2ND ANNUAL 2015

ICESTI

INTERNATIONAL CONFERENCE ON ELECTRICAL SYSTEMS, TECHNOLOGY AND INFORMATION

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September 9-12, 2015

Patra Jasa Bali Resort and Villas, Kuta,
Bali – Indonesia

ICESTI 2015 is the flagship
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Chairman Foreword

It is our great pleasure to welcome you to the 2nd*International Conference on Electrical Systems, Technology and Information (ICESTI2015)*.This year,the topics of *ICESTI2015* provide a forum for accessing to the most up-to-date and authoritative knowledge from both industrial and academic worlds, sharing best practice in the field of Electrical Engineering, Technology and Information towards their sustainable development. The conference covers shape topics,compare to the first one, such as Technology Innovation in Information Technology, Internet of Things, Artificial Intelligence, Power System, Renewable Energy, Mechatronics, Automation, Control, Robotics and many applications related to IT and Electrical Engineering.

This conference has 144 full paper submission from many countries (Germany, Russia, UK, Korea, Italy, Turkey, Malaysia and Indonesia) and 73 of them (50.6 %) are selected to be presented. All selected and presented high quality paper, after conference will be submitted for publication in Lecture Notes in Electrical Engineering (LNEE) - Springer (ISSN: 1876-1100, EI-Compendex and Scopus indexed). In addition, the best paperawards (2 papers with prize money are selected from 70 papers) will be announced on our Conference Dinner.

We really hope that all authors and participants will find this program interesting and thought-provoking and that the conference will provide audiences with a valuable opportunity to share ideas with other researchers and practitioners from institutions around the world.

For closing, I want to thank you to our keynote and invited speakers i.e.: Prof. Mauridhi Hery Purnomo (Sepuluh Nopember Institute of Technology, Surabaya, Indonesia), Prof. Rolly Intan (Petra Christian University, Surabaya, Indonesia) and Assoc. Prof. Giovanni Berselli (University of Genoa, Italy) and Prof. Abraham Lomi (Institute of National Technology Malang, Indonesia). We also thank you Prof. Ajith Abraham eventhough he could not come to this conference because of the health issue.

In addition, we really thankfulfor the contribution and spending valuable time in the review process of our Advisory Boards, Committee Members and Reviewers. Also I really appreciate to our collaboration partners (Petra Christian University, Surabaya; Gunadarma University, Jakarta; UBAYA, Surabaya, University of Ciputra, Surabaya, Institute of National Technology, Malang and LNEE Springer, Germany), our Supported Institution (Oulu University, Finland, Widya Mandala Catholic University, Surabaya and Dongseo University, Korea) and our Sponsors (Continuing Education Centre, Petra Christian University, Surabaya and Patrajasa Resort Hotel, Bali).

Finally, do enjoy the ICESTI conference as well as the sights of Bali, the island of paradise.

On behalf of the Chairs of ICESTI 2015,

Felix Pasila, Ph.D
Chairman ICESTI 2015

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Keynote Speaker 1

Assoc. Prof. Giovanni Berselli
University of Genoa, Italy

Giovanni Berselli received the Master degree (magna cum laude) in Mechanical Engineering from the University of Modena and Reggio Emilia, and the Ph.D. degree from the University of Bologna in 2004 and 2009, respectively. He is now a faculty member in Design Methods and Tools for Industrial Engineering at the University of Genoa, where he teaches the courses Design of Automatic Machines and Computer Aided Design for the 1st and 2nd level Degrees in Mechanical/Robotic Engineering, and Marine/Nautical Engineering. He was previously Research Associate with the Escuela Superior de Ingenieros de la Universidad de Navarra, San Sebastian, Spain (2006), and with Monash University, Melbourne, Australia(2003-2004).

G. Berselli's scientific activity is focused on the development of engineering methods and tools for the conceptual and functional design, the modeling and optimization, and the experimental evaluation of integrated mechanical/mechatronic systems. Specific examples are:

- Virtual Prototyping of Multi-physic Systems with application to sustainable robotics and green automation.
- Integrated Design of Compliant Transducers and Sensory-Motor Technologies for safe and effective human-machine and environment-machine interaction.

Dr. Berselli has authored more than 90 publications in peer-reviewed international scientific journals, conferences and books. Editor of one international book, member of the editorial board of the International Journal of Advanced Robotic Systems, recipient of the IEEE I-RAS 2012 Young Author Best Paper Award, invited speaker in ten international research institution or universities. He is member of several Technical Committes (TC), including the IEEE TC on Sustainable Production Automation, the ASME TC on Modelling, Dynamics and Control of Adaptive Systems, and the Italian National Association of Machine Design (ADM). He is Session Orgnaizer for the ASME SMASIS Conference since 2011 and member of the Doctoral School Committee in Mechanical, Energy and Management Engineering (IMEG) at the University of Genoa.

Dr. Berselli is (or has been) involved in several European projects (EU-grants), projects of relevant national interest, and conventions with pubblic or private companies (e.g. Work Package Leader for the EU project AREUS - Automation and Robotics for EUropean Sustainabile manufacturing, www.areus-project.eu/, and Task Leader for the national project ADAPTIVE - National Technology Cluster "Intelligent Factory").

Towards an Integrated Digital Platform for the Eco-Efficient Design of Robotized Plants

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Abstract

Factories of the future will have to be smart and green:
- SMART: the fierce competition within modern globalised markets requires high performance, reconfigurable, and flexible factories based on robotic technologies,
- GREEN: it is necessary to reduce the factory ecological footprint, by achieving a more efficient use of the available energy resources.

Industrial Robots (IRs) may be envisaged as a key technology to keep the manufacturing industry at the leading edge. Unfortunately, based on the current state-of-the-art, these mechatronic devices are extremely flexible but intrinsically energy intensive, thus compromising the overall system sustainability.

Within this scenario, the objective of the present talk is to critically discuss, on the basis of our experience, novel virtual prototyping methods for the eco-efficient design and the "smart" planning of IR-based production lines. In particular, several industrial case studies will be discussed, in order to practically demonstrate that considerable energy savings can be achieved without either new hardware investments or negative constraints on the production rate. In particular, the following specific examples will be discussed in detail:

Eco-Design of multi-robot assembly lines for the automotive industry. Novel software tools and virtual prototyping technologies will be presented, with the aim of assessing the energy consumption of robotized plants since the early design stages. In parallel, a series of practical methods for reducing the overall energy consumption will be evaluated, such as: a) implementation of energy-optimal, collision-free, robot trajectories; b) energy-optimization via optimal robot placement.

