



**IEEE**  
The Indonesia Section  
Computer Society Chapter



# CITSM 2018

The 6<sup>th</sup> International Conference on Information of Technology

**CYBER AND IT SERVICE MANAGEMENT**



**INNA PARAPAT (Lake Toba)**

August 7, 2018 - August 9, 2018

## CONFERENCE PROGRAM

Organized By :



Partners & Co-Organizers :



# **2018 6th International Conference on Cyber and IT Service Management**

Convention Hall, Inna Parapat Hotel

August 7-9, 2018



ISBN : 978-1-5386-5433-0

IEEE Catalog Number : CFP1837Z-PRT

# 2018 6th International Conference On Cyber And IT Service Management (CITSM)

Convention Hall, Inna Parapat Hotel

Phone: (0625) 41012

Email : [contact.citsm@uinjkt.ac.id](mailto:contact.citsm@uinjkt.ac.id)

Website : <http://citsm.id/>

August 7-9, 2018

ISBN : 978-1-5386-5433-0

IEEE Catalog Number : CFP1837Z-PRT

# 2018 6th International Conference On Cyber And IT Service Management (CITSM)

Copyright ©2018 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved.

## **Copyright and Reprint Permission**

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint, or reproduction requests should be addressed to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

**ISBN : 978-1-5386-5433-0**

**IEEE Catalog Number : CFP1837Z-PRT**

Additional copies of this publication are available from

Curran Associates, Inc.

57 Morehouse Lane

Red Hook, NY 12571 USA

+1 845 758 0400

+1 845 758 2633 (FAX)

email: [curran@proceedings.com](mailto:curran@proceedings.com)

## PREFACE

Assalaamu 'alaykum warahmatullahi wabarakaatuh,

The CITSM 2018 is in the general area of communication and information technology. It provides a forum for presenting and discussing the latest innovations, results and developments in IT Management & organizations, IT Applications, Cyber & IT Security, and ICT. The main objective of this conference is to provide a forum for engineers, academia, scientist, industry, and researchers to present the result of their research activities in the field of Computer and Information Technology. The primary focus of the conference is to create an effective medium for institutions and industries to share ideas, innovations, and problem solving techniques.

There are 282 papers submission and only 150 papers are accepted and 147 papers have been registered and presented. Accepted papers will be presented in one of the regular sessions and will be published in the conference proceedings volume. All accepted papers are submitted to IEEEExplore. IEEE Conference Number: # 43622. Catalog Number: CFP1837Z-PRT, ISBN: 978-1-5386-5433-0, CFP1837Z-USB, ISBN: 978-1-5386-5434-7.

On behalf of the CITSM organizers, we wish to extend our warm welcome and would like to thank for the all Keynote Speakers, Reviewers, authors, and Committees, for their effort, guidance, contribution and valuable support. Last but not least, thanks to all lecturers and staffs of the Faculty of Science & Technology, Syarif Hidayatullah Jakarta State Islamic University and Universitas Potensi Utama-Medan and other parties that directly and indirectly make this event successful.

Wa billahi taufiq wal hidaayah.

Wallahul muwaffiq ila aqwamit-tharieq.

Wasalaamu 'alaykumu warahmatullahi wabarakaatuh.

Husni Teja Sukmana  
(Organizing Chair)

## **COMMITTEES**

### **HONORARY CHAIRS**

Lukman Hakim Saefuddin, Religious Affairs Minister of the Republic of Indonesia  
Rudi Antara, ICT Minister of the Republic of Indonesia  
Dede Rosyada, Rector of State Islamic University of Syarif Hidayatullah Jakarta  
Bob Subhan Riza, Potensi Utama University

### **STEERING COMMITTEE**

Rika Rosnelly, Potensi Utama University, Indonesia  
Agus Salim, State Islamic University of Syarif Hidayatullah Jakarta, Indonesia  
Ismail Khalil, Johannes Kepler University, Austria  
Tri Haryanto, IT Best Practice, Indonesia  
Djoko Soetarno, Coris, Indonesia  
Agus Setiawan, Multimatics, Indonesia  
Abdul Wahab Abdul Rahman, International Islamic University Malaysia, Malaysia  
Sri Hartati, IndoCEISS, Indonesia Computer Electronic and Instrumentation Support Society  
Suryadiputra Liawatimena, IEEE Indonesian Section Computer Society Chapter, Bina Nusantara University  
Nur Inayah, State Islamic University of Syarif Hidayatullah Jakarta, Indonesia  
Syopiansyah Jaya Putra, State Islamic University of Syarif Hidayatullah Jakarta, Indonesia  
Rosiyati Mh Thamrin, STMIK Sepuluh Nopember Jayapura, Indonesia

### **ORGANIZING COMMITTEE**

#### **General Chair**

Husni Teja Sukmana (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)

#### **Local Organizing Committee Chair**

Edy Victor Haryanto (Potensi Utama University)

#### **Publication**

Yusuf Durachman (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)

#### **Publicity**

Yuditha Ichsani (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Asep Taufik Muharram (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Andi Sanjaya (Potensi Utama University)  
Hardianto (Potensi Utama University)

#### **Committee Members**

Feri Fahrianto (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Nurul Faizah Rozy (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Siti Umami Masruroh (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Dewi Khairani (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)

Fitri Mintarsih (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Arini (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Nia Kumaladewi (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)  
Rofiqoh Dewi (Potensi Utama University)  
Charles Bronson (Potensi Utama University)  
Linda Wahyuni (Potensi Utama University)  
Asbon Hendra (Potensi Utama University)  
Iwan Fitrianto (Potensi Utama University)  
Muhammad Rusdi Tanjung (Potensi Utama University)  
Lili Tanti (Potensi Utama University)  
Evri Ekadiansyah (Potensi Utama University)  
Soeheri (Potensi Utama University)  
Haris (Potensi Utama University)

## **TECHNICAL PROGRAM COMMITTEE**

### **Chair**

Ismail Khalil (Johannes Kepler University, Austria)  
M Qomarul Huda (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)

### **Track Chair:**

A'ang Subiyakto (State Islamic University of Syarif Hidayatullah Jakarta, Indonesia)

