through Green Computing Ontology

Herlina Jayadianti, Universidade do Minho; Lukito Edi Nugroho, Gadjah Mada University; Carlos B. Sousa Pinto, University of Minho; Paulus Insap Santosa, Gadjah Mada University; Wahyu Widayat, Gadjah Mada University, Faculty of Economic and Development

Abstract-Green computing refers to the system that provides minimal impact on the environment. When we are talking about green computing we discuss about how much energy is used by the system, such as energy used by the system, time used for the search process, and how effective the system is. Related to that issue, trough this paper we want to proposes a new effort to achieve Green Computing in heterogeneous data in distributed system. The technology chosen to deal with them is Ontology. We try to generate a common ontology including a common set of terms, based on the several ontologies available, in order to make possible to share the common terminology (set of terms) that it implements, between different communities. If a very large amount of distributed data is not managed and distributed properly, user will need more time to do a search process. The longer the search is done, the more energy is used.

TS-1_3C: Software Engineering, Services, and Information Technology 6

Monday, 07 October 15.30-17:50 Orchid 2

1 Improved Thai Text Detection from Natural Scenes

Kuntpong Woraratpanya, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang; Pimlak Boonchukusol, Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang; Yoshimitsu Kuroki, Kurume National College of Technology; Yasushi Kato, Tsuruoka National College of Technology

Abstract-Thai text detection from natural scenes is still a challenging task for language translation applications, since there are many unsolved issues. Furthermore, the existing related works cannot completely detect Thai text. The main reason is that Thai text layout has vowels and tonal marks that differ from other languages. This paper proposes an approach to detect Thai text from natural scenes. The approach consists of two main procedures. (i) Fast boundary clustering algorithm decomposes scene features into multilayers, so that it is faster and easier to analyze Thai text characters. (ii) Modified connected component analysis method is applied to such scene features in order to detect Thai text boundaries. Based on 150 test images with 4,920 characters, the experimental results demonstrate that the proposed approach achieves the high average precision and recall, 0.80 and 0.90.

2 Likelihood Calculation Classification for Indonesian Language News Documents

Aini Fuddoly, Universiti Teknologi Petronas; Jafreezal Jaafar, University Teknology PETRONAS; Norshuhani Zamin, Mrs

Abstract-Text categorization has been an important research area that seeks to classify textual documents into a group of predetermined categories. Unfortunately, the interest towards Indonesian news classification has been very little. In this paper, we propose a text categorization algorithm based on Bracewell method that uses the likelihood calculation between the article and the category's keywords. Through experiments, the algorithm succeeded in classifying Indonesian news corpus with accuracy as high as 93,84% in offline environment, 93,82% in online environment, and 80% benchmarking against human evaluation.

3 News Recommendation in Indonesian Language Based on User Click Behavior

Diandra Desyaputri, Swiss German University; Alva Erwin, Swiss German University; Maulahikmah Galinium, Swiss German University; Didi Nugrahadi, Beritagar

Abstract-Recommendation system has been

proposed for years as the solution of information era problem. This research strives to develop an intelligent recommendation system based on user click behavior on news websites. We extracted frequent itemsets and association rules from the web server log of a news website, performed a pre-computation of similarity between news articles, and then proposed a three-level recommendation system: based on association rule discovery, news articles on the same category, and similarity between news articles. By combining collaborative filtering approach and content-based filtering, experiment results show that the technique produces reliable news recommendation.

4 Preliminiary Design of Static Indonesian Sign Language Recognition System

Rudy Hartanto, Gadjah Mada University; Adhi Susanto, Gadjah Mada University; P. Insap Santosa, Gadjah Mada University

Abstract-Human computer interaction has a long history to become more intuitive. For human being, especially for the deaf, gesture of different kind is one of the most intuitive and common communication.

In this paper we focus on creating a system to identified and translate hand gesture pose to Indonesian alphabets. Skin detections method is used to create a segmented hand image and to differentiate with the background. A contours is used to localize hand area. SIFT algorithm in advanced, were used to recognize the signed gesture.

The result shows that this system can operate well in translated hand gesture image of sign into Indonesian alphabets.

5 Predicting Latent Attributes of Twitter User by Employing Lexical Features

Elisafina Siswanto, Institut Teknologi Bandung; Masayu Leylia Khodra, Institut Teknologi Bandung

Abstract-The rapid growth of social media, especially Twitter in Indonesia, has produced a large amount of user generated texts in the form of tweets. Since Twitter only provides the name and location of its users, we develop a classification system that predicts latent attributes of Twitter user based on his tweets. Latent attribute is an attribute that is not stated directly. Our system predicts age and job attributes of Twitter users that use Indonesian language. Classification model is developed by employing lexical features and three learning algorithms (Naïve Bayes, SVM, and Random Forest). Based on the experimental results, it can be concluded that the SVM method produces the best accuracy for balanced data.

6 Automatic Mood Classification of Indonesian Tweets Using Linguistic Approach

Viktor Wijaya, Swiss German University; Alva Erwin, Swiss German University; Maulahikmah Galinium, Swiss German University; Wahyu Muliady, Akon Teknologi

Abstract-Research concerning Twitter mining becomes an interesting research topic recently. It is proven by numerous num-ber of published paper related with this topic. This research is intended to develop a prototype system for classifying Indonesian language tweets. The prototype includes preprocessing step, main information retrieval and classification system. This research proposes a system that uses grammatical rule for retrieving main information from the tweet, and then classifies the information to the suitable mood space. The classification algorithm, which is used, is lexicon based classifier. The proposed classification system has 53.67% accuracy for classifying tweets into 12 mood spaces and 75% accuracy for classifying tweets into 4 mood spaces. As the comparison, the same dataset is also classified using SVM and Na¨ıve Bayes.