Eco-Programming of Servo-actuated Mechanisms (SM) for automatic machineries. At first, an integrated digital platform for assessing the SM energy flow will be presented. Then, a dedicated software tool for deriving energy-optimal SM trajectories will be critically discussed.

Keywords: Virtual Prototyping, Eco-Design, Industrial Robotics

Keynote Speaker 2

Prof. Mauridhi Hery Purnomo
Sepuluh Nopember Institute of Technology, Indonesia

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Education:
S1 : ITS – Surabaya, 1985, Ir., Power System
S2 : U. Osaka City – Japan, 1995, M.Eng., Electrical Eng
S3 : U. Osaka City – Japan, 1998, Ph.D., Electrical Eng

Academic functional record:
- Assistant (1986-1993).
- Lecturer (1994-2000).
- Associate Professor (2001-2003)
- Professor (2003-now)

Academic management record:
- Student affair Chief of EEPIS-ITS (1988-1990)
- Graduate Program of Electrical Engineering Secretary (1999-2003).
- Graduate Program of Electrical Engineering Chief (2003-2007)
- Vice Director Academic Affair of Graduate Program of ITS (2007-2011)
- Chief of Instrumentation, Measurement and Power System Identification Laboratory of ITS (2008-now)

National Board record (Ministry of Education):
- Higher Education Accreditation Agency assessor (2000-now)
- Research Directorate of Higher Education Reviewer (2003-now)
- HRD Directorate of Higher Education Reviewer (2007-2012)
- Indonesian Scholarship Reviewer under Ministry of Finance (2012-now)

International Professional Membership:
- Member of the Institute Electrical Electronic Engineer (IEEE) since 1993.
- Member of International Neural Network Society (INNS) since 1993, seniormember since 2007.
- Member of the International Association of Science and Technology forDevelopment (IASTED) since 2002.

Computational Intelligence based Regulation of the DC bus in the On Grid Photovoltaic System

Mauridhi Hery Purnomo
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Institut Teknologi Sepuluh Nopember Surabaya

Abstract

Bidirectional DC/AC converter control system based on vector control method for regulating the DC bus in the On-grid photovoltaic system is presented. In this control sheme, the main role of the DC/AC converter is to control the power flow between the DC bus and the electrical grid. To avoid the difficulty for tuning controller parameter and in addition to enhance transient performance of the DC bus voltage response that caused by abrupt changes of the local dc load that directly connected to DC bus system, in this works, the DC/AC converter is controlled by utilizing a kind of the computational intelligence method that is radial basis function neural networks. By using a fix simple proportional gain control topology, the proposed controller can fastly damp overshoot and undershoot of the dc bus voltage that caused by sudden connection and disconection of the local dc load so the overvoltage condition of the dc link capacitor in this case could be avoided. The simulation results show the effectiveness of the proposed control system.

Keywords: bidirectional DC/AC converter, vector control, computational intelligence, radial basis function neural networks

Keynote Speaker 3

Prof. Rolly Intan
Petra Christian University, Indonesia

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Expertise Area	: Soft Computing
Academic Title/Status	: Guru Besar
Title	: Doctor of Engineering (Dr.Eng.)
School Name	: Meiji University, Japan
Major	: Computer Science
Specialization	: Soft Computing
Final Works	: Rough Sets, Fuzzy Sets and Granular Computing in Constructing Intelligent Information System
Research Interest	: intelligent information system, fuzzy set, rough set and fuzzy measure theory.

Since human being is not an omniscient and omnipotent being, we are actually living in an uncertain world. Uncertainty was involved and connected to every aspect of human life as a quotation from Albert Einstein said: ``So far as the laws of mathematics refer to reality, they are not certain. And so far as they are certain, they do not refer to reality."

The most fundamental aspect of this connection is obviously shown in human communication. Naturally, human communication is built on the perception-based information {In psychology, perception is understood as a process of translating sensory stimulation into an organized experience.} Perceptions play a central role in human cognition. Perception-based information is a generalization of measurement-based information. Perceptions are intrinsic aspect in uncertainty-based information. In this case, information may be incomplete, imprecise, fragmentary, not fully reliable, vague, contradictory, or deficient in some other way. Generally, these various information deficiencies may express different types of uncertainty. It is necessary to construct a computer-based information system called ``intelligent information system" that can process uncertainty-based information. In the future, computers are expected to be able to make communication with human in the level of perception.

Many theories ware proposed to express and process the types of uncertainty such as probability, possibility, fuzzy sets, rough sets, chaos theory and so on. Therefore, my interest research is to extend and generalize existing theory of rough set, fuzzy sets and granular computing for the purpose of constructing intelligent information system.

A Concept of Multi Rough Sets defined on Multi-Contextual Information Systems

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Department of Informatics Engineering
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Abstract

Rough set theory, introduced by Pawlak in 1982[12], is an important concept in constructing many applications of Data Mining and Knowledge Discovery. Rough set as a gen-eralization of crisp set, deals with crisp granularity of objects by providing an alternative to for-mulate a given crisp set with imprecise boundaries. In rough set theory, a given crisp set of object is approximated into two different subsets derived from a crisp partition defined on the universal set of objects. The universal set of objects is characterized by a non-empty finite set of attributes, called data table or information system. The information system is formally represent-ed by a pair (U, A) in which U is a universal set of objects and A is a finite set of attributes. In the real application, depending on the context, a given object may have different values of at-tributes. Thus, a given set of objects might be approximated based on multi-context of attributes, called multi-contextual information systems. Here, n context of attributes will provide n partitions. Clearly, a given set of object, X⊆U, may then be represented by n pairs of lower and upper approximations. The n pairs of lower and upper approximations are denoted as multi rough sets of X as already proposed in [5,6]. This paper extends the concept of multi rough sets by providing more properties and examining more set operations.

Keywords: rough sets, multi rough sets, granular computing, multi-context of attributes.