### **Technical Program Committee**

Kuncoro Wastuwibowo, IEEE Indonesian Section  
Shingo Mabu, Yamaguchi University  
Normaziah Abdul Aziz, International Islamic University, Malaysia  
Akram M. Zeki, International Islamic University, Malaysia  
Abdullah Alkalbani, University of Buraimi, Sultanate of Oman  
Suvdaa Batsuuri Affiliati, School of Engineering and Applied Sciences, National University of Mongolia  
Suryadiputra Liawatimena, IEEE Indonesian Section Computer Society Chapter, Bina Nusantara University  
Dwiza Riana, STMIK Nusa Mandiri, Indonesia  
M Qomarul Huda, State Islamic University of Syarif Hidayatullah Jakarta, Indonesia  
Muhammad Izman Herdiansyah, Bina Darma University, Palembang, Indonesia  
Iwan Setyawan, Kristen Satya Wacana University, Indonesia  
Abdul Syukur, Dian Nuswantoro University, Indonesia  
Heru Agus Santoso, Dian Nuswantoro University, Indonesia  
Affandy, Dian Nuswantoro University, Indonesia  
Andrew Tanny Liem, Klabat University, Indonesia  
Muhammad Rusli, The School of Information Management and Computer Engineering (STIKOM) Bali, Indonesia  
I Gde Putu Wirarama Wedashwara Wirawan, The School of Information Management and Computer Engineering (STIKOM) Bali, Indonesia  
Yudi Agusta, The School of Information Management and Computer Engineering (STIKOM) Bali, Indonesia



Taqwa Hariguna, The College of Information Management and Computer Science (AMIKOM) Purwokerto, Indonesia  
 M. Suyanto, The College of Information Management and Computer Science (AMIKOM) Yogyakarta, Indonesia  
 Ema Utami, The College of Information Management and Computer Science (AMIKOM) Yogyakarta, Indonesia  
 Adam Suhaimi, International Islamic University Malaysia  
 Nurhayati, Syarif Hidayatullah State Islamic University Jakarta, Indonesia  
 Amin Anjomshoaa, Vienna University of Technology, Austria  
 Andrzej Gospodarowicz, Wroclaw University of Economics, Poland  
 Ankhaa Bayar, National University of Mongolia  
 Ashraf Elnagar, University of Sharjah  
 Alimuddin, Tirtayasa University, Indonesia  
 Abdelkader Hameurlain, Institut de Recherche en Informatique de Toulouse Paul Sabatier University  
 Aries Susanto HT, State Islamic University of Syarif Hidayatullah Jakarta, Indonesia  
 Bernardo Nugroho Yahya, Ulsan National Institute of Science and Technology, Korea  
 Christian Huemer, Vienna University of Technology, Austria  
 Dieter Kranzlmüller, Ludwig-Maximilians-Universität München, Germany  
 Dimitris Karagiannis, University of Vienna, Austria  
 Duong Anh Duc, University of Information Technology, Vietnam  
 Elly Matul Imah, Sepuluh Nopember Institute of Technology, Indonesia  
 Fauzan Nurdin, International Islamic University Malaysia  
 Fadi Aloul, American University of Sharjah  
 Adel Ali Al-Jumaily, University of Technology Sydney  
 Lintang Yuniar Banowosari, Gunadarma University, Indonesia  
 Asad I Khan, Monash University  
 Bessam Abdulrazak, Université de Sherbrooke  
 Ferry Preska Wathan, Universitas Kader Bangsa, Indonesia  
 Ford Lumban Gaol, Bina Nusantara University, Indonesia  
 Geert Poels, Ghent University, Belgium  
 Imam Shofi, Syarif Hidayatullah State Islamic University Jakarta, Indonesia  
 Gerald Quirchmayr, University of Vienna, Austria  
 Gerhard Budin, University of Vienna, Austria  
 Gerti Kappel, Vienna University of Technology, Austria  
 Günter Müller, University of Freiburg, Germany  
 Günther Pernul, University of Regensburg, Germany  
 Hadipurnawan Satria, Sriwijaya University, Indonesia  
 Hamideh Afsarmanesh, University of Amsterdam, Netherlands  
 Hoang Xuan Dau, Posts and Telecommunications Institute of Technology, Vietnam  
 Husnayati Hussin, International Islamic University Malaysia  
 Hyerim Bae, Pusan National University, Korea  
 Harisno, Bina Nusantara University, Indonesia  
 Irman Hermadi, Bogor Agricultural Institute, Indonesia  
 Indra Budi, University of Indonesia, Indonesia  
 Kudang Boro Seminar, Bogor Agricultural Institute, Indonesia  
 Marimin, Bogor Agricultural Institute, Indonesia  
 Jarot Sembodo, Bina Nusantara University, Indonesia  
 Jaafar Gaber, Universite de Technologie de Belfort-Montbéliard  
 Josaphat Tetuko Sri Sumantyo, Chiba University, Japan



Jamshid B Mohasefi, Urmia University  
 Pavel Lozhnikov, Omsk State Technical University Rusia  
 Josef Küng, Johannes Kepler Universität Linz, Austria  
 Katsumi Tanaka, Kyoto University, Japan  
 Key Sun Choi, Korea Advanced Institute of Science and Technology, Korea  
 Khalid Latif, National University of Sciences and Technolgy, Pakistan  
 Kamel Karoui, RIADI Laboratory  
 Lenka Lhotska, Czech Technical University, Czech Republic  
 Luis M. Camarinha Matos, Universidade Nova de Lisboa, Portugal  
 Masatoshi Arikawa, University of Tokyo, Japan  
 Mansoor Ahmed, COMSATS Institute of Information Technology  
 Media Anugerah Ayu, Universitas Siswa Bangsa Internasional, Indonesia  
 Mizuho Iwaihara, Faculty of Science and Engineering Waseda University, Japan  
 Mohamed Alkanhal, King Abdulaziz City for Science and Technology  
 Mohd Farhan Md Fudzee, Universiti Tun Hussein Onn  
 Imam Machdi, Institute of Statistics  
 Narayanan Kulathuramaiyer, Universiti Malaysia Sarawak, Malaysia  
 Nashrul Hakim, State Islamic University of Syarif Hidayatullah Jakarta, Indonesia  
 Nguyen Thah Binh, IIASA, Austria  
 Nguyen Tuan, Vietnam National University, Vietnam  
 Oky Dwi Nurhayati, Diponegoro University, Indonesia  
 Prihandoko, Gunadarma University, Indonesia  
 R. Rizal Isnanto, Diponegoro University, Indonesia  
 Rizal Broer Bahawares, IEEE Computer Society Member  
 Robert P. Biuk-Aghai, University of Macau, China  
 Ahmad Nurul Fajar, Bina Nusantara University, Indonesia  
 Roslina, International Islamic University Malaysia, Malaysia  
 Sfenrianto, Bina Nusantara University, Indonesia  
 Shuaib Karim, Quaid-i-Azam University, Pakistan  
 Somchai Chatvichienchai, University of Nagasaki, Japan  
 Sourav S. Bhowmick, Nanyang Technological University, Singapore  
 Sukrisno. Mardiyanto, Institiute Technology of Bandung, Indonesia  
 Tarek Sheltami, King Fahd University of Petroleum and Minerals,  
 Tetsuya Furukawa, University of Kyushu, Japan  
 Thoai Nam, HCMC University of Technology, Vietnam  
 Taufik, Bina Nusantara University, Indonesia  
 Vladimir Marik, Czech Technical University, Czech Republic  
 Werner Winiwarter, University of Vienna, Austria  
 Wichian Chutimaskul, King Mongkut's University of Technology Thonburi, Thailand  
 Wikan Danar Sunindyo, Bandung Institute of Technology, Indonesia  
 Zainal A Hasibuan, University of Indonesia, Indonesia  
 Zaheer Khan, University of the West of England  
 Okfalisa, Syarif Kasim State Islamic University Riau, Indonesia  
 Elly Matul Imah, The State University of Surabaya, Indonesia  
 Lee Jeong Bae, Busan University of Foreign Studies, South Korea  
 Bae Jihye, SunMoon University, South Korea  
 KyungOh Lee, SunMoon University, South Korea  
 Kwon Jin Bae, SunMoon University, South Korea  
 Febiansyah Hidayat, Surya University, Indonesia  
 Adila A Krisnadhi, Wright State University, United State of Amerika

