



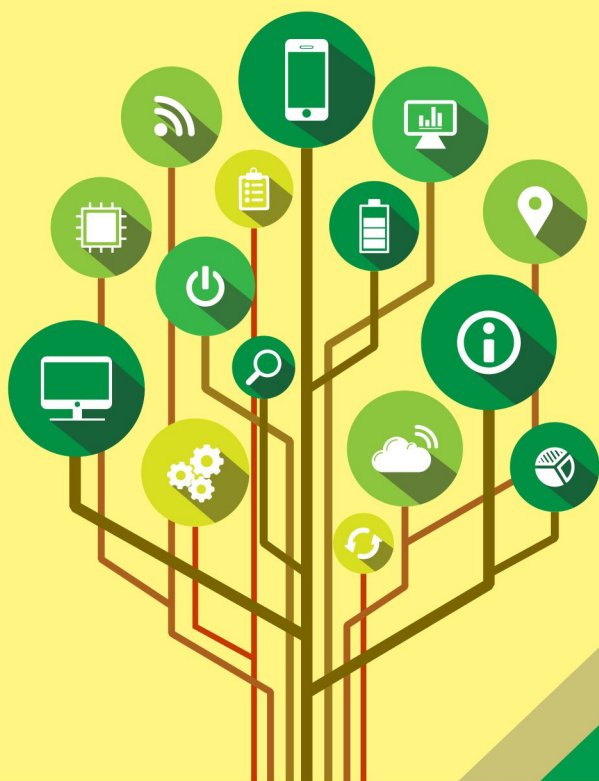
2015 ICITACEE

THE 2nd INTERNATIONAL CONFERENCE ON INFORMATION
TECHNOLOGY, COMPUTER, AND ELECTRICAL ENGINEERING

October 16 - 18th, 2015

PROCEEDINGS

“ **GREEN TECHNOLOGY** STRENGTHENING in INFORMATION TECHNOLOGY,
ELECTRICAL, AND **COMPUTER ENGINEERING** IMPLEMENTATION ”



IEEE

**2015 2nd International Conference on Information Technology,
Computer, and Electrical Engineering (ICITACEE)**

Editor:

R. Rizal Isnanto
Mochammad Facta
Eko Didik Widiyanto
Dani Eridani

Proceedings

2015 2nd International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE)

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Foreword from General Chair of ICITACEE 2015 Universitas Diponegoro, Semarang – Indonesia

Dear Colleagues,

On behalf of Technical Committee and Organizing Committee of ICITACEE 2015, I am honored to welcome you to **The 2nd International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE 2015)**. The conference is planned to be conducted annually. This conference program is organized by Computer Engineering Department, together with Electrical Engineering Department, Faculty of Engineering, Diponegoro University, Semarang. The main theme of the conference is “Green Technology Strengthening in Information Technology, Electrical and Computer Engineering Implementation”.

The conference aims to provide a forum for researchers, academicians, professionals, and industries to expose and exchange innovative ideas, methods, and experience in information technology, computer engineering, as well as in electrical engineering, and their applications, related with the aspects of green technology. This conference also provides forum for researchers, scientists, and engineers to exchange ideas and their current achievements.

In this year we have received more than 120 paper submissions from various universities, research centers, and as well as from industries from many countries. However, after in-depth review, the Technical Committee accepted 80s high quality papers to be selected and presented in this conference. The accepted papers are categorized into five groups, there are: Information Technology and System, Signal and Circuit, Power and Control Engineering, General Papers, and Interdisciplinary Papers related to Green Technology. All accepted and presented papers will be submitted for uploading to the IEEE Xplore digital library.

We thank all authors and all parties which cannot be mentioned here who have contributed and participated in presenting their works at this conference. Thank you for IEEE Indonesia Section for supporting this conference. We also gratefully acknowledge the important review supports provided by members of Conference Committee from Indonesia or abroad. Their efforts were crucial to the success of the conference. We are also so blessed by the presence of 3 (three) invited Keynote Speakers from different institutions which will address the important trends relating to green technology strengthening in information technology, electrical and computer engineering implementation.

Finally, we wish you all can enjoy two days discussion through this conference and could spend to enjoy the beauty of Semarang City in one day City Tour that will be held after closing ceremony. We hope to meet you again in the next conference, the 3rd International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE 2016).



Dr. R. Rizal Isnanto

General Chair of ICITACEE 2015

Foreword from Dean of Engineering Faculty Universitas Diponegoro, Semarang – Indonesia

The 2nd International Conference on Information Technology, Computer, and Electrical Engineering 2015 (ICITACEE 2015) is now held again as a part of 57th Faculty of Engineering Dies Natalis and 58th Diponegoro University Dies Natalis agenda.

The aims of the conference are to obtain and to extend the knowledge of the recent issues, opinions, bright ideas about the development of a comprehensive green technology. ICITACEE 2015 invites the scholars and encourages the researchers to submit high quality manuscripts and papers to this conference. It is also to share extensively and exchange of ideas, thoughts and discussions on all aspect of information technology, information systems, power systems, signal processing, electronics, micro-electronics, biomedical engineering, and communication systems as well as other field that corresponds, such as intelligent systems, intelligent transportation applications, health care applications, and environmental protection to facilitate the formation of networks among participants of the conference for improving the quality and benefits of the research.

It is a great pleasure to welcome all the participants of this conference in Semarang. I also would like to welcome several members from Technology University of Malaysia (UTM), Diponegoro University, Bandung Institute of Technology, Gadjah Mada University, and so on.

I do hope that this conference to be a valuable forum for engineers and scientists to share their precious researches and this event will give significant contributions to the development of Information Technology, Computer, and Electrical Engineering and it will raise the awareness of scientific community members in bringing better life.

I hope that the conference will be stimulating and memorable for you. So, enjoy your time in Semarang.