Invited Speaker 1

Virtual Prototyping of a Compliant Spindle for Robotic Deburring

Giovanni Berselli[1,*], Marcello Pellicciari[2], Gabriele Bigi[2], Angelo O. Andrisano[2]
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2 University of Modena and Reggio Emilia, Via Vignolese 905/B, 41125 Modena, Italy
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Abstract

At the current state-of-the-art, Robotic Deburring (RD) has been successfully adopted in many industrial applications, but it still needs improvements in terms of final quality. In fact, the effectiveness of a RD process is highly influenced by the limited accuracy of the robot motions and by the unpredictable variety of burr size/shape. Tool compliance partially solves the problem, although dedicated engineering design tools are strictly needed in order to identify those optimized parameters and RD strategies that allow achieving the best end-product quality and cost-effectiveness. In this context, the present paper proposes a CAD-based Virtual Prototype (VP) of a pneumatic compliant spindle, suitable to assess the process efficiency in different case scenarios. The proposed VP is created by integrating a 3D multi-body model of the spindle mechanical structure with the behavioural model of the process forces, as adapted from previous literature. Numerical simulations are provided, concerning the prediction of both cutting forces and surface finishing accuracy.

Keywords:CAD-based tools, Compliant Spindle, Robotic Deburring, Virtual Prototyping.

Invited Speaker 2

Computational Intelligence Based Regulation of the DC Bus in the On-Grid Photovoltaic System

Mauridhi Hery Purnomo[1],*, Iwan Setiawan[1,2], Ardyono Priyadi[1]
1 Institut Teknologi Sepuluh Nopember, Surabaya
2 Universitas Diponegoro, Semarang
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Abstract

This paper presents a bidirectional DC/AC converter control system based on the vector control method for regulating the DC bus in On-grid photovoltaic systems. In this control scheme, the main task of the DC/AC converter is to control the power flow between the DC bus and the electrical grid. To avoid conventional controller parameter tuning problems and in addition to enhance transient performances of the DC bus voltage response that caused by abrupt changes of local DC loads that directly connected to DC bus system, in this work, the DC/AC converter control system is designed by utilizing radial basis function neural networks, that is a kind of the computational intelligence method. By combining with simple proportional control, the overshoot and undershoot of the dc bus voltage that caused by sudden connections and disconnections of local DC loads can be damped more quickly and better than the standard optimal PI control system, so the overvoltage condition of the DC bus capacitor could be avoided. The effectiveness of the proposed control system is proved by simulation results.

Keywords: bidirectional DC/AC converter, computational intelligence, radial basis function neural networks, vector control

Invited Speaker 3

The Role of Renewable Energy: Sumba Iconic Island, An Implementation of 100 Percent Renewable Energy by 2020

Abraham Lomi
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Abstract

Sumba Iconic Island is a pilot project program initiated for the development of the island of Sumba as the iconic island of renewable energy with the aim to improve access to energy through the development and utilization of new renewable energy resources with the target realization of 100% of energy supply coming from renewable energy resources by 2020. The initiative of Sumba Iconic Island on Renewable Energy has been started since 2010 by the Ministry of Energy and Mineral Resources, together with Bappenas and Hivos, a non-Governmental International organization. In November 2012, ADB also joined to accelerate the realization of this initiative. In 2013, the Norwegian Embassy in Indonesia has also taken a role in supporting the implementation of initiatives of Sumba Iconic Island. Selection of Sumba as an iconic island is based on studies showed that the potential of renewable energy in Sumba very large. The potential can be used as one of the main tools to drive the economic community in Sumba Island. Since it was initiated in 2011, the implementation of renewable energy in Sumba Island in the framework of Sumba Iconic Island Program has reached an installed capacity of about 5.87 MW which consist of Micro-hydro power plant, solar power plant, Solar Water Pumping, Wind turbine generator, Biomass, Biogas, and Energy efficient furnaces.

Keywords: Hivos, Off-grid, Renewable energy, Rural areas, Sumba iconic island, Urban area.

General Program

Day 1: 9 September 2015	Time (UTC + 8)	Place
Registration: conference kit collection, tour registration, presentation file submission	12.00 – 18.00	Conference venue
End of Day 1		
Day 2: 10 September 2015	**Time (UTC + 8)**	**Place**
Late registration: conference kit collection, tour registration, presentation file submission	08.00 – 09.00	Conference venue
Opening ceremony	09.00 – 09.30	Ballroom
Keynote Speech 1	09.30 – 10.30	Ballroom
Coffee Break 1	10.30 – 10.45	Ballroom
Keynote Speech 2	10.45 – 11.45	Ballroom
Photo session	11.45 – 12.00	Ballroom
Lunch break	12.00 – 13.00	Teratai Coffee shop
Parallel session 1	13.00 – 14.30	Room 1, 2
Coffee Break 2	14.30 – 14.45	
Parallel session 2	14.45 – 16.15	Room 1, 2
End of Day 2		
Day 3: 11 September 2015	**Time (UTC + 8)**	**Place**
Parallel session 3	08.30 – 10.30	Room 1, 2
Coffee Break 1	10.30 – 10.45	
Keynote Speech 3	10.45 – 11.45	Ballroom
Lunch break	11.45 – 13.00	Teratai Coffee shop
Parallel session 4	13.00 – 15.00	Room 1, 2
Coffee Break 2	15.00 – 15.15	
Parallel session 5	15.15 – 17.15	Room 1, 2
Conference Dinner Preparation	17.15 – 18.30	
Conference Gala dinner (best papers award)	18.30 – 21.00	Teratai Coffee shop
End of Day 3		
Day 4: 12 September 2015	**Time (UTC + 8)**	**Place**
Social event: Half day tour	08.00 – 14.00	**TBA**
End of Day 4		