7 Automatic Text Summarization Based on Semantic Analysis Approach for Documents in Indonesian Language

Pandu Prakoso Tardan, Swiss German University; Alva Erwin, Swiss German University; Kho I Eng, Swiss German University; Wahyu Muliady, Akon Teknologi

Abstract-Research about text summarization has been quite an interesting topic over the years, proven by numerous number of papers related with discussion of their studies such as approaches, challenges and trends. This paper's goal is to define a measurement for text summarization using Semantic Analysis Approach for Documents in Indonesian language. The applied measurement requires Indonesian version of WordNet which had been implemented roughly. The main idea of semantic analysis is to obtain the similarity between sentences by calculating the vector values of each sentence with the title. The need of WordNet is to define the depth of each word as being computed for word similarity. Combining all required formulas and calculations, a compact and precise summarization is produced without depriving the gist information of certain document.

TS-2_3D: Wireless Communications, Networking, and Vehicular Technology 3

Monday, 07 October 15.30-17:50 Orchid 3

1 Designing Cross-Coupled Bandpass Filters with Transmission Zeros in Lossy Microstrip

Mudrik Alaydrus, Universitas Mercu Buana; Dian Widiastuti, Universitas Mercu Buana; Teguh Yulianto, Universitas Mercu Buana

Abstract-Bandpass filters play a significant role in many wireless communication systems. The filters pass desired signals and reject unwanted one. In this paper, we design a four-pole bandpass filter using a rigorous computer simulation. The resonators used are square open-loop resonators. To get a sharper selectivity around the pass band, transmission zeros though cross-coupling between resonators are introduced. In simulation, we compare the results for relative permittivity 4.4 and 4.9, and for tangent loss 0.025 (lossy) and 0.0 (lossless). The simulation shows, the required specifications are fulfilled for lossless case, whereas for lossy case, an insertion loss of 8.3 dB observed. For verification, the bandpass filter is built in FR4. In this lossy microstrip, a measurement shows, we get an insertion loss of about 6.64 dB and a bandwidth of about 120 MHz.

2 Development of Marine Radar Signal Acquisition and Processing System

Asif Awaludin, LAPAN; Ginaldi Ari Nugroho, LAPAN; Muhammad Sahirul Alam, Brawijaya University; Dwi

Fadila Kurniawan, Brawijaya University; Rudy Yuwono, Brawijaya University

Abstract-Marine radar commonly used for ship navigation. Nowadays, utilization of this radar to another application has expanded. For further applications, several marine radars have some limitations such as monochrome display and require new signal acquisition and processing. This research developed marine radar signal acquisition and processing system based on Furuno x-band marine radar 1932 Mark-2 . The developed tool consist of marine radar signal conditioner, ADC and marine radar signal processing using Matlab. This signal processing system display provide signal echo strength visualization, gain control, sea clutter control and rain clutter control. The simulation test was conducted to test the signal processing system. The result was the GUI display at full and half gain are quite similar with marine radar display unit view. The sea and rain clutter control test results were relevant with its function in reducing more close echoes rather than far echoes. While the time required for creating an image is still need for improvement.

3 Electrical Model of Two Element Aperture Coupled Cylindrical Dielectric Resonator Antenna Array

Affan Aziz Baba, Universiti Teknologi PETRONAS; Mohd. Azman Zakariya, Universiti Teknologi PETRONAS; Zuhairi Baharudin, Universiti Teknologi PETRONAS; M. H. Md Khir, Syed Muzammil Ali, Universiti Teknologi PETRONAS, Adz Jamros Jamali, Universiti Teknologi PETRONAS

Abstract-In this paper, electrical models of single element cylindrical dielectric resonator antenna (CDRA) and two element CDRA array made of CCTO material are presented. The 50 □ microstrip transmission line is used to excite the CDRAs through coupling slots etched on the ground plane. The electric models of single element CDRA and two element CDRA array are designed by using Advanced Design System (ADS). The electrical circuits are used to validate the CST design feasibility. The validity of RLC model is verified by comparing the return loss of the ADS model against those obtained through computer simulation technology (CST) and fabricated prototype. The results obtained through simulated (CST and ADS) designs and fabricated prototype of single element CDRA and two element CDRA array are in good agreement.

4 An Analysis Method of Effect of Linear Polarized Electromagnetic Exposure from Mobile Phone to Human Head with Various Incident Angles

Bayu Satriya, ITS; Eko Setijadi, ITS

Abstract-This research is focused on the effect of various incident angles of the linear polarized electromagnetic exposure from mobile phone to the value of Specific Absorption Rate (SAR) in human head which is a safety standardization for mobile phone user. Method of Moment is chosen to calculate the electric field in the human head because it is the most suitable method. The incident electromagnetic is assumed as a plane wave with a frequency at 900 MHz and power density of antenna for 4.5 W/m2. The integral used for calculation is Tensor Integral Equation (TIE). Human head is modelled as a homogeneous spheroid and is divided into cubical cells. The incident angles which are examined are 0 (horizontal polarization), 15 , 30 , 45 , 60 , 75 and 90 (vertical polarization). The results show that the incident angle does not affect the average SAR in the human head, but it affects the local and maximum SAR of the cells in human head. The difference of seven angles maximum SAR does not vary in the form of linear but in the form of damped sinusoidal. The angle which produces the least maximum SAR is 0 namely 0.1521 W/kg whereas the angle which produces the highest maximum SAR is produced by angle 15 namely 0.1748 W/kg. The highest SAR is obtained around the side of the head near the electromagnetic exposure source. None of the SAR produced by the variation of incident angle is above the limit of safety standard.