Ir. M. Agung Wibowo, MM, MSc, PhD
Dean of Faculty of Engineering
Diponegoro University, Semarang-Indonesia

Foreword from Chief of Computer Engineering Department Universitas Diponegoro, Semarang – Indonesia

Welcome to all the participants in the International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE 2015) at Semarang. I would like to welcome keynote speakers from Universiti Teknologi Malaysia, Institute of Technology Bandung, and Gajah mada University. This is the third conference held together by Computer Engineering Department and Electrical Engineering Department of Engineering Faculty, Universitas Diponegoro.

I would like to appreciate the vast work in this conference as a collaborative effort among Computer Engineering Department, Electrical Engineering Department, Universitas Diponegoro, IEEE Student Branch of Universitas Diponegoro and IEEE Indonesia Section.

I do hope that this conference will be a prestige forum to communicate and sharing the findings and precious researches among experts in field of computer, information technology and electrical engineering.

I would like to express my deep appreciation to Organizing Committee members, staffs, and students of Computer Engineering and Electrical Engineering Department of Universitas Diponegoro for their effort and support. I wish that this event will give contribution to global development of Computer and Electrical Engineering.



Ir. Kodrat Iman Santoso, M.T.

Chief of Computer Engineering Department – Engineering Faculty
Universitas Diponegoro, Semarang – Indonesia

Foreword from IEEE Indonesia Section Chair

Dear colleagues, Professors, researchers, ICT professionals, ladies and gentlemen, good morning.

On behalf of IEEE Indonesia section, I would like to express my sincere gratitude and welcome you to the 2nd International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE 2015). The conference is an annual event, organized in collaboration between Computer Engineering Department and Electrical Engineering Department, Diponegoro University. In this year, the conference is organized by Computer Engineering Department, Diponegoro University, Semarang Indonesia.

ICITACEE 2015 with the theme Green Technology Strengthening in Information Technology, Electrical and Computer Engineering Implementation, has been approved and technically co-sponsored by IEEE Indonesia Section, with the conference No. #36226. The previous conferences in 2014 were also technically co-sponsored by the IEEE and successfully held in Semarang on 07 Nov 2014. The ICITACEE 2014 publication has been indexed by IEEE Xplore® Digital Library and Scopus.

As we may aware, IEEE is one of the largest professional associations in the world. Having been founded over 130 years ago, nowadays it brings together over 432,000 active members in more than 160 countries. This is the world's largest technical professional society, dedicated to fostering technological innovation and excellence for the benefit of humanity. IEEE provides more than 3.5 million digital libraries and currently has organized about 1,300 annual conferences, worldwide.

IEEE Indonesia section, which is a part of IEEE global, has already been established for 28 years. It currently has about 1,395 active members, with activities in 6 society chapters, namely Computer Society Chapter, Communications Society Chapter, Circuits and Systems Chapter, Engineering in Medicine and Biology Chapter, Solid State Circuits Society Chapter, and Power and Energy Chapter. Moreover, IEEE Indonesia section also has 4 joint chapters, namely Joint chapter of Microwave Theory / Antennas & Propagation, Joint chapter of Aerospace & Electronics Systems Society / Geoscience & Remote Sensing Society, Joint chapter of Control System Society / Robotics & Automation Society, and Join Chapter of Education Society / Electron Devices Society / Power Electronics Society / Signal Processing Society.

IEEE Indonesia Section has 25 student branches in several universities in Java, Sumatera, Bali and Sulawesi islands and three Affinity Groups, namely Women in Engineering, SIGHT in Telemedicine, and SIGHT in Humanitarian Technology.

IEEE Indonesia section has organized several activities almost weekly. Its activities are related to Technical, Education, and Social Activities, such as ICT Training, Workshop, International Seminar, Focus Group discussion, and Distinguish Lecturer Tour (DLT) activities all around Indonesia. The main discussed topics are related to the technology for humanity, such as Internet of Things (IoT), Artificial Intelligent, Robotic technology, Biomedicine Technology, Antenna and Microwave, Circuit and Device, Renewable Energy, etc. Recently, IEEE Indonesia section organized two days 5G training; with the trainer is the one of the worldwide recognized professor in the field of Wireless Communication. We believed that it was the first 5G training activities in the Asia Pacific region.

In terms of collaboration, IEEE Indonesia section has a good and mutual relationship with ICT organizations, Industries, Universities as well as the government in Indonesia. IEEE Indonesia also participated in the preparation of forming a new regulation related to the ICT in Indonesia.

Through this opportunity, I would also like to highlight that Indonesia is an emerging country, one of the fastest growing countries in South East Asia and Pacific. Based on International Data Corporation, Indonesia has become the largest spender on ICT in South East Asia and is ranked 19th by spending globally. This is

related to the Indonesia Economic Masterplan to 2025 (MP3EI) that Indonesia has ambitious plans and strategies to accelerate the economic development through ICT infrastructures.

As a critical hub to the Sub-Districts and Villages, the Palapa Ring Development Project connects 34 provinces and 440 cities/districts, stitching a circumference of 36,000 km fiber optics cable. The National Backbone Network, the Palapa Ring, will be completed with the last implementation in the submarine cable in the most eastern part, Papua Province. The National Network capacity and speed would be much improved with its completion. A network failure or disconnection in the Ring would be compensated by rerouting traffic through the other side.

However, the challenge is how to make these plans come into fruition and provide greater access to ICT beyond Jakarta and the Island. Palapa Ring connects Provinces and all Districts, as a critical hub to the Sub-Districts and Villages. The capacity is practically unlimited (Tbps), cheaper access and better guarantee of continuity.

The Palapa Ring could easily provide Network Transit for Asia and Pacific Region, between the Indian and Pacific Oceans and the three (3) Continents (Asia-Australia-Americas). It would be easy to access our neighboring ASEAN countries, Singapore, Brunei Darussalam, Malaysia, Philippines, and Thailand.

The ICITACEE 2015 conference provides a forum for researchers, academicians, professionals, and students from various engineering fields and with cross-disciplinary working or interested in the development and design of information technology, computer system, and electrical engineering to interact and disseminate the latest issues and researches. It also offers opportunity to enjoy the heritage and the beauty of Semarang.