Muhammad Agni Catur, Sampoerna University, Indonesia  
Aries Kusdaryono, Ministry of Communication and Informatics, Indonesia  
Samsuryadi Sahmin, Sriwijaya University, Indonesia  
M. Fachrurrozi, Sriwijaya University, Indonesia  
Teddy Mantoro, Sampoerna University, Indonesia  
Qonita Shahab, UX Specialist, Netherlands  
Murni Mahmud, International Islamic University, Malaysia  
Noor Azurati, University Teknologi Malaysia, Malaysia  
Azizul Azizan, University Teknologi Malaysia, Malaysia  
Adamu Ibrahim, University Teknologi Malaysia, Malaysia  
Kamilia Bin Kamardin, University Teknologi Malaysia, Malaysia  
Akeem Olowo, University Teknologi Malaysia, Malaysia  
Sya Azmeela, University Teknologi Malaysia, Malaysia  
Kusrini, Amikom University, Indonesia  
Ema Utami, Amikom University, Indonesia  
Kim Jin Mook, Sunmoon University, South Korea  
Houari Sabirin, KDDI Research, Inc  
Khamis Faraj Alarabi Aljribi, Baniwalid University, Libya  
Leon Andretti Abdillah, Bina Darma University, Indonesia  
Darmawan Napitupulu, Indonesian Research Institute, Indonesia  
Golooba Moses, Islamic University In Uganda  
Wendi Usino, Budi Luhur University, Indonesia  
Mochamad Wahyudi, Bina Sarana Informatika, Indonesia  
Roy Rudolf Huizen, Universitas Sumatera Utara Medan, Indonesia  
Wisnu Ananta Kusuma, Bogor Agricultural University  
Opim Salim Sitompul, Universitas Sumatera Utara Medan, Indonesia  
Purwanto, Udinus Semarang, Indonesia  
Yana Aditia Gerhana, UIN Sunan Gunung Djati Bandung, Indonesia  
Ali Ramdhani, UIN Sunan Gunung Djati, Indonesia  
Agus Rifai, International Islamic University Malaysia  
Diyah Puspitaningrum, Bengkulu University, Indonesia  
Umar Aditiawarman, International Islamic University Malaysia  
Purwanto, Udinus Semarang, Indonesia  
Dini Octarina Dwi Handayani, Taylors University  
Arief Setyanto, AMIKOM Yogya, Indonesia  
Elis Ratna Wulan, UIN Sunan Gunung Djati, Indonesia  
Muljono, UDINUS Semarang, Indonesia  
Untung Rahardja, STMIK Rahardja, Indonesia  
Sri Hartati, Gadjah Mada University, Indonesia  
Muharman Lubis, Telkom University, Indonesia  
Retantyo Wardoyo, Gadjah Mada University, Indonesia  
Insap Santosa, Gadjah Mada University, Indonesia  
Arief Setyanto, AMIKOM Yogya, Indonesia  
Sunny Arief Sudiro, STMIK Jakarta STI&K, Indonesia  
Arief Setyanto, AMIKOM Yogya, Indonesia  
Evi Triandini, STIKOM Bali, Indonesia  
Rahmat Sembiring, Poltek Medan, Indonesia  
Achmad Nizar Hidayanto, UDINUS Semarang, Indonesia  
Soetam Rizky Wicaksono, Machung Univesity  
Nur Sultan Salahuddin, Gunadarma University, Indonesia

Yaqoob Koondhar, Sindh Agriculture University Tandojam, Pakistan  
Ankhubayar Yukhuu, The national university of Mongolia  
M. Ary Heryanto, UDINUS Semarang, Indonesia  
Arief Fatchul Huda, UIN Sunan Gunung Djati, Indonesia  
Very Ronny Palilingan, Universitas Negeri Manado, Indonesia  
Mohammad Syafrullah, Budi Luhur University, Indonesia  
Meyliana, Bina Nusantara University, Indonesia  
Masayu Leylia Khodra, ITB, Indonesia  
Heru Susanto, Indonesian Institute of Science, Indonesia  
Rifki Sadikin, Indonesian Institute of Science, Indonesia  
Muhammad Khusairi Osman, Universiti Teknologi Mara (UiTM) Malaysia  
Lili Wulandhari, Bina Nusantara University, Indonesia  
Meyliana, Bina Nusantara University, Indonesia  
Untung Rahardja, STMIK Rahardja, Indonesia

# TABLE OF CONTENT

FRONT MATTER	ii-iv
PREFACE	v
COMMITTEES	vi-xi
TABLE OF CONTENT	xii-xxvi
1 Pinning-Up Green IT for Competitive Advantage In Education Industries <i>Doni Purnama Alamsyah, Rizal Amegia Saputra, Tuti Alawiyah, Herlan Sutisna, Dini Silvi Purnia and Miftah Farid Adiwisastra</i>	1-5
2 Intra-Integration Conceptual Framework using OBASHI Model Toward Business-IT Communication, Case Study: UKRIDA' IT Infrastructure Division <i>Marcel</i>	6-11
3 Secure and Effective Reengineering Information System and Business Processes of Cross-Border Control between the Republic of Indonesia and the Republic Democratic of Timor-Leste <i>Fransiskus M.H. Tjiptabudi, Skolastika Siba Igon, Raul Bernardino and Asep Taufik Muharram</i>	12-18
4 Analysis of Project Integration on Smart Parking System in Telkom University <i>Muharman Lubis, Rahmat Fauzi, Arif Ridho Lubis and Rokhman Fauzi</i>	19-24
5 A Case Study of Universities Dormitory Residence Management System (DRMS) in Indonesia <i>Muharman Lubis, Rokhman Fauzi, Arif Ridho Lubis and Rahmat Fauzi</i>	25-30
6 The Influence of Iteration Calculation Manipulation on Social Network Analysis toward Twitter's Users Against Hoax in Indonesia with Single Cluster Multi-Node Method Using Apache Hadoop Hortonworkstm Distribution <i>Husain Faiz Karimi, Arini, Siti Ummi Masruroh and Fitri Mintarsih</i>	31-36
7 Indonesia National Cybersecurity Review: Before and After Establishment National Cyber and Crypto Agency (BSSN) <i>Mulyadi and Dwi Rahayu</i>	37-42