5 The Spectral and Temporal Description of Javanese Gong Kempul

Matias H.W. Budhiantho, Satya Wacana Christian University; Gunawan Dewantoro, Satya Wacana Christian University

Abstract-In Central Java, the Gong Kempul is one of eminent gamelan instrument, an ensemble of predominantly struck instruments found across Central Java and has deep philosophical meaning for Javanese. However, there lack of studies concerning on this particular instrument as a bridging means between scientific description and human artistic perception. This study aims to investigate the spectral and temporal properties as well as particularly look into the typical wave-like sound of the Gong Kempul. Acoustic measurements were conducted and analyzed using ARTA. Both frequency and time domain analyses were explored to better understand the nature of the Gong Kempul. It was found that the partials at 93.8 Hz, 187.5 Hz, 281.3 Hz, and 375 Hz are the strict integer multiples of the fundamental frequency. It can also be inferred that the fundamental frequency at 93.8 Hz decays much more slowly than the other harmonic. In addition, the pitch of the Gong Kempul slide upward as the time goes on. The wave-like sound of the Gong Kempul is due to the beat phenomenon between two partials that occur closely.

6 Generating Customized Web Search Result Through Community Driven Search Engine

Sunarfri Hantono, Universitas Gadjah Mada; Guntur Dharma Putra, Universitas Gadjah Mada

Abstract-These days, the growth of web has led it to a big source of information. Web search engine plays an important role of searching desired information from this enormous web. However, search engine provides the same result independently to the user while actually each user has different preference. In this paper, we present a novel method of customized web search result generation to provide a better result according to community's preference. We benefit from proxy servers, which are widely used in a community network to reduce bandwidth needs. Proxy servers are, actually, providing the user preference within its access log that contains accessed URLs. Instead of web crawler, we will use this logs, which is always updated as users browse the web through this proxy. This would be the base of our customized web search. As the proxy log only covers URL list, we still need to crawl the information contained in an URL. When the crawling method has completed, document vector is created to make those data to be more machine friendly. Eventually, searching process is carried out by

utilizing the vector space model.

7 Microwave Bandpass Filter Using QMSIW

Muhammad Zaka Ur Rehman, Universiti Teknologi PETRONAS

Abstract-A planar bandpass filter based on a technique that utilizes quarter mode of substrate integrated waveguide (SIW) is presented. This concept reduces the circuit foot print of SIW to a quarter of its size, along with miniaturization good performance and high quality factor is maintained by the structure. The design concept for single-pole resonator structure is presented; and by coupling the resonators a two-pole substrate integrated waveguide bandpass filter is achieved for the frequency of 5.9 GHz. The simulation results show that the filter insertion losses are better than 2 dB and return losses are less than 15 dB.

TS-1_3E: Software Engineering, Services, and Information Technology 7

Monday, 07 October 15.30-17:50 Chrysant

1 Automatic Exudate Extraction for Early Detection of Diabetic Retinopathy

Syna Sreng, King Mongkut's Institute of Technology Ladkrabang; Noppadol Maneerat, King Mongkut's Institute of Technology Ladkrabang

Abstract-Diabetic Retinopathy (DR) is the most common cause of blindness in diabetic patients, but early detection and timely treatment can prevent this problem. Exudates have been found to be one of the signs and serious DR anomalies so the proper detection of these lesions and the treatment should be done immediately to prevent loss of vision. The aim of this study is to automatically detect these lesions in fundus images. To achieve this goal, the proposed method first preprocesses to improve the quality of fundus image, and then Optic Disc (OD) is detected and eliminated to prevent the interference to the result of exudate detection by combination of 3 methods; image binarization, Region Of Interest (ROI) based segmentation and Morphological Reconstruction (MR). Next, exudates are detected by applying the maximum entropy thresholding to filter out the bright pixels from the result of OD region eliminated. Since the result contains some noises which appear as bright light at the edge of fundus area in some images, that affect is considered and eliminated to improve the result of false positive. Finally, exudates are extracted by using MR. The proposed technique has been tested on 100 fundus images from hospital. Experimental results show that 91 % of exudate is extracted correctly with the average process of 3.92 second per image.

2 Computer Aided Diagnosis for Lung Tuberculosis Identification Based on Thoracic X-ray (Preliminary result)

Ratnasari Nur Rohmah, UMS and UGM; Adhi Susanto, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada; Indah Soesanti, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada; Maesadji Tjokronagoro, Dept. of Medical Universitas Gadjah Mada

Abstract-This paper presents research on lung tuberculosis (TB) identification by using computer. This research was attempt to reduce patient waiting time in receiving X-ray diagnosis result on lung TB disease, due to mismatch ratio of radiologic experts to the number of patient, especially from remote areas in Indonesia. We used textural features calculated by computer to be used as descriptor in classifying image as TB or non-TB. We used statistical features of image histogram by calculates five features: mean, standar deviation (std), skewness, kurtosis, and entropy. These features were calculated from ROI images using pre defined ROI shape from thresholding method. Features calculated was then reduced down to one principal feature using Principal Componen Analysis (PCA) method. Finally, we used Mahalanobis distance classifier as classifier method based on one principal feature as descriptor. This research results show that it was possible to classify TB and non-TB image based on statistical feature on image histogram.

3 Cascade Generalization for Breast Cancer Detection

Kuntoro Adi Nugroho, Universitas Gadjah Mada; Noor Akhmad Setiawan, Universitas Gadjah Mada; Teguh Bharata Adji, Universitas Gadjah Mada

Abstract-Mammography is known as the preferred method for breast cancer diagnosis. Researchers have proposed machine learning based methods to improve the detection of breast cancer using mammography. In this study, cascade generalization is proposed for breast cancer detection. Four Bayesian Network based methods, SVM, and C4.5 are evaluated in loose coupled cascade classifier. The Bayesian based methods are evaluated in both base level and meta level. The evaluation results show the superiority of the proposed cascade strategy compared to Bagging and single classifier approach. Naive Bayes with SMO cascade demonstrated the best result in terms of ROC area under curve of 0.903. Bayesian Network using Tabu search with SMO cascade demonstrated the best accuracy of 83.689%.