I do hope in the near future the event will be continued and strengthened, so the result will give more benefit and positive impact to the Indonesian people. Technology drives innovation, people can do more, do better. Technology drives higher quality of life, people can live better.

In this occasion, I would also like to say welcome to Semarang, one of the famous destinations in Indonesia. Semarang serves beautiful heritages, mountain and scenery with warm and friendly people, a vibrant culture and lifestyle.

Finally, we do hope all of you will have enjoyable and valuable experience. During this 3 days conference, you may share your best knowledge in your area of research and professional activities.

Thank you.

Semarang, 16 October 2015.

IEEE Indonesia Section Chair

2015 2nd International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE)

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Hendra Setiawan (Indonesia Islam University, Indonesia)

2015 2nd International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE)

Conference Program

Friday, 16th October 2015

07.30 – 08.00	Registration			
08.00 – 08.45	Opening Ceremony			
	Photo Session			
08.45 – 09.00	Coffee Break			
09.00 – 09.50	Invited Speaker 1: Novel Device Architectures and Carbon Based Materials for Future Nanoelectronics <i>Razali Ismail, Universiti Teknologi Malaysia</i>			
09.50 – 10.40	Invited Speaker 2: Distributed Consensus Control of Robot Swarm with Obstacle and Collision Avoidance <i>Bambang Riyanto Trilaksono, Institut Teknologi Bandung</i>			
10.40 – 11.30	Invited Speaker 3: Context-Awareness: Connecting Computing with Its Environment <i>Lukito Edi Nugroho, Universitas Gadjah Mada</i>			
11.30 – 13.30	LUNCH BREAK			
13.30 – 15.00	Parallel Session			
	ROOM A	ROOM B	ROOM C	ROOM D
15.00 – 15.15	Coffee Break			
15.15 – 17.30	Parallel Session			
	ROOM A	ROOM B	ROOM C	ROOM D
17.30 – 18.30	BREAK			
18.30 – 20.00	Gala Diner			

Saturday, 17th October 2015

08.00 – 10.15	Parallel Session			
	ROOM A	ROOM B		
10.15 – 10.30	BREAK			

Sunday, 18th October 2015

08.00 - ...	Cultural program (city tours) (* with additional arrangements)			
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Parallel Session Day 1

Friday, 16th October 2015

Room A (Hall, 5 th Floor)	
Parallel Session 1 (13.30 – 15.00)	
1	Multiplying Cipher Images on Visual Cryptography with ElGamal Algorithm <i>Alexander Edi Suranta Kacaribu, Ratnadewi Ratnadewi</i>
2	Vowel Pronunciation in Indonesian Language Recognition Using the Lips Angle Measurement and Lips Area <i>Ratnadewi Ratnadewi, Adhi Fajar Sakti Wahyudi, Anisa Fardhani Prasetyaningtyas</i>
3	Optimization of Photovoltaic Farm Under Partial Shading Effects Using Artificial Intelligent Based Matrix Switch Controller <i>Antonius Rajagukguk, Dedet Candra Riawan, Mochamad Ashari</i>
4	Feature Extraction and Classification for Detection Malaria Parasites in Thin Blood Smear <i>Hesti Khuzaimah Nurul Yusufiyah, Hanung Adi Nugroho, Teguh Baratha Adji, Anan Nugroho</i>
5	An Epileptic Signal Preictal Ictal Using PCA, K-Means, K Nearest Neighbors <i>Siswandari Noertjahjani, Risanuri Hidayat, Samekto Wibowo, Adhi Susanto</i>
6	Exploring the Perception of Indonesian Students on Mendeley Reference Management Software in Academic Writing <i>Muhammad Basri, Andi Anto Patak</i>
Parallel Session 2 (15.15 – 17.30)	
1	Time Series Forecasting Using Exponential Smoothing (To Predict the Number of Visitor of the Website of Sebelas Maret University) <i>Rini Anggrainingsih, Gilang Romadhon Aprianto, Sari Widya Sihwi</i>
2	Model of Human Resources for Health Information Systems <i>Bens Pardamean, Timor Utama, Diah Rostanti Fadilah</i>
3	Sentinel Web: Implementation of Laravel Framework in Web Based Temperature and Humidity Monitoring System <i>Lathifah Alfat, Aris Triwiyatno, R. Rizal Isnanto</i>
4	Electromyography (EMG) Signal Compression using Sinusoidal Segmental Model <i>Florentinus Budi Setiawan, Siswanto Siswanto</i>
5	A Mobile Diabetes Educational System for Fasting Type-2 Diabetics in Saudi Arabia <i>Mohammed Alotaibi</i>
6	Fuzzy MADM for Major Selection At Senior High School <i>Fata Nidaul Khasanah, Adhistya Erna Permanasari</i>
7	CANREG 5 Networks for Indonesia <i>Bens Pardamean, Teddy Suparyanto, Diah Rostanti Fadilah</i>
8	Impact of Service-Oriented Architecture Adoption in Information System <i>Erick Fernando, Derist Touriano, Rico Rico</i>
9	Crosscutting Concerns Refactoring in Agent Framework <i>Maman Somantri, Lukito Edi Nugroho, Widywan Widyawan, Ahmad Ashari</i>