Paralel Session

Technology Innovation in Information Technology

SESSION : **1**
DATE : **10 SEPTEMBER 2015**
TIME : **13.00 - 15.00 WITA (UTC + 8)**
ROOM : **1**

Session
Chair : **Hartono Pranjoto**

Time	ID	Title	Author(s)
13.00 - 13.20	67	Enhancing University Library Services with Mobile Library Information System	Singgih Anggana, Stephanus Eko Wahyudi
13.20 - 13.40	59	Measuring the Usage Level of the IE Tools in SMEs Using Malcolm Baldrige Scoring System	I Nyoman Sutapa, Togas W. S. Panjaitan, Jani Rahardjo
13.40 - 14.00	73	Multi-Objective Using NSGA-2 For Enhancing The Consistency Matrix On AHP	Abba Suganda Girsang, Jarot Suroso
14.00 - 14.20	30	Network Traffic and Security Event Collecting System	Hee-Seung Son, Jin-Heung Lee, Tae-Yong Kim, Sang-Gon Lee
14.20 - 14.40	12	Innovative Tester for Underwater Locator Beacon Used in Flight/Voyage Recorder (Black Box)	Hartono Pranjoto, Sutoyo
14.40 - 15.00	76	Surakarta Cultural Heritage Management Based on Geographic Information Systems	Viny Christanti Mawardi

SESSION : **2**

DATE : **10 SEPTEMBER 2015**

TIME : **15.15 - 17.15 WITA (UTC + 8)**

ROOM : **1**

Session Chair : **Siana Halim**

Time	ID	Title	Author(s)
15.15 - 15.35	62	Indonesian Dynamic Sign Language Recognition At Complex Background With 2D Convolutional Neural Networks	Nehemia Sugianto, Elizabeth Irenne Yuwono
15.35 - 15.55	20	Digital Natives: Its Characteristics and Challenge to the Library Service Quality	Siana Halim, Felecia, Inggrid, Dian Wulandari, Demmy Kasih
15.55 - 16.15	28	Games and Multimedia Implementation on Heroic Battle of Surabaya an Android Based Mobile Device Application	Andreas Handojo, Resmana, Justinus Andjarwirawan, Sandy Sunaryo
16.15 - 16.35	47	Security Handwritten Documents by Using Inner Product	Syaifudin, Dian Pratiwi
16.35 - 16.55	80	Securing Client-Server Application Design For Information System Inventory	Ibnu Gunawan, Djoni Haryadi Setiabudi, Agustinus Noertjahyana, Yongky Hermawan
16.55 - 17.15	34	Study on the PSI Service Model for Science & Technology Domain in Korea	Yong Ho Lee

SESSION : **3**

DATE : **11 SEPTEMBER 2015**

TIME : **08.30 - 10.30 WITA (UTC + 8)**

ROOM : **1**

Session Chair : Trianggoro Wiradinata

Time	ID	Title	Author(s)
08.30 - 08.50	25	Web-Based Design of the Regional Health Service System in Bogor Regency	B. Sundari, Revida Iriana, Bertilia Lina Kusrina
08.50 - 09.10	60	Factors Affecting Edmodo Adoption as Online Learning Medium	Iwa Sungkono Herlambangkoro, Trianggoro Wiradinata
09.10 - 09.30	71	Query Rewriting and Corpus of Semantic Similarity as Encryption Method for Documents in Indonesian Language	Detty Purnamasari, Rini Arianty, Diana Tri Susetianingtias, Reni Diah Kusumawati
09.30 - 09.50	61	A Leukocyte Detection System using Scale Invariant Feature Transform Method	Lina, Agus Budi Dharmawan
09.50 - 10.10	53	Cyber Security for Website of Technology Policy Laboratory	Jarot S. Suroso
10.10 - 10-30	33	Vision-based Human Position Estimation and Following Using an Unmanned Hexarotor Helicopter	JungHyun Lee, Taeseok Jin

SESSION : **4**

DATE : **11 SEPTEMBER 2015**

TIME : **13.00 - 15.00 WITA (UTC + 8)**

ROOM : **1**

Session Chair : **Sulistyo Puspitodjati**

Time	ID	Title	Author(s)
13.00 - 13.20	69	Enumeration and Generation Aspects of Tribonacci Strings	Maukar, Asep Juarna, Djati Kerami
13.20 - 13.40	31	An Object Recognition in Video Image Using Computer Vision	Sang-gu Kim, Seung-hoon Kang, JoungGyu Lee, HoonJae Lee
13.40 - 14.00	75	Gray Code of Generating Tree of Permutation n with m Cycles	Sulistyo Puspitodjati, Henny Widowati, Crispina Pardede
14.00 - 14.20	54	TAM-MOA Hybrid Model to Analyze the Acceptance of Smartphone for Pediatricians in Teaching Hospital in Indonesia	Oktri Mohammad Firdaus, Nanan Sekarwana, T.M.A. Ari Samadhi, Chai Kah Hin
14.20 - 14.40	63	Principal Feature Selection Impact For Internet Traffic Classification Using Naïve Bayes	Adi Suryaputra Paramita
14.40 - 15.00	91	Streamlining Business Process: a Case Study of Optimizing a Business Process to Issue a Letter of Assignment for a Lecturer in the University of Surabaya	Jimmy

SESSION   :   5

DATE   :   11 SEPTEMBER 2015

TIME   :   15.15 - 17.15 WITA (UTC + 8)

ROOM   :   1

Session Chair   :   Djoni Haryadi Setiabudi

Time	ID	Title	Author(s)
15.15 - 15.35	84	Clustering And Principal Feature Selection Impact For Internet Traffic Classification Using K-NN	Trianggoro Wiradinata, Adi Suryaputra
15.35 - 15.55	70	Multi Level Filtering Undesirable Explicit Material in Website	Mohammad Iqbal, Hifshan Riesvicky, Hasma Rasjid
15.55 - 16.15	26	Direction and Semantic Features for Handwritten Balinese Character Recognition System	Luh Putu Ayu Prapitasari, Komang Budiarta
16.15 - 16.35	44	Android and iOS Hybrid Applications for Surabaya Public Transportation Information	Djoni Haryadi Setiabudi, Lady Joanne Tjahyana
16.35 - 16.55	49	Augmented Reality Technique for Climate Change Mitigation	Ruswandi Tahrir
16.55 - 17.15	94	Tracing Related Scientific Papers by a Given Seed Paper using Parscit, Google Scholar & Mendeley API	Resmana Lim, Indra Ruslan, Hansin Susatya, Adi Wibowo, Andreas Handojo