4 Automatic Microaneurysms Detection Through Retinal Color Image Analysis

Preeyaporn Yunuch, King Mongkut's Institute of Technology Ladkrabang; Noppadol Maneerat, King Mongkut's Institute of Technology Ladkrabang

Abstract-This paper proposes an automatic system to diagnose the diabetic retinopathy symptom, which can cause a loss of vision by analysis the abnormality in retinal image. Digital image processing system is developed for the retinal image analysis which helps ophthalmologists to identify diabetic patients. The retinal images derived from ophthalmologists are used to analysis by using HSV, area identification and eccentricity techniques to distinguish diabetic retinopathy symptoms from normal diabetic patients. First color bar is evaluated by using HSV method and then using the eccentricity technique with area of pixel to find out the abnormality of Microaneurysms (MAs). The accuracy result of experiment is around 93% when compares to the analysis of ophthalmologists.

5 Comparative Study of Attribute Reduction on Arrhythmia Classification Dataset

Anugerah Galang Persada, Jurusan Teknik Elektro dan Teknologi Informasi Fakultas Teknik UGM;

Noor Akhmad Setiawan, Jurusan Teknik Elektro dan Teknologi Informasi Fakultas Teknik UGM; Hanung Adi Nugroho, Jurusan Teknik Elektro dan Teknologi Informasi Fakultas Teknik UGM

Abstract-The research presented in this paper is focused on comparative study of various attribute selections as one of pre-processing methods used in world machine learning applications. Using UCI arrhythmia dataset, nine combination of attribute selection, based on search methods (Best First, Genetic Search and PSO Search) and attribute evaluator (CfsSubsetEval, ConsistencySubsetEval, and RSARSubsetEval) are tested and compared. Those data of attribute reduction results are then classified by using eight classifiers (Naive Bayes, Bayes Net, MLP Classifier, RBF Classifier, Jrip, PART, J48 and Random Forest). The best overall results are achieved by the combination of Best First and CsfSubsetEval which has the accuracy of 81% when it is tested with RBF Classifier. PSO Search methods was also found not very effective to generate high quality subsets.

6 A Comparison of Effectiveness of Risk Data Clustering Method in Psychiatric Patient Service

Khaengkai Compapong, Department of Computer Science, Faculty of Science, Khon Kaen University; Sumonta Kasemvilas, Department of Computer Science, Faculty of Science, Khon Kaen University

Abstract-In this paper, we clustered clinical risk data of a mental health service, Khon Kaen Rajanagarindra Psychiatric Hospital. This study aims to compare performance values of cluster (k) in k-means clustering algorithm and hierarchical clustering algorithm. The result shows that for k-means clustering algorithm, sum of squared error (SSE) is 32.68, minimum of distance (MD) is 1.38, mean squared error (MSE) is 2.95 and values of k is 11. Therefore, we found that k-means clustering algorithm is the most appropriate method for using in cluster the risk group of the Psychiatric Patient Service. The result also suggests that the most risky age is between the ages of 32 and 36. The result can be a guideline for further research about data prediction. The implications of this study can assist medical staff to be knowledgeable about what should beware of when they treat psychiatric patients and this can be basic planning medicate guidelines for medical staff.

7 SARIMA (Seasonal ARIMA) Implementation on Time Series to Forecast The Number of Malaria Incidence

Adhistya Erna Permanasari, Department of Electrical Engineering and Information Technology, Gadjah Mada University; Indriana Hidayah, Department of Electrical Engineering and Information Technology, Gadjah Mada University; Isna Alfi Bustoni, Department of Electrical Engineering and Information Technology, Gadjah Mada University

Abstract-The usefulness of forecasting method in predicting the number of disease incidence is important. It motivates development of a system that can predict the future number of disease occurrences. Fluctuation analysis of forecasting result can be used to support the making of policy from the stake holder. This paper analyses and presents the use of Seasonal Autoregressive Integrated Moving Average (SARIMA) method for developing a forecasting model that able to support and provide prediction number of disease incidence in human. The dataset for model development was collected from time series data of Malaria occurrences in United States obtained from a study published by Centers for Disease Control and Prevention (CDC). It resulted SARIMA (0,1,1) (1,1,1)12 as the selected model. The model achieved 21,6% for Mean Absolute Percentage Error (MAPE). It indicated the capability of final model to closely represent and made prediction based on the Malaria historical dataset.

TS-3_4A: Power Systems 3

Tuesday, 08 October 11:30-12:10 Orchid 1

1 Control of TCSC and SVC Using Least Square Support Vector Regression (LS-SVR) to Improve Voltage Stability

Rony Seto Wibowo, Institut Teknologi Sepuluh Nopember; Ontoseno Penangsang, Institut Teknologi Sepuluh Nopember; Adi Soeprijanto, Institut Teknologi Sepuluh Nopember

Abstract-This paper proposes the application of Least Square Support Vector Regression (LS-SVR) for controlling Flexible AC Transmission Systems (FACTS) in order to meet voltage stability requirement. Transient voltage stability is a very fast phenomenon. Therefore, the proposed approach is aimed to provide a quick response to prevent voltage collapse. Generally, time response consists of two parts. Firstly, control center receives signals from the field and then process those signals to determine the appropriate setting of FACTS devices according to load level and location of fault. Secondly, FACTS devices react based on the signals sent by control center to prevent voltage collapse. The total response time should be shorter than the time to voltage collapse. Two kinds of FACTS devices, Thyristor Controlled Series Capacitor (TCSC) and Static VAR Compensator (SVC), are used to represent series and shunt type devices, respectively. To prove the effectiveness of the proposed approach, IEEE 14 buses is used as test system. In addition, comparison study between application of LS-SVR and Extreme Learning Machine (ELM) is also presented.