Room B (Hall, 5th Floor)	
Parallel Session 1 (13.30 – 15.00)	
1	Two Phase Flow Imaging Using Infra Red Tomography <i>Sallehuddin Ibrahim, Muhammad Abu Bakar Sidik, Mohd Amri Md Yunus</i>
2	Design of Self Balancing Pitch Control in Fixed Wing Unmanned Aerial Vehicle with Fuzzy Logic Controller <i>Aris Triwiyatno, Wahyul Amien Syafei, Teguh Prakoso, Budi Setiyono, Aristya Panggi Wijaya</i>
3	Intensity Average Value of Image Segmentation for Infrared Image of Environmental Condition <i>S.R. Sulistiyanti, M. Komarudin, L. Hakim, A. Yudamson</i>
4	FPGA-Based System for Countinous Monitoring of Three Human's Body Vital Signs <i>Aminuddin Rizal, Munawar Agus Riyadi, Darjat Darjat</i>
5	Robust Control Design for a Spindle of Lathe Machine <i>Moh Khairudin</i>
6	Smart Controller Design of Air to Fuel Ratio (AFR) and Brake Control System on Gasoline Engine <i>Aris Triwiyatno, Enda Wista Sinuraya, Joga Dharma Setiawan, Suroto Munahar</i>
Parallel Session 2 (15.15 – 17.30)	
1	Design of Prepaid Energy Meter Based on PROTEUS <i>Heribertus Himawan, Catur Supriyanto, Adrin Thamrin</i>
2	The Development of Track Record Application for Conservation Activity and Wildlife in Indonesia <i>Arie Vatesia, Jonathan Sadler, Rendra Regen Rais</i>
3	A High Speed Low Power Reading Scheme in DRAMs Using Resonant Tunneling Diode <i>Ahmed Lutfi Elgreatly, Ahmed Ahmed Shaaban, El Sayed M. El-Rabie</i>
4	Control System of Train Speed Based on Fuzzy Logic Controller <i>Reza Dwi Utomo, Sumardi Sumardi, Eko Didik Widiyanto</i>
5	Comparison Methods of Noise Elimination for Pregnancy Image Processing <i>Moh Khairudin, D. Rahmawati</i>
6	Maximum Power Point Tracking Simulation for a Photovoltaic System <i>Susatyo Handoko, Tejo Sukmadi</i>
7	Design of Multisensor IMU for Land Vehicle <i>Wahyudi Wahyudi, Ngatelan Ngatelan</i>

Room C (Hall, 4th Floor)	
Parallel Session 1 (13.30 – 15.00)	
1	Energy Detector Threshold Under White Gaussian Noise Channel in Cognitive Radio System <i>Nasrullah Armi, Chaeriah Bin Ali Wael, Muhammad Arshad, Dadin Mahmudin, Pamungkas Daud</i>
2	Modeling and Simulation of OFDM Scheme for Radio Over Fiber (RoF) <i>Fauza Khair, Fakhriy Hario P, I Wayan Mustika, Budi Setiyanto, Sevia Mahdaliza Idrus</i>
3	Spectrum Sensing Performance in Cognitive Radio System <i>Nasrullah Armi, Chaeriah Bin Ali Wael, Muhammad Arshad</i>
4	Performance of AOMDV Routing Protocol Under Rushing and Flooding Attacks is Manet <i>Sukiswo Sukiswo, Muhamad Rifqi Rifquddin</i>
5	SDN Based Data Center Designs Using Cisco ACI Architectures <i>Atif Khan</i>
6	Multi-Objective Cuckoo Search Algorithm for Task Scheduling in the Cloud Environments <i>Farnaz Sharifi Milani, Nima Jafari Navimipour</i>
Parallel Session 2 (15.15 – 17.30)	
1	Investigation and Comparison of Expert Cloud and E-learning Systems <i>Nima Jafari Nanimipour, Batool Zareie</i>
2	Property Investigation of Nanofiber Polyaniline as Active Material for Biosensor <i>Ngurah Ayu Ketut Umiati, Mochammad Facta, Kuwat Triyana, Kamsul Abraha</i>
3	Basic Study of Multiple Symbol Differential Detection for SC-FDMA System <i>Ziyan Jia, Qiuye Li, Lin Shen</i>
4	Performance Analysis of Transceiver 4 x 4 Space Time Block Coded MIMO-OFDM System <i>Subuh Pramono, Tommi Hariyadi, Budi Basuki Subagio</i>
5	Measurement System of Temperature, Humidity and Air Pressure Over 433 MHz Radio Frequency. an Application on Quadroter <i>Budi Setiyono, Sumardi Sumardi, Rafdito Harisuryo</i>
6	Managing Bandwidth Resource for Vehicular Ad-hoc Networks <i>Sami S. Alwakeel, Agung B. Prasetijo</i>
7	Adaptive Blind Equalization for Differential SC-FDMA System <i>Ziyan Jia, Ming Wu, Lianfeng Shen</i>

Room D (Hall, 4th Floor)	
Parallel Session 1 (13.30 – 15.00)	
1	Morphological Analysis of Epoxy Resin After Electrical Tracking <i>Juningtijastuti Juningtijastuti, Abdul Syakur</i>
2	Reduction of Harmonic with LLCL Filter on Residential Loads 450 VA and 900 VA in Central Java, Indonesia <i>Sapto Nisworo, Hamzah Berahim, Suharyanto Suharyanto, Tumiran Tumiran</i>
3	A Three-phase Power Flow Analysis for Electrical Power Distribution System with Low Voltage Profile <i>Lukmanul Hakim, Muhamad Wahidi, Umi Murdika, Federico Milano, Junji Kubokawa, Naoto Yorino</i>
4	Design of Photovoltaic Powered Converter to Provide AC Controlled Voltage Source <i>Slamet Riyadi</i>
5	Smart Monitoring of Electrical Quantities Based on Single Board Computer BCM2835 <i>Gigih Forda Nama, Dikpride Despa, Muhamad Komarudin, Mardiana Mardiana, Ady Kurniawan</i>
6	Assessment of TRV Parameters and Overvoltages in Three-Phase Ungrounded Faults <i>Alejandro Marmolejo, Mirko Palazzo</i>
Parallel Session 2 (15.15 – 17.30)	
1	Ontology-based Context Aware for Ubiquitous Home Care for Elderly People <i>Kurnianingsih Kurnianingsih, Lukito Edi Nugroho, Widyawan Widyawan, Lutfan Lazuardi, Khamla Non-alinsavath</i>
2	Impact of High Penetration of Photovoltaic Generation on Voltage Fluctuation of Transmission and Distribution Systems <i>Jimmy Trio Putra, Sarjiya Sarjiya, M. Isnaeni BS</i>
3	Study on Surface Resistance of Epoxy Resin Filled Silicon Rubber and Silica Due to Electrical Tracking <i>Abdul Syakur, Tumiran Tumiran, Hamzah Berahim, Rochmadi Rochmadi</i>
4	Blackout Risk Assessment for IEEE 30 BUS System <i>Muhammad Usman Cheema, Muhammad Usman Aslam, Adnan Bashir, Maria Komal, Naila Kousar Rao</i>
5	Involving Generator Capability Curves in Optimal Power Flow <i>Hermagasantos Zein, Yutra Sabri</i>
6	HoMeTrack: RFID-based Localization for Hospital Medicine Tracking System <i>Kurnianingsih Kurnianingsih, Muhammad Anif, Helmy Helmy, Anton Satria Prabuwono</i>
7	The Comparative Study of Buck-Boost, Cuk, Sepic and Zeta Converters for Maximum Power Point Tracking Photovoltaic Using P&O Method <i>Jimmy Trio Putra, Sarjiya Sarjiya, M. Isnaeni BS</i>
8	Harmonic Current Elimination in Industrial Power Systems <i>Deria Pravitasari, Deria Pravitasari, Eka Firmansyah, T. Haryono</i>