8	Big Data Analysis Using Hadoop Framework and Machine Learning as Decision Support System (DSS) (Case Study: Knowledge of Islam Mindset) <i>Nurhayati and Busman</i>	43-48
9	Thresholding Technique in the Application of Sclera Segmentation <i>Fahmi Akmal Dzulkifli, Mohd Yusoff Mashor and Karniza Khalid</i>	49-54
10	Underwater Image Enhancement Using Guided Joint Bilateral Filter <i>Muhammad Nasir, Arini and Feri Fahrianto</i>	55-60
11	Fuzzy Tahani Algorithm and REST Web Service for Tourist Destination Recommendation <i>Yana Aditia Gerhana, Dian Sa'Adillah Maylawati, Wisnu Uriawan and Galfin Muzani Syukur</i>	61-66
12	The Employee Promotion Base on Specification Job's Performance Using: MCDM, AHP, and ELECTRE Method <i>Akmaludin, Mohammad Badrul, Linda Marlinda, Sopiyan Dalis, Sidik and Budi Santoso</i>	67-71
13	NFC Based Mobile Attendance System with Facial Authorization on Raspberry Pi and Cloud Server <i>Siti Ummi Masruroh, Andrew Fiade and Imelda Ristanti Julia</i>	72-77
14	An Investigation on Factors that Affect Trust Model Toward The E-Government Procurement Success Factors In Indonesia <i>Herlino Nanang, Yusuf Durachman, Imam Subchi, Ahmad F. Misman, and Zahidah Zulkifli</i>	78-82
15	Comparative Studies: The Effect of Service Quality System toward Customer Satisfaction on TIKI and JNE <i>Nur Komariah, Suryana H Achmad and Rahmat Hidayat</i>	83-87
16	Implementation of Data Collecting Platform Over Distributed Sensors for Global Open Data for Agriculture and Nutrition <i>Yuyanto and Suryadiputra Liawatimena</i>	88-94
17	Identification and Position Estimation Method with K-Nearest Neighbour and Home Occupants Activity Pattern <i>Alfatta Rezqa Winnersyah, Feri Fahrianto and Nenny Anggraini</i>	95-98
18	Performance Evaluation DMVPN Using Routing Protocol RIP, OSPF, And EIGRP <i>Andrew Fiade, Khairul Hamdi Putra Widya, Siti Ummi Masruroh, and Imelda Ristanti Julia</i>	99-104

19	Comparison of Optimization of Algorithm Particle Swarm Optimization and Genetic Algorithm with Neural Network Algorithm for Legislative Election Result <i>Mohammad Badrul, Frieyadie, Akmaludin, Dwi Arum Ningtyas, Daning Nur Sulistyowati, and Nurajijah</i>	105-111
20	Noise Reduction through Bagging on Neural Network Algorithm for Forest Fire Estimates <i>Rangga Sanjaya, Fitriyani, Suharyanto and Diah Puspitasari</i>	112-116
21	Open Data and Right to Information in Malaysia: A Comparative Analysis <i>Mahyuddin Daud and Sonny Zulhuda</i>	117-121
22	Classification of Science, Technology and Medicine (STM) Domains with PSO and NBC <i>Erfian Junianto, Mayya Nurbayanti Shobary, Rizal Rachman, Ai Ilah Warnilah and Bambang Kelana Simpony</i>	122-127
23	Feature Selection of Diabetic Retinopathy Disease Using Particle Swarm Optimization and Neural Network <i>Asti Herliana, Toni Arifin, Sari Susanti and Agung Baitul Hikmah</i>	128-131
24	Measuring Quality of Information System Through Delone Mclean Model in Online Information System of New Student Registration (SISFO PPDB) <i>Jamal Maulana Hudin, Yusti Farlina, Rizal Amegia Saputra, A. Gunawan, Denny Pribadi and Dwiza Riana</i>	132-137
25	Addressing the Threats of Online Theft of Trade Secret and Cyber Espionage in Malaysia: The Legal Landscape <i>Juriah Abd Jalil</i>	138-143
26	Review of Customer-Centered Knowledge Management Models: Goals and Key Factors <i>Muhammad Fadhil Dzulfikar, Iik Wilarso and Deki Satria</i>	144-148
27	IT Operation Services: Impacts of Maturity Levels of IT Governance on Online Stores in West Kalimantan <i>Sandy Kosasi, Harjanto Prabowo, Dyah Budiastuti and Vedyanto</i>	149-154

28	Implementation of The Naïve Bayes Algorithm with Feature Selection using Genetic Algorithm for Sentiment Review Analysis of Fashion Online Companies <i>Siti Ernawati, Eka Rini Yulia, Frieyadie, and Samudi</i>	155-159
29	Systematic Implementation of ASM (Asset Management System) <i>Dwi Sari and Alex Elentukh</i>	160-164
30	Sentiment Analysis of Online Auction Service Quality on Twitter Data: A case of E-Bay <i>Calandra Alencia Haryani, Achmad Nizar Hidayanto, Nur Fitriah Ayuning Budi and Herkules</i>	165-169
31	Improving The Accuracy of Neural Network Technique with Genetic Algorithm for Cervical Cancer Prediction <i>Herlambang Brawijaya, Slamet Widodo and Samudi</i>	170-176
32	Certainty Factors in Expert System to Diagnose Disease of Chili Plants <i>Anik Andriani, Anastasya Meyliana, Sardiarinto, Wahyu Eko Susanto and Supriyanta</i>	177-182
33	Analysis Model of User Acceptance Knowledge Management System (KMS) at PT. Samsung R&D Institute Indonesia (SRIN) <i>Imam Marzuki Shofi, Sitti Rahajeng N Puspitasari and Ahmad Nurul Fajar</i>	183-187
34	Protecting Consumers from Misleading Online Advertisement for Herbal and Traditional Medicines in Malaysia: Are the Laws Sufficient? <i>Suzi Fadhilah Ismail, Mahyuddin Daud, Juriah Abd Jalil, Ida Madieha Abd Ghani Azmi, and Sahida Safuan</i>	188-193
35	The User Acceptance of Service Desk Application System Description <i>Muhammad Qomarul Huda, Rinda Hesti Kusumaningtyas and Bella Marisela Caroline</i>	194-198
36	Pornographic Novel Criterion on Indonesian Cultural Background <i>Hartatik, Arief Setyanto and Kusrini</i>	199-203
37	Improvement Accuracy of Instant Noodle Product Selection Using Method ANP <i>Asbon Hendra Azhar, Ratih Adinda Destari, and Linda Wahyuni</i>	204-209