2 Inter-Area Power Oscillation Identification Using Synchronized Ambient and Ringdown Data

Husni Rois Ali, Universitas Gadjah Mada

Abstract-This paper presents inter-area power oscillation identification based on the synchronized PMU data. The iden-tification is carried out during both ringdown and ambient condition. Prony analysis is used to identify the mode during ring-down condition. While, modified Yule-Walker (MYW) is deployed during ambient condition. To verify the result of identification, it is compared to modal analysis result. The benchmark two-area test system is used to demonstrated the identification process. The result shows that it is close to result from modal analysis. Thus, it indicates that both algorithms are promising for online monitoring of inter-area power oscillation.

3 A Novel Design of WACS Based Multi-Output Support Vector Machine (M-SVM) for Oscillation Damping on Power System

Muhammad Abdillah, Department of Electrical Engineering, Institut Teknologi Sepuluh Nopember; Adi Soeprijanto, Department of Electrical Engineering, Institut Teknologi Sepuluh Nopember; Mauridhi Hery Purnomo, Department of Electrical Engineering, Institut Teknologi Sepuluh Nopember; Imam Wahyudi Farid, Department of Electrical Engineering, Institut Teknologi Sepuluh Nopember

Abstract-This paper proposes a novel design of wide area control system (WACS). WACS is utilized to damp the oscillation on power system. WACS consists of wide area monitor (WAM) and wide area control (WAC). WAM is used to monitor the dynamic behavior of power system, while WAC is used as the additional controller on power system. The proposed method is called WACS based multi-output support vector machine (M-SVM). M-SVM used in this paper is M-SVM for regression. The input signal which used by WAM is the input signal to the AVR ΔVwi, the mechanical power ΔPmi and the electrical power ΔPei of each generator. The output of WAM is utilized to predict the speed deviation of the generator. WAC is using the input signal of mechanical power ΔPmi and electrical power ΔPei from generator, while the output of WAC is the signal control which injected to the AVR ΔVwi. A two-area-four-generator is utilized as a tested system to evaluate the performance of the proposed method. From the simulation results that has been conducted, the proposed method can reduce the overshoot and compress the settling time better than other methods that presented in this paper.

4 Wind Speed Calculation by Using Electrical Output and Wind Turbine Power Curve

Agus Purwadi, LPKEE ITB; Muhammad Ikhsan, LPKEE ITB

Abstract-Measurements of wind speed usually done by using anemometer, these data can be used as a reference signal to the wind turbine control, or it can be used also for mapping the wind energy potential. Recently, the use of anemometer on wind turbines are often eliminated because of technical and cost reasons. This paper describes an alternative method to determine the upstream wind at the wind turbine without using the anemometer, but using only the electrical output (current and voltage) and the power curve data provided by the wind turbine manufacture. Further, the power curve is mathematically modeled by polynomial interpolation method so that the wind speed equation as a function of power can be determined.

5 Teaching the Large Synchronous Generator Dynamic Model under Unbalanced Steady-State Operation

Sugiarto, Sekolah Tinggi Teknologi Nasional; Sasongko Pramono Hadi, Gadjah Mada University; Tumiran, Gadjah Mada University; F. Danang Wijaya, Gadjah Mada University

Abstract-This paper presents an attractive approach for teaching the large three-phase synchronous generator under unbalanced steady-state condition of the 500 kV EHV Jawa-Madura-Bali (or Jamali) system to which it is connected using Matlab's Graphical User Interface (GUI) capability. Whereas two unbalanced steady-state conditions of the grid are obtained by setting all of IBTs (or inter bus transformers), the Jamali's grid loads, into load imbalance of 5% and 10%. The main motivation for such a study is to develop user-friendly software for better teaching the behavior of the generator which is connected to the grid when unbalanced loads are present. An example is given to demonstrate the usefulness of the developed tool.

TS-3_4B: Power Systems 4

Tuesday, 08 October 11:30-12:10 Orchid 2

1 Thermal Unit Commitment Solution Using Genetic Algorithm Combined with The Principle of Tabu Search and Priority List Method

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Abstract-Unit commitment (UC) is one of optimization problem which is important in electrical power systems as effort to minimize generation cost by applying an effective scheduling. However, the size of search space and many constraints in this problem are becoming the problems. This paper will present hybrid algorithm which integrates genetic algorithm (GA) combined with the principle of tabu search (TS) and priority list (PL) methods to solve the UC problem. PL will be used for solving the unit scheduled problem. GA and the principle of TS are used for solving the economic dispatch problem. To optimize GA parameters, design of experiment (DOE) method will be used. The proposed algorithm is tested on the IEEE 10 unit systems for a one day scheduling periods. The results are compared with methodological priority list, shuffled frog leaping algorithm, hybrid particle swarm optimization, standard GA, integer coded GA, and Lagrange relaxation GA methods. This proposed hybrid method shows that the total cost of the unit commitment problem is better than other compared methods and near-optimal solution.