Parallel Session Day 2

Saturday, 17th October 2015

Room A (Hall, 5 th Floor)	
Parallel Session (08.00 – 10.30)	
1	Developing Agent Application Using Aspect Oriented Aglets Framework <i>Maman Somantri, Lukito Edi Nugroho, Widywan Widyawan, Ahmad Ashari</i>
2	Stroke Identification System on the Mobile Based CT Scan Image <i>Oky Dwi Nurhayati, Ike Pertiwi Windasari</i>
3	An Integrative Framework of COBIT and TOGAF for Designing IT Governance in Local Government <i>Iis Hamsir Ayu Wahab, Assaf Arief</i>
4	Popular Games, Can Any Concept of Cognitive Preschoolers Be in It? <i>Endah Sudarmilah, Adhi Susanto, Ridi Ferdiana, Neila Ramdhani</i>
5	Palmpoint Recognition System Based on Principle-lines Feature Using Euclidean Distance and Neural Network <i>R. Rizal Isnanto, Ajub Ajulian Z., Eko Didik Widiyanto</i>
6	Design of Management Information Systems Research, Publications and Community Service <i>Kodrat Iman Satoto, Kurniawan Teguh Martono, R. Rizal Isnanto, Rinta Kridalukmana</i>
7	The Role of Management Information System in Data Surveillance of Maternal and Child Health <i>Kurniawan Teguh Martono, Yudhi Dharmawan</i>
8	Generic Social Network Data Crawler Using Attributed Graph <i>Rinta Kridalukmana</i>
9	Simulation of Attendance Application on Campus Based on RFID (Radio Frequency Identification) <i>Dania Eridani, Eko Didik Widiyanto</i>
10	Expert System for Campus Environment Indexing in Wireless Sensor Network <i>Sumardi Sumardi, Oky Dwi Nurhayati, Muhammad Naufal Prasetyo, Eko Didik Widiyanto</i>

Room B (Hall, 5 th Floor)	
Parallel Session (08.00 – 10.30)	
1	Implementation of K-Best Method for MIMO Decoder in WLAN 802.11n <i>Wahyul Amien Syafei</i>
2	TMS: Traffic Management System in VANETs <i>Jetendra Joshi, Manash Jyoti Deka</i>
3	Air Flow Numerical Simulation on Rotor-Stator Surface of Flux Axial Permanent Magnet Generator <i>Prih Sumardjati Mulyaseputra, Sasongko Pramono Hadi, F. Danang Wijaya, Suharyanto Suharyanto</i>
4	Implementation of Photovoltaic and Simple Resonant Power Converter for High Frequency Discharge Application <i>Mochammad Facta, Hermawan Hermawan, Nngurah Ayu Ketut Umiati, Zainal Salam, Zolfakle Buntat</i>
5	Implementation of Detection Device Method on Seamless Proxy Mobile Internet Protocol Version 6 (SPMIPv6) <i>Wiwik Wiharti, Ihsan Lumasa Rimra, Rikki Vitria, Igor Novid</i>
6	Numerical Design of Dual Resonant Phased Array RF Coil for MRI 3T and 7T System <i>Basari Basari, Sri Yuliyanti, Eko Tjipto Rahardjo, Fitri Yuli Zulkifli</i>
7	Interconnection of Hydro Power Plant through 20 kV Distributed Line to Improve Electrical Power Supply in Dieng – Central Java <i>Mochammad Facta, Hermawan Hermawan</i>
8	A Comparative Analysis and Survey of Handoff for VoIP Applications in Mobile IPv6 Protocols <i>Wiwik Wiharti, Ihsan Lumasa Rimra, Efrizon Efrizon, Igor Novid</i>
9	Cooperative Fair Multichannel MAC Protocol for Cognitive Radio Ad Hoc Network <i>Aghus Sofwan, Salman A. AlQahtani</i>
10	The Depletion Influence on the Non-planar Vertical MOSFET Threshold Voltage <i>Munawar Agus Riyadi, Darjat Darjat, Teguh Prakoso, Jatmiko E. Suseno</i>

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Intensity Average Value of Image Segmentation for Infrared Image of Environmental Condition

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Abstract—In this paper, we make a report our research about intensity average value of image segmentation for infrared image of air pollution. Infrared image of environmental condition (captured sequentially every two hours, from 06:00—16:00) processed using wavelet transform. After that processed, used image segmentation to get intensity average value distribution from 0 till 255 to obtain trending graphic of pollution. Infrared image divided into 4, 8, and 16 segments. The result of this research is the increasing air pollution characterized at 12:00 and 16:00, by increasing intensity average value from 13%—27%. Finally intensity average value of image segmentation was made to estimate the environmental condition, especially air pollution, based on infrared image.