Technology Innovation in Electrical and Electronics

SESSION : **1**
DATE : **10 SEPTEMBER 2015**
TIME : **13.00 - 15.00 WITA (UTC + 8)**
ROOM : **2**

Session Chair : **Giovanni Berselli**

Time	ID	Title	Author(s)
13.00 - 13.20	56	Virtual Prototyping of a Compliant Spindle for Robotic Deburring	Giovanni Berselli, Marcello Pellicciari, Gabriele Bigi, Angelo O. Andrisano
13.20 - 13.40	21	Relevant Features for Classification of Digital Mammogram Images	Erna Alimudin, Hanung Adi Nugroho, Teguh Bharata Adji
13.40 - 14.00	66	Performance Comparison of Intelligent Control of Maximum Power Point Tracking in Photovoltaic System	Daniel Martomanggolo Wonohadidjojo
14.00 - 14.20	32	Adaptive Bilateral Filter for Infrared Small Target Enhancement	Tae Wuk Bae, Hwi Gang Kim
14.20 - 14.40	27	Situation Awareness Assessment Mechanism for a Telepresence Robot	Petrus Santoso, Handry Khoswanto
14.40 - 15.00	7	Monitoring System Design for River Height Level Using Android-Based Wireless Sensor Network as an Flood Early Warning	Riny Sulistyowati, Hari Agus Sujono, Ahmad Khamdi Musthofa

SESSION : **2**
DATE : **10 SEPTEMBER 2015**
TIME : **15.15 - 17.15 WITA (UTC + 8)**
ROOM : **2**

Session Chair : **Yudan Whulanza**

Time	ID	Title	Author(s)
15.15 - 15.35	98	Coordinate Modelling via Artificial Intelligence of the Discrete Hexapod Manipulator	Felix Pasila, Roche Alimin
15.35 - 15.55	65	Electromechanical Characterization of Bucky Gel Actuator Based on Polymer Composite PCL-PU-CNT for Artificial Muscle	Yudan Whulanza, Andika Praditya Hadiputra, Felix Pasila, Sugeng Supriadi
15.55 - 16.15	14	Vehicle Security and Management System on GPS Assisted Vehicle Using Geofence and Google Map	Lanny Agustine, Egber Pangaliela, Hartono Pranjoto
16.15 - 16.35	92	Sizing and Costs Implications of Long-Term Electricity Planning: a Case of Kupang City, Indonesia	Daniel Rohi, Yusak Tanoto
16.35 - 16.55	8	Prototype Design of Realtime Monitoring System Over Fuel Tank at the Gas Station Using Android-Based Mobile Applications	Riny Sulityowati, Bayu Bhahtra Kurnia Rafik
16.55 - 17.15	29	Performance Evaluation of Welded Knitted E-Fabrics for Electrical Resistance Heating	Senem Kursun Bahadir, Ozgur Atalay, Fatma Kalaoglu, Savvas Vassiliadis, Stelios Potirakis

SESSION : **3**
DATE : **11 SEPTEMBER 2015**
TIME : **08.30 - 10.30 WITA (UTC + 8)**
ROOM : **2**

Session Chair : **Abraham Lomi**

Time	ID	Title	Author(s)
08.30 - 08.50	78	The Role of Renewable Energy: Sumba Iconic Island, An Implementation of 100 Percent Renewable Energy by 2020	Abraham Lomi
08.50 - 09.10	23	Comparative Study on Mammogram Image Enhancement Methods According to Determinant of Radiography Image Quality	Erna Alimudin, Hanung Adi Nugroho, Teguh Bharata Adji
09.10 - 09.30	43	Security and Stability Improvement of Power System due to Interconnection of DG to the Grid	Ni Putu Agustini, Lauhil Mahfudz H., Taufik Hidayat, I Made Wartana
09.30 - 09.50	72	Design of Fetal Heartbeat Detector	Nur Sultan Salahuddin, Sri Poernomo Sari, Paulus A Jambormias, Johan Harlan
09.50 - 10.10	55	Development of The Remote Instrumentation Systems Based on Embedded Web to Support Remote Laboratory	F. Yudi Limpraptono, Irmalia Suryani Faradisa
10.10 - 10-30	89	The Influence of Depth of Cut, Feed Rate, and Step-Over on Surface Roughness of Polycarbonate Material in Subtractive Rapid Prototyping	The Jaya Suteja

SESSION : **4**
DATE : **11 SEPTEMBER 2015**
TIME : **13.00 - 15.00 WITA (UTC + 8)**
ROOM : **2**

Session Chair : **Hendi Wicaksono**

Time	ID	Title	Author(s)
13.00 - 13.20	50	Design Arrhythmia Detection Device Based Fingertip Pulse Sensor	Wahyu Kusuma R, Al Aziz Abbie R, Purnawarman Musa
13.20 - 13.40	45	Solar Simulator Using Halogen Lamp for PV Research	Aryuanto Soetedjo, Yusuf Ismail Nakhoda, Abraham Lomi, Teguh Adi Suryanto
13.40 - 14.00	74	The Diameter of Enhanced Extended Fibonacci Cube Interconnection Networks	Ernastuti, Mufid Nilmada, Ravi Salim
14.00 - 14.20	58	Artificial Bee Colony Algorithm for Optimal Power Flow on Transient Stability Java-Bali 500 KV	Irrine Budi Sulistiawati, M Ibrahim Ashari
14.20 - 14.40	90	A Reliable, Low-Cost, and Low-Power Base Platform for Energy Management System	Henry Hermawan, Edward Osnawi, Albert Darmaliputra
14.40 - 15.00	87	Altitude Lock Capability Benchmarking : Type 2 Fuzzy, Type 1 Fuzzy, and Fuzzy PID with Extreme Altitude Change as a Disturbance	Hendi Wicaksono, Yohanes Gunawan, Cornelius Kristanto, Leonardie Haryanto