- 38 An Improved of Stemming Algorithm for Mining Indonesian Text with Slang on Social Media 210-215  
*Dian Sa'Adillah Maylawati, Wildan Budiawan Zulfikar, Cepy Slamet, Muhammad Ali Ramdhani, and Wisnu Uriawan*
- 39 Beaufort Cipher Algorithm Analysis Based on the Power Lock-Blum Blum Shub In Securing Data 216-219  
*Rita Novita Sari and Ratna Sri Hayati*
- 40 Applying Fuzzy Multiple-Attribute Decision Making Based on Set-pair Analysis with Triangular Fuzzy Number for Decent Homes Distribution Problem 220-226  
*Irvanizam, Intan Syahrini, Razief Perucha Fauzie Afidh, Muhammad Reki Andika and Hizir Sofyan*
- 41 The Use of FIFO Method for Analysis and Design Inventory Information System 227-230  
*Meinarini Utami, Dwi Sabarkhah, Elvi Fetrina, and M. Qomarul Huda*
- 42 Enhancement of Independence and Students Learning Outcomes by Using Self-Directed Learning 231-235  
*Nita Syahputri, Ommi Alfina, Ulfah Indriani, and Fithri Tahel*
- 43 Expert System Diagnose Tuberculosis Using Bayes Theorem Method and Shafer Dempster Method 236-239  
*Dedi Leman, Yudi, and Muhammad Fauzi*
- 44 Educational Games as A learning media of Character Education by Using Multimedia Development Life Cycle (MDLC) 240-243  
*Sri Lestari Rahayu, Fujiati, and Rofiqoh Dewi*
- 45 Strategies to Improve Human Resource Management using COBIT 5 (Case Study: Center for Data and Information Systems (Pusdatin) Ministry of Agriculture) 244-247  
*Fitroh, Arbaiti Damanik and Asep Fajar Firmansyah Iwa Airlangga*
- 46 Assessment of Relationship Management using ODS (Online Database System) at the Ministry of Cooperatives and SMEs with the Community Based on COBIT 5 248-252  
*Fitroh, Suci Ratnawati, and Tyas Rosiana Dewi*
- 47 Hybrid Cryptography WAKE (Word Auto Key Encryption) and Binary Caesar Cipher Method for Data Security 253-257  
*Mikha Sinaga and Nita Sari Br Sembiring*

48	A Forward Chaining Trace Analysis In Diagnosing Tamarillo Disease	258-261
	<i>Mikha Dayan Sinaga, Bob Subhan Riza, Juli Iriani, Ivi Lazuly, Daifiria, Edy Victor H.</i>	
49	Analysis of Dempster Shafer Method In Diagnosing Diseases Inflamed By Salmonella Bacteria	262-267
	<i>Nita Sembiring and Mikha Sinaga</i>	
50	Identification of Giemsa Stained Of Malaria Using K-Means Clustering Segmentation Technique	268-271
	<i>Edy Victor Haryanto S, M. Y. Mashor, A.S. Abdul Nasir, and Zeehaida Mohamed</i>	
51	Application of Fuzzy Multi Criteria Decision Making Determining Best Cooking Oil	272-277
	<i>Hardianto, Nogar Silitonga, Bob Subhan Riza, and Edy Victor Haryanto S</i>	
52	The Implementation of Balanced Scorecard Method to Measure Study Program Key Performance Indicators	278-281
	<i>Ratna Sri Hayati, Rita Novita Sari, and Ivi Lazuly</i>	
53	Management Information Systems Doctorate Program of Educational Management	282-286
	<i>Mukhneri Mukhtar, Andi B Fransiska and Mochamad Wahyudi</i>	
54	Election Public Transport Based Online for Women Using Importance Performance Analysis (IPA)	287-291
	<i>Linda Marlinda, Yusuf Durachman, Wahyu Indrarti, Eva Zuraidah and Dinar Ajeng Kristiyanti</i>	
55	Sentiment Analysis of State Officials News On Online Media Based On Public Opinion Using Naive Bayes Classifier Algorithm And Particle Swarm Optimization	292-298
	<i>Ali Idrus, Herlambang Brawijaya and Maruloh</i>	
56	TAM Approach on E-Commerce of Aircraft Ticket Sales On Consumer Purchase Intention	299-304
	<i>Gusti Syarifudin, Bahtiar Abbas and Pantri Heriyati</i>	
57	Comparative Analysis of Application Quality Between Appserv and Xampp Webserver By Using AHP Based On ISO/IEC 25010:2011	305-309
	<i>Fhery Agustin, Helmi Kurniawan, Yusfrizal and Khairul Ummi</i>	
58	Effectiveness of IT Governance of Online Businesses with Analytical Hierarchy Process Method	310-315

- 59    Analysis of K-Means and K-Medoid's Performance Using Big Data    316-320  
 Technology (Case Study: Knowledge of Shia History)  
*Nurhayati, Nadika Sigit Sinatrya, Luh Kesuma Wardani and Busman*
  
- 60    A Comparison Tsukamoto and Mamdani Methods in Fuzzy    321-327  
 Inference System for Determining Nutritional Toddlers  
*Dewi Ayu Nur Wulandari, Titin Prihatin, Arfhan Prasetyo and Nita Merlina*
  
- 61    Clustering Algorithm Comparison of Search Results Documents    328-333  
*David Liauw and Raymondus Raymond Kosala*
  
- 62    Performance Improvement of C4.5 Algorithm using Difference    334-339  
 Values Nodes in Decision Tree  
*Handoyo Widi Nugroho, Teguh Bharata Adji and Noor Akhmad Setiawan*
  
- 63    Expert System of Diagnosis Koi's Fish Disease by Certainty Factor    340-344  
 Method  
*Wirhan Fahrozi, Charles Bronson Harahap, Andrian Syahputra, and Rahmadani Pane*
  
- 64    Expert System of Diagnosis Impairment Nutrition of The Thin Body    345-350  
 By Dempster Shafer Method  
*Wirhan Fahrozi, Andrian Syahputra, Charles Bronson Harahap, and Fitriana Harahap*
  