Keywords—environmental condition, wavelet transform, intensity average value, infrared image, air pollution

I. INTRODUCTION

The increasing air pollution characterized using wavelet decomposition by increasing index value from 0—3 and amount of white spots about 60% (from 5% become 65%). Wavelet decomposition could be used to monitoring environmental condition, especially air pollution. [1]. Therefore, the study about intensity average value of infrared images using wavelet transform could be used to get information about when most air pollution happen.

II. THE UNDERLYING THEORY

Worse air environment is estimated to be the causes of fatigue during the trip. Fatigue can lead to motorists and other road users could not control themselves. In turn, this may reduce alertness and threaten the safety of the trip. However, there is currently no practical tools to tell this condition. So far, the road superintendents (traffic police and CCTV cameras) are only able to tell the extent of traffic levels. In fact, the more denser and the longer traffic congestion, pollution levels in the jammed area also increased. This has implications for accelerated fatigue and concentration of motorists and other road users. CCTV cameras were installed

to monitor the level of traffic density and the infrared camera can be used utilized as a means of monitoring air pollution. The resulting infrared image is a picture of a record object or objects in an image is usually a picture. The term image is used to express the intensity of light in a two-dimensional function $f(x, y)$, where (x, y) coordinates of spatial states and the values of f at the point (x, y) expressed levels of brightness (gray level) image at that point [2].

A. Infrared image

Infrared image acquired from infrared photography, they have wavelength greater than 700 nm.

Investigation the characteristics of the light-absorbing filter visual and infrared light passed by the effect of variations in light intensity and SRS filter the results obtained [3]; [4] studied the physical phenomena on digital photography which in fact can be improved by using the image of near infrared (NIR), the result of a combination of NIR image with a grayscale image look more powerful than the original RGB image.

Have obtained infrared image histogram characteristics are captured using a modified digital camera [5]. Furthermore conducted a study and found that moving averages can be applied to spatial filtering towards the object to obtain thermal conditions [6]. Sulistiyanti, et. al. also found that slicing the histogram can be used to obtain information object temperature distribution thermal conditions [7]. Furthermore, by conducting research with Surface (2D) contour fittings obtained for the isothermal calorimetry catches consumer digital camera [8]. Article entitled characterization of Cutting Temperature and Ignition Phenomena of Magnesium Chip using Infrared Imaging [9] Indicated that infrared thermography could be used to determine the ignition point of magnesium chips cutting temperature.

B. Wavelet Transform

The wavelet transform is processing for images, used 2-D wavelet transform. The steps of 2-D wavelet transform could be illustration in the Fig. 1.

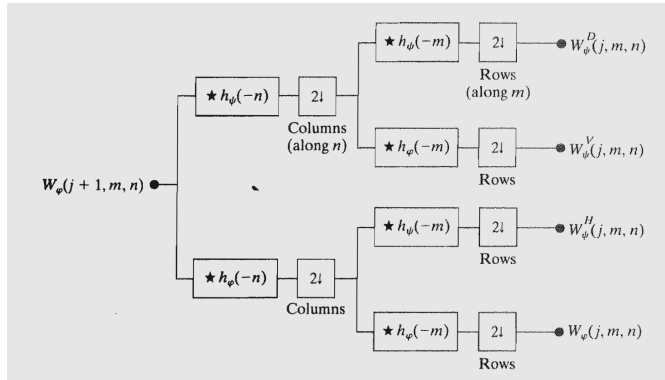


Fig. 1 The 2-D Fast Wavelet Transform, the analysis filter bank [10].

In [11], demonstrate the advantage of this algorithm over standard soft thresholding (implemented with the same wavelet representation) on images with artificial Gaussian noise. On infrared images of landmines from our data set, this simple technique offers a significant improvement. The background noise is strongly suppressed and the presence of the object of interest is enhanced. One should note that noise suppression is achieved here by a “severe” suppression of all the coefficients that are not located in the vicinity of the edges detected from the lowpass images. This is useful for images where a uniform-intensity object needs to be distinguished from a background, but this method is not as favorable in cases where fine image details need to be preserved.

III. MATERIALS AND METHODS

Infrared image acquired using digital camera with filter infrared SRS, obtained starting at 06.00 until 16.00, with a time interval of 2 hours. For infrared images of environmental condition processing, the RGB images converted into gray level images. Conversion to gray level meant to be seen how much noise of the object. After that, the images have been registered, and the next step is processing using wavelet transformation.

After wavelet processing, the images divided into 4, 8, and 16 segments using image segmentation. Intensity average value could be determined and then compare each other.

IV. RESULTS OF THE RESEARCH

Fig. 2 shows the result of wavelet processing with 4 segments. In Fig. 2, increasingly air pollution depends on the

time. In the morning (06:00—08:00) qualitatively resulting images seen ‘dark’, these mean environmental condition relatively clear, but from 10:00—16:00 seen increasing ‘white spots’, these mean dirty air in other words increasing pollution air. It could be show in Fig. 2. Fig. 3 also show the result of image segmentation processing (8 segments), they captured every two hours from 06:00 till 16:00.

Seen in Fig. 4, increasingly air pollution depends on the time. In the morning (06:00—08:00) qualitatively resulting images seen ‘dark’, these mean environmental condition relatively clear, but from 10:00—16:00 seen increasing ‘white spots’, these mean dirty air in other words increasing pollution air.

The result of this research shows that wavelet transform could be used to see environmental condition but enhanced with image segmentation.

The value of intensity average could be seen in Table 1. Increasing average value really show at 12:00 and 16:00, this is due to activity people. At 12:00, many people have lunch break, and at 16:00, many people have a home from work.

Fig. 5 shows trending of the graph of each image segmentations. From that figure could be show that image segmentation processing cold be used to monitoring environmental condition as evidence by similarity trending curve that show in Table 1 and Fig. 5.