2 Macro Demand Spatial Approach (MDSA) with Principal Component Analysis (PCA) on Spatial Demand Forecasting for Industrial Area in Transmission Planning

Sudarmono Sasnono, School of Electrical Engineering and Informatics, Institut Teknologi Bandung; Ngapuli Irmea Sinisuka, School of Electrical Engineering and Informatics, Institut Teknologi Bandung; Mukmin Widyanto Atmopawiro, School of Electrical Engineering and Informatics, Institut Teknologi Bandung; Djoko Darwanto, School of Electrical Engineering and Informatics, Institut Teknologi Bandung

Abstract-Macro Demand Spatial Approach (MDSA) is an approach introduced in long time electricity demand forecasting considering location. It will be used at transmission planning and policy decision on electricity infrastructure development in a region. In the model, MDSA combined with principal component analysis (PCA) method to determine the variables that affecting electricity demand in industrial area. The variables are different for each load sector. Hypothesis on unique variables affecting electricity demand on

every load sector in the industrial area were analyzed with qualitative methods and references. The variables have no significant effect can be reduced by using PCA. The generated models tested to assess whether it still at the range of confidence level of electricity demand forecasting. At the case study, generated model for South Sumatra Subsystem as a part of Sumatra System is still in the range of confidence level.

3 Contingency Analysis on 500kV Jawa-Bali Transmission Line System Based on Power Load Performance Index

Lesnanto Putranto, Jurusan Teknik Elektro UGM; Julian Perdana, Jurusan Teknik Elektro UGM; M Isnaeni, Jurusan Teknik Elektro UGM

Abstract-The line outage of a power system may cause overloads on the lines, overvoltage on buses, and undervoltage on buses that can threat the power system security itself. The effect of the contingency of each power system element is vary. Power Load Performance Indexes as one of the contingency indexes can be implemented to rank the contingency level of each power system lines. N-1 contingency line is applied at 500 kV Jawa Bali Transmission System to rank the severe of contingency and to evaluate the effect of contingency of each element. Tanjung Jati-Ungaran line has the biggest contingency index which means it would be the worst scenario of the line outage.

4 Design of Matching Impedance for Ultra Wideband Partial Discharge Detection

Primas Emeraldi, Bandung Institute of Technology; Umar Khayam, Bandung Institute of Technology

Abstract-Partial Discharge (PD) detection in the ultra wideband (UWB) at frequency from 100 kHz up to and above 1 GHz give some benefits especially for nature observation of PD pulse shape and frequency spectrum. One of the methods to measure the UWB PD signal is a method of impedance matched. Impedance of 50 ohm corresponding to the characteristic impedance of the coaxial cable and the internal impedance of oscilloscope is used as a coupling device to maximize the power transfer of PD current so that it can obtain real PD signals. This paper designs a matching impedance which composed from attenuator as detecting impedance and UWB amplifier as signal amplifier and evaluates the performance using S-parameter value. The matching impedance has good reflection loss below -10 dB over low frequencies up to 3 GHz frequency bandwidth, with a minimum value of S11 is -28.8 dB at a frequency of 322 MHz and -18.3 dB at 3 GHz. The input impedance and output impedance values are close to 50 ohm over the frequency bandwidth. The gain (S21) of the impedance matching circuit is 14 dB at a frequency close to DC and down to a 6 dB at a frequency of 100 MHz and have flat value of 6 dB up to 3 GHz frequency. From the simulation results, the designed matching impedance has frequency bandwidth from DC up to 3 GHz that can be implemented as a coupling device for UWB PD detection.

5 Simulation of Magnetic Field Distribution of Opposite-Poles Single-Disc Permanent Magnet Rotor

Prih Sumardjati Mulyaseputra, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada (UGM) and Department of Electrical Engineering Bandung State Polytechnic; Suharyanto, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada (UGM); Sasongko Pramono Hadi, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada (UGM); Danang Wijaya, Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada (UGM)

Abstract-The study development regarding Axial Flux Permanent Magnet Generator (AFPMG) has been increasingly interesting, since its construction is simple and easy to construct; permanent magnet type NdFeB has high density, available everywhere and relatively low cost; without using brushes and slip ring, thus the maintenance cost can be low, long usage duration, direct drive connection. These will affect in the increasing efficiency and reliability. One of the problems which remain to be the main issue in AFPMG is rotor disc dimension influenced by distance between magnets in rotor disc. This paper discussed magnetic field distribution simulation between permanent magnet NdFeB type N40 with diameter dimension 40 mm and 10 m in height on different pole rotor disc in order to obtain the minimum disc dimension with maximum magnetic flux distribution. Simulation was performed by Finite Element Method Magnetics (FEMM). The simulation result was presented in the form of magnetic field distribution geometry on two permanent magnets inside rotor disc. It showed that the magnetic field strength in the midpoint between different pole single rotor was very low (44 mT) on the distance of 25 mm.

TS-1_4C: Software Engineering, Services, and Information Technology 8

Tuesday, 08 October 11:30-12:10 Orchid 3

1 Lip Segmentation and Tracking Based on Chan-Vese Model

Aris Nasuha, Electrical Engineering Institut Teknologi Sepuluh Nopember; Mauridhi Hery Purnomo, Electrical Engineering Institut Teknologi Sepuluh Nopember; Tri Arief Sardjono, electrical engineering Institut Teknologi Sepuluh Nopember

Abstract-Lip reading has wide spread application, e.g. audio-visual Automatic Speech Recognition (AV-ASR), silent speech interface and person identification. Lip segmentation is one of important step in lip reading, because it provides basic information to be processed in subsequent steps. Lip tracking is a process of locating lip to associate lip in consecutive video frames. Chan-Vese model is a region-based segmentation algorithm, which also can be used as tracking method. This algorithm can detect boundary of object which not defined by gradient, while classical active contour can't be applied. This method also can detect object by any initial curve in the image, not necessarily surround the object. This paper investigates about lip segmentation and tracking based on Chan-Vese model, preceded by the color segmentation.