- 65    Implementation of Naïve Bayes Classification Method In Predicting    351-355  
 Car Purchases  
*Fitriana Harahap, Ahir Yugo Nugroho Harahap, and Evri Ekadiansyah*
  
- 66    A Weighted Adaptive Fuzzy Interpolation Method of Interval Type-    356-361  
 2 Polygonal Fuzzy Sets  
*Stenly Ibrahim Adam*
  
- 67    Scholarship Decision Support System Using Preference Ranking    362-366  
 Organization Method for Enrichment Evaluation  
*Qurrotul Aini, Nur Aeni Hidayah, and Annisa Nurul Istiqomah*
  
- 68    Classification of Lower Back Pain Using K-Nearest Neighbor    367-371  
 Algorithm  
*Green Arther Sandag, Natalia Elisabet Tedry and Steven Lolong*
  
- 69    Lowering the Gradient Error on Neural Network Using    372-376  
 Backpropagation to Diagnose Psychological Problems in Children  
*Nurhayati, Abdul Meizar, Nidia Anjelita Saragih, and Ermayanti Astuti*

- 70 Designing and Building an Information System of Career Development and Alumni Based on Android (Case Study: Information Systems Department, Syarif Hidayatullah State Islamic University Jakarta) 377-381  
*Abdul Azis, Yuni Sugiarti, Nia Kumaladewi, and Muhammad Qomarul Huda*
- 71 The Role of Social Commerce Features and Customer Knowledge Management in Improving SME's Innovation Capability 382-387  
*Winarni, Muhammad Fadhil Dzulfikar, Regina Carla Handayani, Andy Syahrizal, Dana Indra Sensuse, Deki Satria and Ika A Wulandari*
- 72 Analysis of Electronic Logistics (E-Logis) System Acceptance Using Technology Acceptance Model (TAM) 388-393  
*Lilyani Asri Utami, Suparni, Ishak Kholil, Lia Mazia and Rizki Aulianita*
- 73 Key Management Using Combination of Diffie–Hellman Key Exchange with AES Encryption 394-399  
*Yusfrizal, Abdul Meizar, Helmi Kurniawan, Fhery Agustin*
- 74 Master Data Management Maturity Assessment: A Case Study in the Supreme Court of the Republic of Indonesia 400-406  
*Nanik Qodarsih, Satrio Baskoro Yudhoatmojo and Achmad Nizar Hidayanto*
- 75 Model Prediction of Psychoanalysis Trend of Radical Emotional Aggressiveness Using EEG and GLCM-SVM Method 407-413  
*Anif Hanifa Setianingrum and Bagus Sulistio*
- 76 Examining the Relationship of Technology, Personal and Environment Factors on the User Adoption of Online Laboratory in the Field of Health 414-419  
*Dwiza Riana, Rachmawati Darma Astuti, Ina Maryani and Achmad Nizar Hidayanto*
- 77 Application of ANP Methods In The Best Bread Products Selection 420-422  
*Ratih Adinda Destari and Linda Wahyuni*
- 78 Decision Support System for Employee Recruitment Using Multifactor Evaluation Process (MFEP) 423-426  
*Wiwi Verina, Muhammad Fauzi, Fina Nasari, Dahri Yani Hakim Tanjung, and Juli Iriani*
- 79 Analyzing Topsis Method for Selecting the Best Wood Type 427-432  
*Ria Eka Sari, Ahir Yugo Nugroho and Abdul Meizar*

80	Analysis of Factors Cause High Electricity Use of Households Using C4.5 Algorithm <i>Fina Nasari, Rofiqoh Dewi, and Fujiati</i>	433-436
81	Optimizing Selection of Used Motorcycles With Fuzzy Simple Additive Weighting <i>Dahri Yani Hakim Tanjung, and Robiatul Adawiyah</i>	437-440
82	Development of Population Administration Service System <i>Nia Kumaladewi, Suci Ratnawati, Basic Dirgantara Bayu Aji Pamungkas, and Muhammad Qomarul Huda</i>	441-445
83	Teacher Engagement Interventions through ITEI Apps <i>Sasmoko, Yasinta Indrianti, Samuel Anindyo Widhoyoko, Yogi Udjaja and Alvin Tanurwijaya</i>	446-449
84	Efficiency of Bayes Theorem in Detecting Early Symptoms of Avian Diseases <i>Adil Setiawan, Soeheri, Erwin Panggabean, Bagus Riski, Mas Ayoe Elhias and Frans Ikorasaki</i>	450-454
85	Monitoring and Evaluation of Flight Instructor Performance with PROMETHEE Method <i>Safrizal, Lili Tanti, Iwan Fitrianto Rahmad, Yanyang Thanri</i>	455-460
86	Measurement of Successful Implementation of Knowledge Management System: Case Study Ministry of Finance of the Republic of Indonesia <i>Kristian Ibrahim M., Dana Indra S., M. Ichsan, Wida Choirunnisa, and Gusni Haryadi</i>	461-466
87	Application of AHP Method Based on Competence in Determination of Best Graduate Students <i>Rofiqoh Dewi, Wiwi Verina, Dahri Yani Hakim Tanjung, and Sri Lestari Rahayu</i>	467-471
88	E-commerce Adoption in SME: A Systematic Review <i>Pamela Kareen, Betty Purwandari, Iik Wilarso and M. Octaviano Pratama</i>	472-478
89	Implementation of Equal Width Interval Discretization on SMARTER method in Acceptance of Computer Laboratory Assistant <i>Alfa Saleh, Khairani Puspita, Andi Sanjaya, Daifiria, and Giovani</i>	479-482
90	Improve Security Algorithm Cryptography Vigenere Cipher Using Chaos Functions	483-487

*Budi Triandi, Evri Ekadiansyah, Ratih Puspasari, Lili Tanti, and Iwan Fitrianto Rahmad*

- 91    Implementation Data Mining in Prediction of Sales Chips with Rough Set Method    488-494  
*Helmi Kurniawan, Fherly Agustin, Yusfrizal, and Khairul Ummi*
  
- 92    Increased Accuracy of Selection High Performing Employees Using Multi Attribute Utility Theory (MAUT)    495-498  
*Heri Gunawan and Hari Ramadhan*
  
- 93    Auto Tee Prototype as Tee Golf Automation in Golf Simulator Studio    499-503  
*Ahmad Roihan, Po Abas Sunarya and Chandra Wijaya*
  
- 94    Design and Build of Information System on E-Commerce of Organic Waste    504-508  
*Elpawati and Yuni Sugiarti*
  