Table 1 Intensity Average Value of Each Segment

Clock	Intensity Average Value		
	4 segments	8 segments	16 segments
06.00	0.00	0.00	0.00
08.00	11.23	12.30	11.75
10.00	39.46	36.32	40.48
12.00	50.18	44.91	45.61
14.00	41.07	37.15	36.09
16.00	46.38	38.82	40.79

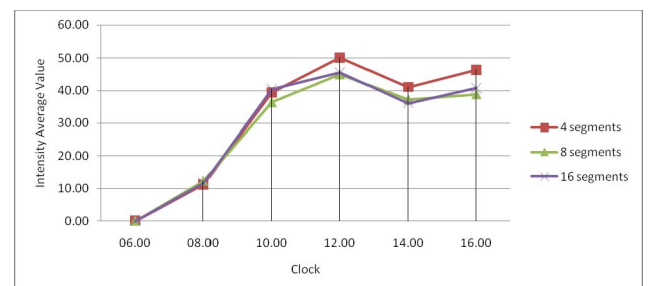


Fig. 5 Graph of Intensity Average Value

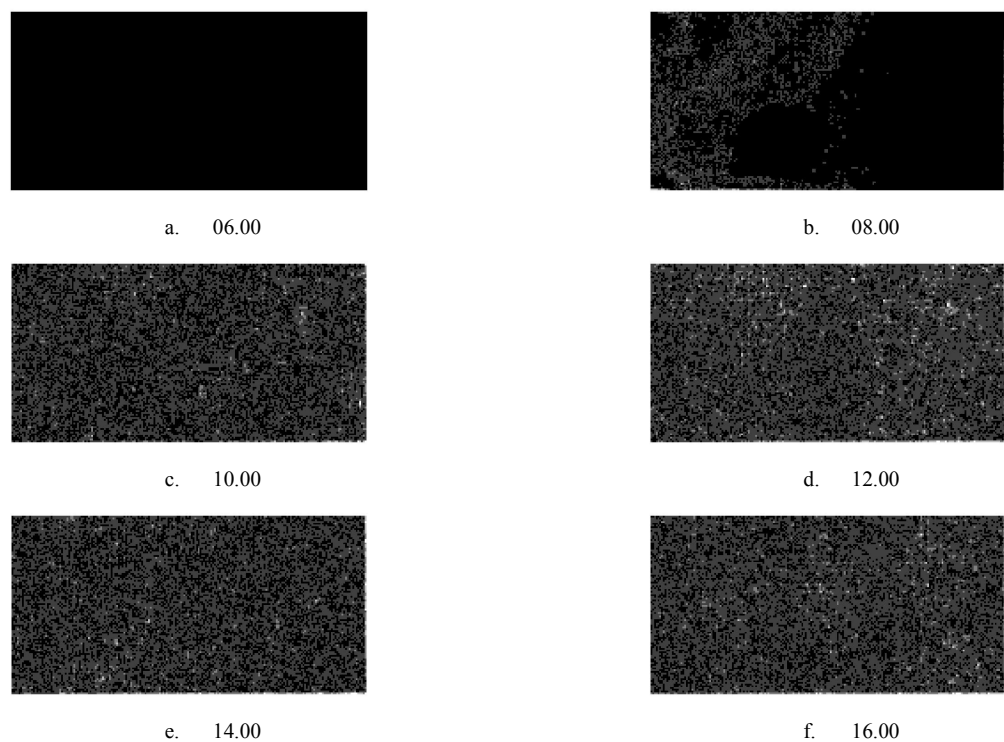


Fig. 2 Wavelet transform 4 segments of infrared environmental condition images

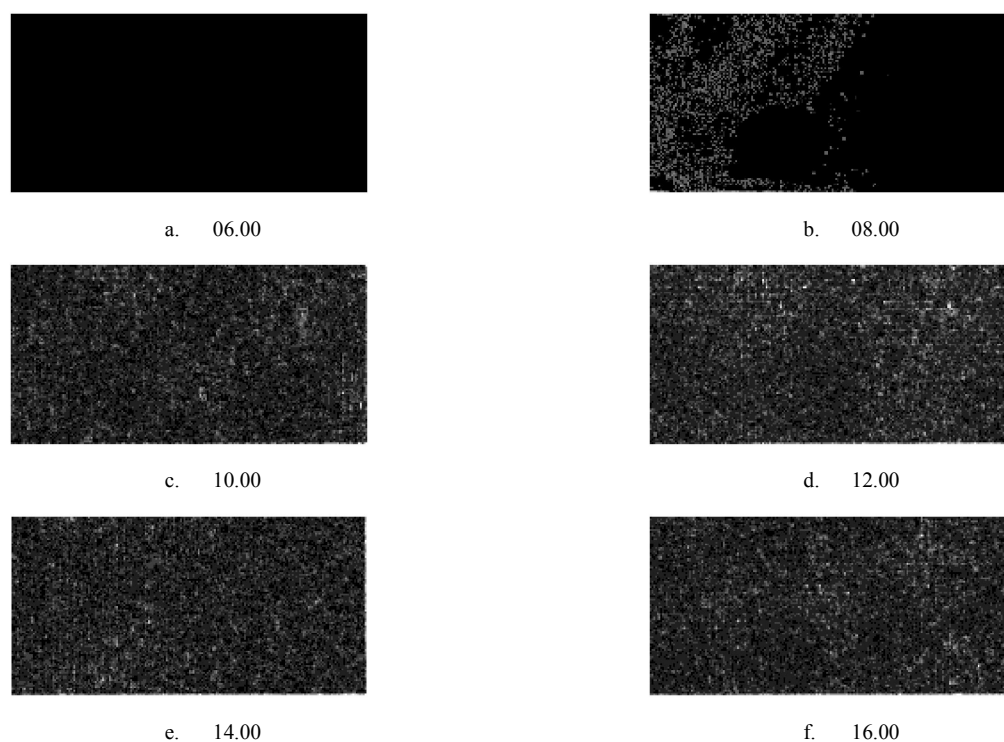


Fig. 3 Wavelet transform 8 segments of infrared environmental condition images

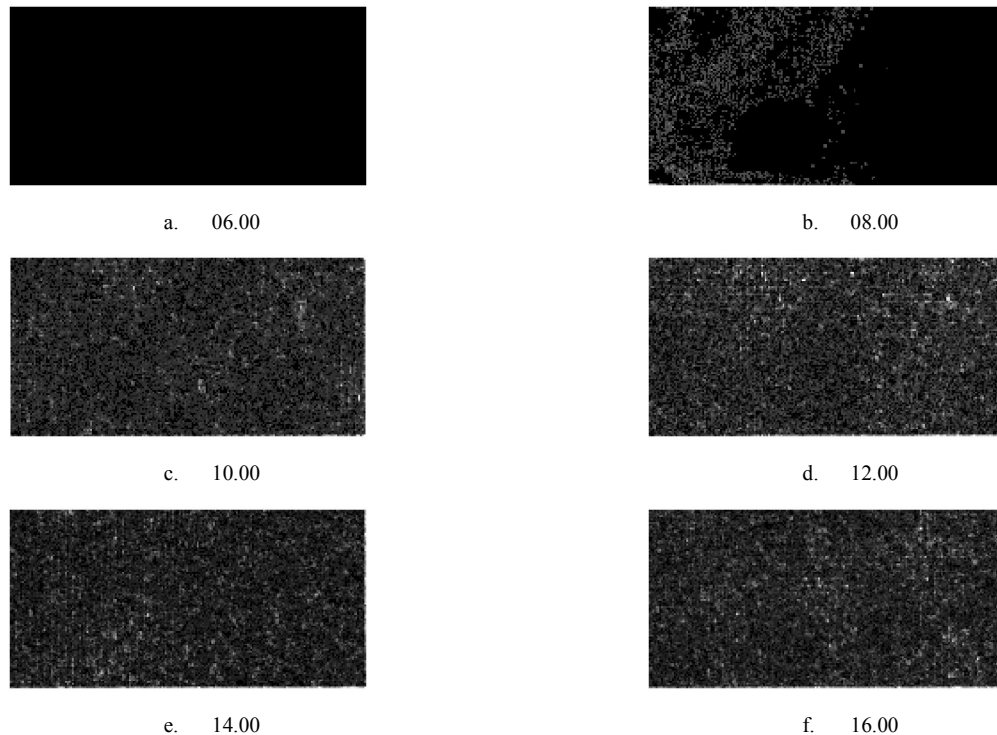


Fig. 4 Wavelet transform 16 segments of infrared environmental condition images

V. CONCLUSIONS AND SUGGESTION

A. Conclusions

- The increasing air pollution characterized using image segmentation by increasing intensity average value from 13%—27%.
- Wavelet could be used to monitoring environmental condition, especially air pollution.

B. Suggestion

This research could be continuing with further research to monitoring air pollution.

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References

- [1] S.R. Sulistiyanti, M. Komarudin, L. Hakim, A.Yudamson, "Study of Environmental Condition Using Wavelet Decomposition Based on Infrared Image", Proc. ICITACEE 2014, Semarang, Indonesia, 8—9 November 2014.
- [2] Marvin Ch.Wijaya & Agus Prijono, "Digital Image Processing using Matlab", Informatika, Jakarta, 2007.
- [3] S.R. Sulistiyanti, "Characteristic Filter Absorber Based on Influence Intensity Sun Variety", Proceeding Seminar Hasil Penelitian dan Pengabdian Masyarakat Universitas Lampung, 2007.
- [4] C. Fredembach, S. Stsstrunk, "Colouring the Near-infrared". In Proceedings of the IS&T/SID 16th Color Imaging Conference, pages 176-182. November 10-15. Portland, USA. 2008.