SESSION : **5**
DATE : **11 SEPTEMBER 2015**
TIME : **15.15 - 17.15 WITA (UTC + 8)**
ROOM : **2**

Session
Chair : **Nemuel Daniel Pah**

Time	ID	Title	Author(s)
15.15 - 15.35	51	Analysis of Fundamental Frequency and Formant Frequency for Speaker 'Makhraj' Pronunciation with DTW Method	Muhammad Subali, Miftah Andriansyah, Christanto Sinambela
15.35 - 15.55	48	IP Base Module for Building Automation System	Joseph Dedy Irawan, Sonny Prasetio, Suryo Adi Wibowo
15.55 - 16.15	88	Image Based Distance Identification by Segment Correlation	Nemuel Daniel Pah
16.15 - 16.35	64	Design and Fabrication "Ha ( )" Shape-Slot Microstrip Antenna for WLAN 2.4 GHz	Sotyohadi, Sholeh Hadi Pramono, Moechammad Sarosa
16.35 - 16.55	13	2D CFD Model of Blunt NACA 0018 at High Reynolds Number for Improving Vertical Axis Turbine Performance	Nu Rhahida Arini, Stephen R. Turnock, Mingyi Tan
16.55 - 17.15	57	Influence of CTAB and Sonication on Nickel Hydroxide Nanoparticles Synthesis by Electrolysis at High Voltage	Yanatra Budipramana, Suprapto, Taslim Ersam, Fredy Kurniawan

Paralel Session

Technology Innovation

SESSION : **3**
DATE : **11 SEPTEMBER 2015**
TIME : **08.30 - 10.30 WITA (UTC + 8)**
ROOM : **3**

Session Chair : **Hanny H. Tumbelaka**

Time	ID	Title	Author(s)
08.30 - 08.50	85	Mobile Application Development as a Tool to Support Low Voltage Electrical Switchboard Design	Julius Sentosa S., Kevin Budihargono
08.50 - 09.10	36	A Single-Phase Twin-Buck Inverter	Hanny H. Tumbelaka
09.10 - 09.30	97	Adaptive Cars Headlamps System with Image Processing and Lighting Angle Control	Resmana Lim, William Tandy Prasetyo, Petrus Santoso
09.30 - 09.50	16	Waste Industrial Processing of Boron-Treated by Plasma Arc to Produce the Melt and Fiber Materials	S.L. Buyantuev, Ning Guiling, A.S. Kondratenko, Junwei Ye, E.T. Bazarsadaev, A.B. Khmelev, Shuhong Guo
09.50 - 10.10	96	Robot Arm Control Prototipe Using Depth Sensor Camera	Petrus Santoso
10.10 - 10-30	17	Investigation of the Electric Discharge Machining on the Stability of Coal-Water Slurries	S.L. Buyantuev, A.B. Khmelev, A.S. Kondratenko, F.P. Baldynova,

SESSION : **4**
DATE : **11 SEPTEMBER 2015**
TIME : **13.00 - 15.00 WITA (UTC + 8)**
ROOM : **3**

Session
Chair : **Handry Khoswanto**

Time	ID	Title	Author(s)
13.00 - 13.20	15	Recycling of the Ash Waste by an Electric Plasma Treatment to Produce Fibrous Materials	S.L. Buyantuev, A.S. Kondratenko, E.T. Bazarsadaev, A.B. Khmelev
13.20 - 13.40	93	Energy Decomposition Model Using Takagi-Sugeno Neuro Fuzzy	Yusak Tanoto, Felix Pasila
13.40 - 14.00	18	Changes in the Rheological Properties and the Selection of a Mathematical Model of the Behavior of Coal-Water Slurry During Transport and Storage	S.L. Buyantuev, A.B. Khmelev, A.S. Kondratenko
14.00 - 14.20	95	Odometry Algorithm with Obstacle Avoidance on Mobile Robot Navigation	Handry Khoswanto, Petrus Santoso, Resmana Lim
14.20 - 14.40	68	Computational Intelligence based Regulation of the DC bus in the On Grid Photovoltaic System	Mauridhi Hery Purnomo

SESSION **:** **5**
DATE **:** **11 SEPTEMBER 2015**
TIME **:** **15.15 - 17.15 WITA (UTC + 8)**
ROOM **:** **3**

Session
Chair **:** **Hestiasari Rante**

Time	ID	Title	Author(s)
15.15 - 15.35	82	Optimization of AI Tactic in Action RPG Game	Kristo Radion Purba
15.35 - 15.55	24	Paper Prototyping for BatiKids - a Technique to Examine Children's Interaction and Feedback in Designing a Game-Based Learning	Hestiasari Rante, Heidi Schelhowe, Michael Lund
15.55 - 16.15	81	Adventure Folklore Game	Kartika Gunadi, Liliana , Harvey Tjahjono

Digital Natives: Its Characteristics and Challenge to the Library Service Quality

Siana Halim[1,*], Felecia[1],Inggrid[2], Dian Wulandari[3], and **Demmy Kasih[1]**

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Abstract. Digital natives which always connect to the world through their gadgets have special needs for gathering information. Do libraries which in the past can be said as the sources of information can satisfy their needs? What should libraries do, so that they can answer those needs? Those queries are the prominent questions to be answered in this paper. In this paper we describe the digital natives' characteristics when they use their PC and gadgets. The data were collected from 460 university students in Surabaya. We also measure the library service quality (LibQual) for five university libraries in Surabaya. Moreover, using K-means, we also clustered the respondents into two groups, i.e, the first group is the ones who attach to their gadgets, and the second group is the ones who do not attach to their gadgets. For the first groupthe library online information and for the second group, the operational service are the most important factors for measuring the LibQual.

1. Introduction

Digital native or net generation is a generation which was born after 1994. Marc Prensky[1] defines the digital native as the young generation that "native" in the language of computers, videos, videos games, social media and other sites on the internet. The digital natives have their own ways to gain the information. They connected to the world through their gadgets. Oblinger and Oblinger[2] states that the digital natives are digital literate, connected, immediate, experiential, prolific communicators (social), work in a team, their preference is for structure rather than ambiguity, oriented toward making observations, visual and kinesthetic, take part in the community activities. Digital natives are nontraditional learners [2].