- 95    Decision Support System for Improving Electronic Pulse Buyer Services Based SMS Gateway    509-515  
*Ratih Puspasari, Lili Tanti, Budi Triandi, Iwan Fitrianto Rahmad and Evri Ekadiansyah*
  
- 96    Efficiency of SMART method to Matching Profile method in choosing Delivery Service Partner    516-519  
*Adil Setiawan, Soeheri, Erwin Panggabean, Bagus Riski, Hardianto and Asbon Hendra Azhar*
  
- 97    Implementation of Text Mining in Predicting Consumer Interest on Digital Camera Products    520-526  
*Dinda Ayu Muthia, Dwi Andini Putri, Hilda Rachmi and Artika Surniandari*
  
- 98    Application of Clustering Method in Data Mining for Determining SNMPTN Quota Invitation UIN Syarif Hidayatullah Jakarta    527-530  
*Eva Khudzaeva, Fitri Mintarsih, Asep Taufik Muharram and Chandra Wirawan*
  
- 99    Educational Game as A Learning Media Using DGBL and Forward Chaining Methods    531-534  
*Fujiati, Fina Nasari, Sri Lestari Rahayu, and Andi Sanjaya*
  
- 100    e-Government Challenges in Developing Countries: A Literature Review    535-540  
*Ruci Meiyanti, Bagus Utomo, Dana Indra Sensuse and Rinda Wahyuni*



- 101 Combining Photogrammetry and Virtual Reality for Exploration of Otanaha Fortress Heritage of Indonesia 541-546  
*Andria Kusuma Wahyudi, Edson Yahuda Putra, Joe Yuan Mambu and Stenly Ibrahim Adam*
- 102 The Determination Of Household Surgical Feasibility For Poor Family By Using Weighted Product Method 547-552  
*Labuan Nababan and Elida Tuti*
- 103 Employee Performance Assessment with Profile Matching Method 553-558  
*Safrizal, Lili Tanti, Ratih Puspasari, and Budi Triandi*
- 104 Enterprise Architecture, Zachman Framework, Value Chain Analysis 559-562  
*Mas Ayoe Elhias, Rahmadani Pane, Wiwi Verina, Hardianto, and Efani Desi*
- 105 An Approach to Classify Eligibility Blood Donors Using Decision Tree and Naive Bayes Classifier 563-567  
*Wildan Budiawan Zulfikar, Yana Aditia Gerhana and Aulia Fitri Rahmania*
- 106 Risk Assessment on Information Asset at academic application using ISO 27001 568-571  
*Angraini, Megawati, and Lukman Haris*
- 107 Decision Support System to Find the Best Restaurant Using AHP Method 572-576  
*Dedek Indra Gunawan Hts, Deny Adhar, Ommi Alfina, Adnan Buyung Nst and Erwin Ginting*
- 108 Expert System Detect Stroke with Dempster Shafer Method 577-580  
*Dedek Indra Gunawan Hts, Deny Adhar, Nurhayati, Erwin Ginting, and Andrian Syahputra*
- 109 Extending the End-user Computing Satisfaction with Security Measures 581-585  
*Syopiansyah Jaya Putra, Rosalina, A'ang Subiyakto and Muhamad Nur Gunawan*
- 110 Data Quality Management Maturity Model: A Case Study in BPS-Statistics of Kaur Regency, Bengkulu Province, 2017 586-589  
*Rela Sabtiana, Satrio B. Yudhiatmodjo and Achmad Nizar Hidayanto*
- 111 Performance Change With or Without ITEI Apps 590-593  
*Sasmoko, Yasinta Indrianti, Samuel Anindy Widhoyoko, Yogi Udjaja and Unifah Rosyidi*



112	Monte Carlo Application On Determining Production of Cakes <i>Nidia Enjelita Saragih, Ermayanti Astuti, Austin Alexander Parhusip, and Tika Nirmalasari</i>	594-598
113	Determining User Satisfaction Factors on University Tuition Fee Systems Using End-User Computing Satisfaction (EUCS) <i>Nur Aeni Hidayah, Eri Rustamaji and Purusotama</i>	599-603
114	Analysis of Students Graduation Target Based on Academic Data Record Using C4.5 Algorithm Case Study: Information Systems Students of Telkom University <i>Dela Youlina Putri, Rachmadita Andreswari and Muhammad Azani Hasibuan</i>	604-609
115	Smart Car: Digital Controlling System Using Android Smartwatch Voice Recognition <i>Marchel Thimoty Tombeng, Regi Najoan and Noviko Karel</i>	610-614
116	Utilization ELECTRE Method with Decision Support System in Select Locations Warehouse Production <i>Frans Ikorasaki and Muhammad Barkah Akbar</i>	615-618
117	Detecting Corn Plant Disease with Expert System Using Bayes Theorem Method <i>Frans Ikorasaki and Muhammad Barkah Akbar</i>	619-621
118	Building Digital Strategy Plan at CV Anugrah Prima, an Information Technology Service Company <i>Bayu Waspodo, Suci Ratnawati and Ridwan Halifi</i>	622-625
119	Comparative Analysis of Encryption/Decryption Data Use the Symmetrical Key Algorithm of Bit Inserted Carrier (BIC) <i>Ommi Alfina, Nita Syahputri, Ulfah Indriani, Dina Irmayanti Hrp, and Erwin Ginting</i>	626-630
120	Target Analysis of Students Based on Academic Data Record Using Method Fuzzy Analytical Hierarchy Process (F-AHP) Case Study: Study Program Information Systems Telkom University <i>Qalbinuril Setyani, Rachmadita Andreswari and Muhammad Azani Hasibuan</i>	631-636
121	The Implementation of Augmented Reality as Learning Media in Introducing Animals for Early Childhood Education <i>Esron Rikardo Nainggolan, Hasta Herlan Asymar, Aloysius Rangga Aditya Nalendra, Anton, Fajar Sulaeman, Sidik, Ummu Radiyah and Susafa'Ati</i>	637-642
122	Dempster-Shafer Method for Diagnose Diseases on Vegetables	643-646