- [5] S.R. Sulistiyanti, A. Susanto, FX. A. Setyawan, "Histogram Characterizations of Infrared Images Captured by a Modified Digital Camera", International Journal of Electronic Engineering Research (IJEER), Research India Publications (RIP), Vol. 1, No. 4, ISSN 0975 – 6450, pp. 329-336, 2009.
- [6] S.R. Sulistiyanti, A. Susanto, T.S. Widodo, G.B. Suparta, 2010, "Noise Filtering on Thermal Images Acquired by Modified Ordinary Digital Camera", Proceeding International Conference on Electronics and Information Technology (ICEIE), Kyoto, Japan, , 1-3 August 2010.
- [7] S.R. Sulistiyanti, A. Susanto, T. S. Widodo, G. B. Suparta, "Histogram Slicing to Better Reveal Special Thermal Objects", Proceeding Int. Conference on Signal and Image Processing (ICSIP), World Academy of Science, Engineering, and Technology (WASET), 25-27 August, 2010, Singapore.
- [8] S.R. Sulistiyanti, A. Susanto, T.S. Widodo, G.B. Suparta, 2011, "Surface (2D) Fitting to Exhibit the Inaccessible Isotherms Contours of Thermograms Acquired by a Consumer Digital Camera", International Journal of Computer Science and Technology (IJCTST), Vol. 2 Issue 1, ISSN:0976-8491 (online), and ISSN: 2229-4333 (Print), 2011.
- [9] S.R. Sulistiyanti, Y. Burhanudin, S. Harun, "Characterization of Cutting Temperature and Ignition Phenomena of Magnesium Chip using Infrared Imaging", Advanced Materials Research, © (2012) Trans Tech

Publications, Switzerland doi:10.4028/www.scientific.net/AMR. Vols. 588-589, pp. 1744, 2012.

[10] Gonzalez, R.C., Richard E. Woods, "Digital Image Processing", Prentice-Hall, Inc., Upper Saddle River, New Jersey, 2008.

[11] A. Pizurica, W. Philips, I. Lemahieu and M. Acheroy, "Image denoising using a multiscale nonlinear filtering technique," in *Proc. Internat. Symp. on Intelligent Vision Systems ACIVS*, pp. 9–13, Baden-Baden, Germany, 5-6 Aug 1999.