2 Ontology and Semantic Matching for Diabetic Food Recommendations

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of Brawijaya Malang, East Java, Indonesia; Riyanarto Sarno, Department of Informatics Institut Teknologi Sepuluh Nopember Surabaya, East Java, Indonesia; Mohamad Sidiq, Department of Informatics, Institut Teknologi Sepuluh Nopember (ITS) Surabaya, Indonesia; Heri Kristianto, Department of Nurses & Medical Surgery, University of Brawijaya

Abstract-Foods recommendation for diabetes patients is indispensable for controlling blood sugar levels. Currently, the foods preparation is done by a nutrition expert. The patient's dependence on the nutrition experts is very high, thus the selection of foods could not be done independently. The Automation system to determine foods combination for diabetic patients is needed to solve these problems. In this study, the automation system has been designed and implemented. The technologies used in this research are the OWL and SWRL. There are few researches that explore an automation process of foods recommendation for diabetes patients using the technology of OWL and SWRL. Domain knowledge based on Ontology is needed to process foods composition automatically. However, using SWRL and OWL technology is not enough, because the accuracy of the words required. A semantic ontology understanding was added using weighted tree similarity method to specify the composition of foods for diabetic patients. 73% data were able to be correctly predicted by this method.

3 Detection and Object Position Measurement using Computer Vision on Humanoid Soccer

Iwan Awaludin, Computer Engineering Department, Bandung State Polytechnic; Priyanto Hidayatullah, Computer Engineering Department, Bandung State Polytechnic; Jonner Hutahaean, Computer Engineering Department, Bandung State Polytechnic; Dewa Gede Parta, Computer Engineering Department, Bandung State Polytechnic

Abstract-Bandung State Polytechnic (POLBAN) has participated twice in humanoid robot soccer competition. From those two participations, it was known that the weakness was in computer vision. Computer vision capability is constrained by robot hardware specifications so that it was impossible to embed our recent object recognition application. In this study, we propose a computer vision system that implemented the latest technology similar to that technology used in the humanoid soccer winner season 2011. The model uses a field where the object and size comply with the rules of humanoid soccer tournament 2011. Some previous methods use off the field camera which is cannot be used in humanoid soccer tournament because the sensor used has to be attached to the robot. While the approach in this paper emphasized to the fact that goalkeeper's position tend to be static relative to the object in a competition field. Goal keeper through its vision system recognizes objects and measures ball position using image processing technique. The process of ball position measurement was first carried out by recognizing three different objects in the competition field: ball, goal's bar, and field line. Recognition process utilizes back projection method based on HSV information.. After the three objects were detected, the measurement of ball position on the field was carried out by ANN model by considering ball position in the image, position of goal's horizontal bar, and the middle field line point. After 10,000 training, the result is encouraging with the average error is less than 1 cm.

4 Digital Color Image Encryption Using RC4 Stream Cipher And Chaotic Logistic Map

Riah Ukur Ginting, Universitas Sumatera Utara; Rocky Dillak, Kupang State Polytechnic

Abstract-Doing a digital image transmission over internet need a secure protection againts ilegall copying. Unfortunately, many current data encryption methods such as DES, RSA, AES, and other only suitable for test data, but not for digital image. In this paper, we propose new secure algorithm for image encryption, which based on RC4 stream cipher algorithm and chaotic logistics map. The proposed algorithm works as follows : (i0 converting the external key into initial value, (ii) using he initial value to generate a key stream using chaotic logistic map function, and (iii) processing a permutation and the result is then XOR-ed with bytes stream of digital image. The experiment results show that the proposed algorithm (i) is able to make the cipher-image can not be visually identified, (ii) can eliminate the statistical correlation between the plain-image and cipher-image, (iii) is very sensitive to small changes of key, and (iv) has no change in image contents (lossless encryption) during encryption and decryption process which is indicated by the hash value (MD5) of plain-image has the same hash value (MD5) wth decrypted image.

5 The Effect of Transformation on Anisotropic Semivariogram Model

Kurnia Sari, Bandung Institute of Technology; Udjianna Pasaribu, Bandung Institute of Technology

Abstract-Usually there are two anisotropic semivariogram model. Those are geometric anisotropy and zonal anisotropy that depend on distance and direction between pairs of observations. Here, we study more the geometric anisotropy model because this model use transformation of any coordinate of locations. The transformations include translation, rotation and scaling. Translation and rotation does not change the distance that is an important element in semivariogram models. While scaling change the distance that also certainly change semivariogram model.

TS-3_4D: Power Systems 5

Tuesday, 08 October 11:30-12:10 Chrysant

1 Design of New Shape Printed Bowtie Antena for Ultra High Frequency Partial Discharge Sensor in Gas-Insulated Substations

Hanalde Andre, Bandung Institute of Technology; Umar Khayam, Bandung Institute of Technology

Abstract-Detection of partial discharge (PD) with an antenna as ultra high frequency (UHF) sensor at a frequency of 300 MHz - 3 GHz has been widely used and proven to be an effectife away for diagnosis of insulation in gas insulation switchgear (GIS). Various types of antennas have been developed to obtain better sensitivity and accuracy in the UHF bandwidth range. Bowtie antenna can be used as a sensor because it has the characteristics of ultra wide band (UWB). Sensitivity antenna greatly affects the ability of the sensor to detect the electromagnetic signals (EM) from source PD. Return loss (RL) used as a parameter to see the sensitivity of the antenna because it has a

better resolution to see the reflected signal. This study new shape bowtie antenna to get better sensitivity. Influence edge modification and sliced modification will be discussed and simulated in antenna design. Simulation results show modification edge and sliced bowtie antenna able to produce optimal sensitivity antenna with a radius of 18 mm and 16 mm. The technique led to the reduction of the antenna surface significantly.