Library as a collection of sources of information, archives and databases faces a new challenging to be existed in the digital era. The Digital natives recognize that library is very important, but internet promises ease and fast access. Search engine overcomes library in term of reliability, cost effectiveness, easiness to use, comfort and speed (de Rosa *et al.* [3])

Lippincot [4] reported that by the end of the year 2005, the University of Southern California's Library has been visited for more than 1.4 million visitors. From 2009 to 2012, the physical visitors of the Petra Christian University (PCU) library were decreasing. In 2009 the rate of the visitor is 431 persons per day but in 2012 it becomes 384 persons per day (Wulandari [5]). In this recent year, the physical visitors of PCU library is increasing but the number of borrowed books is decreasing. Widjaja and Halim [6] reported that the easiness to access the web gives positive effects to the PCU students to visit the library, but the PCU library collections do not give positive effect for the students to visit the library.However, the digital PCU library is accessed for more than 6.7 million visitors per year (Wulandari [7]). This fact shows that library is still important for students, but it has to be developed to satisfy the digital natives' needs.

2. Methods

Answering the query which is explained in the introduction, we adapt the Library Service Quality (LibsQual [8]) for the digital natives' nature. There are six factors that measure the LibsQual, i.e., personal control, information access, library as place, affect of service (personal), affect of service (organizational) and interest to visit library (see Figure 1). For each factors, there are several indicators for measuring them. To simplify the indicators for each factors, we applied the factor analysis technique (Sharma [9]) before measuring the LibQual models using structural equation modeling (Hair *et al.* [10]).

This model is applied to two groups of respondents, i.e, digital natives who attach to their gadgets and who do not attach to their gadgets. Those two groups were obtained via clustering analysis method, i.e., k-means (Sharma [9]). We then applied the results of those groups to get the characteristics of each group.

Data

The data were collected from 460 university students which studies in five universities in Surabaya. Those five universities are InstitutTekonologiSepuluhNopember Surabaya (ITS), Universitas Pembangunan Nasional-Veteran (UPN), Universitas Kristen Petra (UKP), Universitas Surabaya (UBAYA), UniversitasWidya Mandala (UWM).

The respondents for each universities are 92 (20%) from ITS, 48 (10.4%) from UPN, 186 (40.4%) from UKP, 87 (18.9%) from UBAYA, 47 (10.3%) from UWM. The proportion of respondents from each university is depend on the size of the library. ITS and UPN are state universities, while UKP, UBAYA dan UWM are private universities.
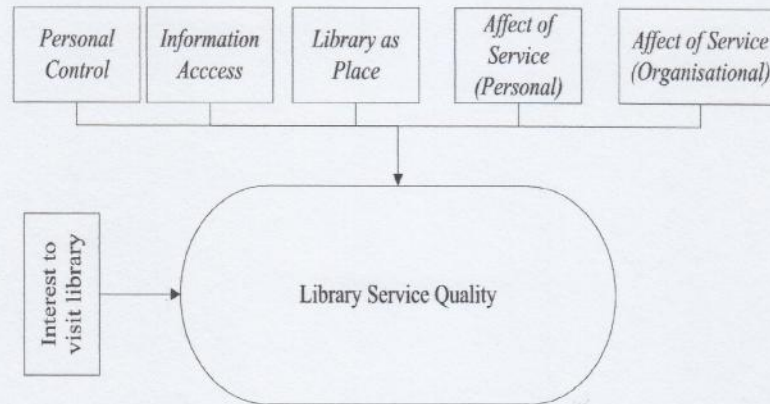
Figure 1. Library service quality model

3. Results

3.1 The digital native characteristics

Most of the respondents are listening to music (24%), searching information using web (23%), playing games (13%) and writing documents (13%) as their most frequent activities when the use their PC (see Figure 2). Similarly, they use their gadgets frequently are for instant messaging or chatting (13%), emailing (11%), phone (10%), searching information using internet (10%), sending photos or videos (10%) see Figure 3 for the detail.

Applying the k-means with 2 classes, i.e, digital natives who attach to their gadgets (Cluster 1) and who do not attach to their gadgets (Cluster 2), the Table 1 shows the average of their several activities using their gadgets. It can be clearly seen that those two clusters is very distinct in the ability to use some apps. Digital natives which attach to their gadgets are the one who are powerful in using the apps in their gadgets. The apps here are including instant messaging/chatting (e.g. BBM, WhatsApp, Line, etc), downloading music, uploading foto/videos (Instagram, path), Blogging, Social Media, Phone, Writing diary, searching information through internet access, emailing, saving ebooks/e-resources.

There are several variables used in this research for measuring the library service quality. There are eight variables for measuring the personal control, eleven for information access, and twelve for library as place, fourteen for personal affect of service, twelve for organizational affect of service and four for the external factors. Those original variables are then simplified using factor analysis to form a new ones. The new and the original variables are summarized in Table 2. Using the new variables, we then constructed the model.
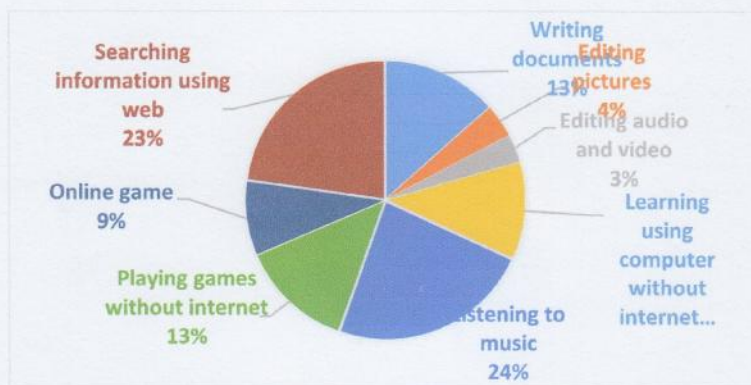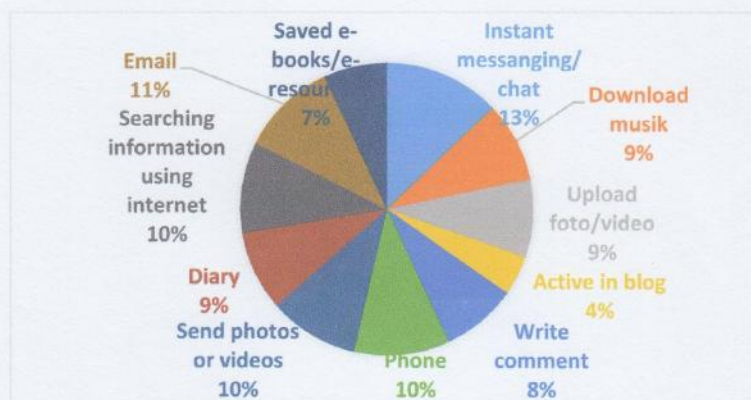
Figure 2. The frequency of using computer

Figure 3. The frequency of using gadget

Figure 4 and Figure 5 show the result of SEM model for the digital native who attach and who do not attach to their gadgets consecutively. For both clusters the external factor do not contribute to the LibQuality. The external factors measures four factors, i.e., the willingness to visit the library deliberately, library has special interest to be visited, library escalates the academics competency, I go to the library without planning in advanced. This means that even the library itself has good quality in term of others measurement (personal control, information access, aspect of personal, aspect of organizational and library as a place) but without the external factors of the visitors, i.e., the library customer, the library will be empty.

Table 1. The average of several activities using gadgets for Cluster1 and Cluster2

Clus-ter	Read-ing ebooks	Buy-ing books	Download-ing ebooks	Amount of Gadgets on hand	Fre-quency of us-ing Gadg-ets	Abil-ity to use gadg-ets	Num-ber of Social Media	Fre-quency of using some apps	Abil-ity to use some apps
1	1,81	0,78	1,36	5,20	2,55	3,60	1,95	6,20	8,82
2	1,48	0,57	0,87	4,86	2,03	1,52	1,64	5,60	1,55

Table 2. The new and the original variables used for the model

Factor	New variabel	The original variables
Personal Control	PCNEW1: Website and online catalog	PC1, PC2, PC3, PC4, PC5
	PCNEW2:Library online information	PC6, PC7, PC8
Information Access	IANEW1:Online and non-online col-lection	IA1, IA2, IA3, IA4, IA5, IA6, IA9, IA10, IA11
	IANEW2: Variabel informasi Per-pustakaan	IA7, IA8
Library as Place	LPNEW: Library as place	LP1 - LP12
Affect of Service (Per-sonal)	ASPNEW1:The library's staff skill	ASP4, ASP5, ASP6, ASP7, ASP8, ASP9, ASP10, ASP11, ASP12, ASP13
	ASPNEW2:Hospitality	ASP1, ASP2, ASP3, ASP14
Affect of Service (Organi-sational)	ASONEW1:Operational service	ASO1, ASO2, ASO3, ASO5, ASO6, ASO8, ASO9, ASO10
	ASONEW2:Library programs	ASO4, ASO7, ASO11, ASO12
External factors	MBNEW1	MB1, MB2, MB3, MB4

For the digital native who attach to their gadgets (Cluster 1), the information access is the most important factors in the library quality. Additionally the library online information (PCNEW2) are the most influencing indicator for personal control. The PCNEW2 includes the easiness to access the library collection, the library collections suitable with my needs, the availability of online resources that can meet my needs. For the digital native who do not attach to their gadget (Cluster 2), oper-ational service are the most important factors and the ASONEW1 is the most influ-encing indicator for them. The ASONEW1 includes the appropriateness and the punctuality in giving service. For both model the goodness of fit of the model is acceptable (see Table 3)
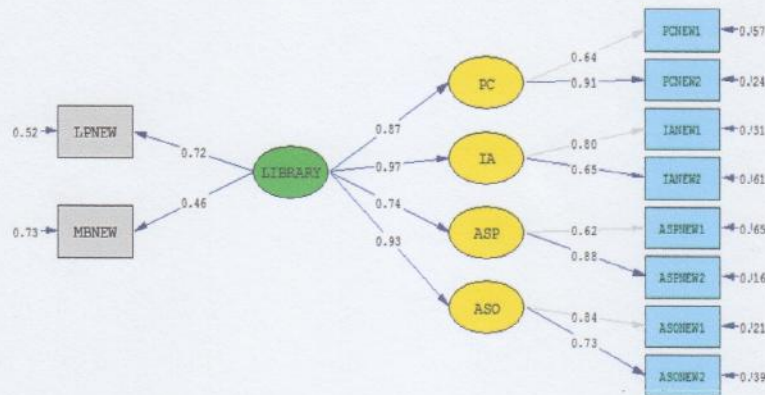
Figure 4. The SEM for the Digital Native who attach to their gadgets (Cluster 1)
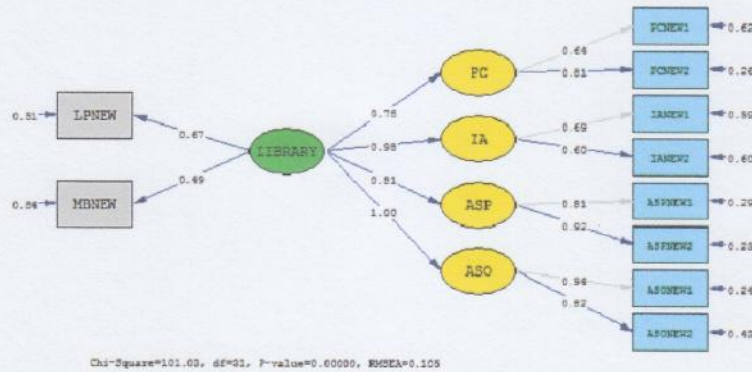

Chi-Square=101.03, df=31, P-value=0.00000, RMSEA=0.105

Figure 5. The SEM for the Digital Native who do not attach to their gadgets (Cluster 2)

Table 3. The goodness of fit test

Model	Goodness of Fit	Result	Cut off	explanation
Digital native who attach to their gadgets	GFI	0,89	≥ 0,9	acceptable
	AGFI	0,80	≥ 0,9	acceptable
Digital native who do not attach to their gadgets	GFI	0,91	≥ 0,9	acceptable
	AGFI	0,84	≥ 0,9	acceptable

4. Conclusion

In this research the characteristics of the digital natives especially in their habit in using pc and gadgets has been explored. There are two types of digital natives, the ones who attach to their gadgets (Cluster 1) and who do not attach to their gadgets (Cluster 2). For the Group1 the library online information and for the Group2, the operational service is the most important factors for measuring the LibQuality. The library has to be innovated such that the external factors that affect the willingness the customers to visit the library will be increased.

Acknowledgements

5. Reference citations

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