2 Optimized GDPWM based on Spontaneous Evolutionary GA for Reducing Switching Losses on Inverter

Ony Asrarul Qudsi, Department of Electrical Engineering Institut Teknologi Sepuluh Nopember; Novie Ayub Windarko, Department of Electrical Engineering Politeknik Elektronika Negeri Surabaya; Ardyono Priyadi, Department of Electrical Engineering Institut Teknologi Sepuluh Nopember; Mauridhi Hery Purnomo, Department of Electrical Engineering Institut Teknologi Sepuluh Nopember

Abstract-This paper presents analytical techniques for reducing switching losses of voltage source inverter (VSI) using Generalized Discontinuous PWM (GDPWM). The switching losses of inverter is influenced by the angle on the modulation of GDPWM. This problem will be optimized using a new optimization method. This method is called as Spontaneous Evolutionary GA (SEGA). The inverter switching losses is formulated as objective function to optimize the angle. At this optimization process, angle values will be determined to minimize the inverter switching losses. Thermal module of Power Simulator (PSIM) is used to verify the optimized angle of GDPWM. The simulation was performed using a three-phase voltage source inverter (VSI) and an inductive load. Simulation results confirm the method could minimize the losses of inverter.

3 Characteristics of Electric Field Change Preceding Negative First Return Stroke Produced by Preliminary Breakdown

Ariadi Hazmi, Andalas University; Zulka Hendri, Andalas University

Abstract-Understanding the initiation process of preliminary breakdown during negative CG lightning discharges to the ground is important to design a lightning protection system. We observed electric field change preceding negative cloud to ground lightning flashes related to preliminary breakdown in tropical region, Indonesia. The characteristics of electric field change of negative first return stroke produced by preliminary breakdown process were studied. The results showed that arithmetic mean and geometric mean of pre-return stroke separation is 57 ms and 32 ms, respectively. Other statistical parameters also are shown in this paper.

4 Input Current Ripple Analysis of Double Stator AC Drive Systems

Raymond Parlindungan, ITB; Pekik Dahono, ITB

Abstract-An input current ripple analysis of PWM inverter fed double-stator AC drive system is proposed in this paper. The expression of rms input current ripple of PWM inverter as a function of phase difference between stator windings is derived. It is found that the optimum phase difference that results in minimum input current ripple is 60o. Several experimental results are included to show the validity of the proposed analysis method.

5 Regenerative Braking Performance Analysis On Gang Car Electric Prototype

Wahyu Parbowo, STEI – ITB; Agus Purwadi, STEI – ITB

Abstract-Increasing the driving range of an electric vehicle can be achieved by applying regenerative braking. In this paper, how much regenerative braking affects the vehicle will be discussed. The vehicle prototype on this study is Gang Car Electric, a conversion from internal combustion engine car type. The regenerative braking configuration enables the feedback energy active as soon as the throttle pedal being released and emulate engine retarding function of conventional car. With that goal, we still want the vehicle to be able to cruise in a constant speed on the cruise mode. The proposed configuration is included in this paper.

Venue

THE SAHID RICH JOGJA HOTEL

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The Sahid Rich Jogja Hotel is in an ideal location in the very heart of Yogyakarta's main business district, which allows guest fast and easy access to the airport and the cities many cultural highlights. The hotel's strategic location ensures that guests can quickly and easily reach many local points of interest. No less exceptional is the hotel's easy access to the city's myriad attractions and landmarks, such as Monumen Jogja Kembali (Monjali), Universitas Gadjah Mada, Tugu Jogja and many others. Hotel facilities include swimming pool, SPA, laundry service, fitness centre, barbershop, art shop, billiard, and free Wi-Fi.

Travel Information

Borobudur
The Borobudur Temple is one of the greatest Buddhist monuments in the world, and was built in the 8th and 9th centuries AD during the reign of the Syailendra Dynasty. The temple's design in Gupta architecture reflects India's influence on the region, yet there are enough indigenous scenes and elements incorporated to make Borobudur uniquely Indonesian. The monument is located in the Kedu Valley, in the southern part of Central Java, at the centre of the island of Java, Indonesia.

Prambanan
Prambanan Temple Compounds consist of Prambanan Temple (also called Loro Jonggrang), Sewu Temple, Bubrah Temple and Lumbung Temple. All the mentioned temples form the Prambanan Archaeological Park and were built during the heyday of Sailendra's powerful dynasty in Java in the 8th century AD. These compounds are located on the border between the two provinces of Yogyakarta and Central Java on Java Island. Prambanan is known locally as Roro Jonggrang, coming from the legend of the 'slender virgin'.

Yogyakarta Palace (Kraton)
Keraton Kasultanan Ngayogyakarta Hadiningrat or now better known by the name of Yogyakarta Palace is the center of Javanese culture living museum that is in the Special Region Yogykarta (Daerah Istimewa Yogyakarta). Not just becomes the place to live for the king and his family, the palace is also a main direction of cultural development of Java, as well as the flame guard of the culture.

Malioboro Street
Malioboro is the most famous street in Yogyakarta. Located in the heart of Yogya, this is the city's main street, and was once the ceremonial avenue for the Sultan to pass through on his way to and from the Keraton. During such occasions Malioboro would be festively decorated with flowers. Some say that the name Malioboro" derives from the name of the British governor Marlborough from the era when Britain ruled the archipelago, between 1811-1816.

King Boko Palace
King Boko Palace was a glorious building that was constructed during the reign of Rakai Panangkaran, descendant of Sailendra dynasty. The palace that initially was named Abhayagiri Vihara (that means a monastery on a peaceful hill) was built for seclusion purpose and to focus on spiritual life. From this palace, you will feel peace and will be able to see Yogyakarta city and Prambanan temple with Merapi Mountain as the background.

More information:
http://www.indonesia.travel/en/discover-indonesia/region-detail/33/di-yogyakarta
http://www.yogyes.com/en/yogyakarta-tourism-object/

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