- 123 Combining Statistical and Interpretative Analyses for Testing E-Commerce Customer Loyalty Questionnaire 647-651  
*A'ang Subiyakto, Muhammad Rasyid Juliansyah, Meinarini Catur Utami and Aries Susanto*
- 124 Accuracy Analysis of Pasang Aksara Bot using Finite State Automata Transliteration Method 652-657  
*Padma Nyoman Crisnapati, Putu Devi Novayanti, Gde Indrawan, Kadek Yota Ernanda Aryanto, and Made Satria Wibawa*
- 125 Applying of Recommendation and Rating Criterion in Evaluation of Mustahik Using AHP Method 658-661  
*Husni Teja Sukmana, Rizky Suprihadi, Tabah Rosyadi, and Imam Subchi*
- 126 Indonesian Affective Word Resources Construction in Valence and Arousal Dimension for Sentiment Analysis 662-666  
*Khodijah Hulliyah, Normi Sham Awang Abu Bakar, Husni Teja Sukmana, and Amelia Ritahani Ismail*
- 127 Comparison of SVM & Naïve Bayes Algorithm for Sentiment Analysis Toward West Java Governor Candidate Period 2018-2023 Based on Public Opinion on Twitter 667-672  
*Dinar Ajeng Kristiyanti, Akhmad Hairul Umam, Mochamad Wahyudi, Ruhul Amin and Linda Marlinda*
- 128 The Comparison of Satisfaction Level Between Face to Face Conference and Teleconference Media on Employee' Performance 673-678  
*Santi Arafah and Juliana*
- 129 Sentiment Analysis for Popular e-traveling Sites in Indonesia using Naive Bayes 679-682  
*Tata Sutabri, Syopiansyah Jaya Putra, Muhammad Ridwan Effendi, Muhamad Nur Gunawan and Darmawan Napitupulu*
- 130 E-Readiness for ICT Implementation of the Higher Education Institutions in the Indonesian 683-688  
*Mohamad Irfan, Syopiansyah Jaya Putra and Cecep Nurul Alam*
- 131 Expert System for Social Assistance and Grant Selection Using Analytical Hierarchy Process 689-692  
*Ichsan Taufik, Wildan Budiawan Zulfikar, Mohamad Irfan, Jumadi and Finna Monica*

- 132 Comparison of Certainty Factor and Forward Chaining for Early Diagnosis of Cats Skin Diseases 693-699  
*Wisnu Uriawan, Aldy Rialdy Atmadja, Mohamad Irfan and Nur Jati Luhung*
- 133 Tropical Diseases Identification Using Neural Network Adaptive Resonance Theory 2 700-703  
*Rika Rosnelly and Linda Wahyuni*
- 134 Segmentation for Tuberculosis (TB) Ziehl-Neelsen Stained Tissue Slide Image using Thresholding 704-706  
*Bob Subhan Riza, M. Y. Mashor, M. K. Osman, and H. Jaafar*
- 135 SD-Enabled Mobile Fronthaul Dynamic Bandwidth and Wavelength Allocation (DBWA) Mechanism in Converged TWDM-EPON Architecture 707-712  
*Andrew Tanny Liem, I-Shyan Hwang, Aliakbar Nikoukar and Andrew Pakpahan*
- 136 Integrating the Readiness and Usability Models for Assessing the Information System Use 713-718  
*Dwi Yuniarto, Mulya Suryadi, Esa Firmansyah, Dody Herdiana, Aang Subiyakto, and Aedah Binti Abd. Rahman*
- 137 Abnormal Heart Rhythm Detection Based on Spectrogram of Heart Sound using Convolutional Neural Network 719-722  
*Made Satria Wibawa, I Md. Dendi Maysanjaya, Kadek Dwi Pradnyani Novianti and Padma Nyoman Crisnapati*
- 138 Earthquake Damage Intensity Scaling System based on Raspberry Pi and Arduino Uno 723-726  
*Padma Nyoman Crisnapati, Putu Desiana Wulaning, I Nyoman Rudy Hendrawan, and Anak Agung Ketut Bagus Bandanagara*
- 139 A Proposed Model of Green Computing Adoption in Indonesian Higher Education 727-732  
*Shofwan Hanief, Luh Gede Surya Kartika, Ni Luh Putri Srinadi and I Komang Rinantha Yasa Negara*
- 140 Analysis of Electronic Ticketing System Acceptance Using an Extended Unified Theory of Acceptance and Use of Technology (UTAUT) 733-737  
*Aries Susanto, Putra Rama Mahadika, A'ang Subiyakto and Nuryasin*
- 141 A Combination of Multi Factor Evaluation Process (MFEP) And The Distance To The Ideal Alternative (DIA) Methods For Majors Selection And Scholarship Recipients In SMAN 2 Tasikmalaya 738-744

*Teuku Mufizar, Evi Dewi Sri Mulyani, Restu Adi Wiyono and Wendi Arifiana*

142	Performance of Manual and Auto-Tuning PID Controller for Unstable Plant - Nano Satellite Attitude Control System	745-749
	<i>Hani Hazza A, Mashor, M.Y, and Mohammed Chessab Mahdi</i>	
143	The Development of University Website using User Centered Design Method with ISO 9126 Standard	750-753
	<i>Muhammad Dirga Dzulfiqar, Dewi Khairani and Luh Kesuma Wardhani</i>	
144	A Review on Cloud Computing Adoption from the Perspectives of Providers and Clients	754-759
	<i>Mohd Adam Suhaimi, Husnayati Hussin, Asma Md Ali and Noor Hazwani Mohamad Puad</i>	
145	Indonesian Muslims' Political Disagreements on Social Media	760-763
	<i>Rena Latifa, Abdul Rahman Shaleh, Melanie Nyhof, and Dede Rosyada</i>	
146	University Teachers' Perceptions of Using Computer Technology in An Indonesian English Language Classroom	764-768
	<i>Desi Nahartini, Rena Latifa, and Dede Puji Setiono</i>	
147	Online Gamers Self Control	769-772
	<i>Rena Latifa, Fuji Setiyawan, Imam Subchi, Desi Nahartini, and Yusuf Durachman</i>	
	AUTHORS INDEX	773-781

# Implementation of The Naïve Bayes Algorithm with Feature Selection using Genetic Algorithm for Sentiment Review Analysis of Fashion Online Companies

Siti Ernawati

STMIK Nusa Mandiri Jakarta  
rna2103@gmail.com

Eka Rini Yulia

STMIK Nusa Mandiri Jakarta  
ekariniyulia@gmail.com

Frieyadie

STMIK Nusa Mandiri Jakarta  
frieyadie@nusamandiri.ac.id

Samudi

STMIK Nusa Mandiri Jakarta  
samudi.net@gmail.com

**Abstract-** Opinion rivalry that occurs in social media have an important role in increasing the potential customers to the company or agency. The review is a rich and useful resource for marketing, social and others for excavations and mining opinions such as views, moods, and behavior. The reviews describe perceptions of something, such as review of a product, review of airline services, reviews of restaurant and others. The analysis of sentiment is an ongoing field of text-based research. The analysis of sentiment or opinion mining is the study of ways to solve problems of public opinion, attitudes, and emotions of an entity, in which the entity may represent individuals, events or topics. Sentiment analysis is an important tool for analyzing opinions in social media. This measurement begins with pre-processing consisting of tokenizing, stopwords removal and stemming. This study uses naïve Bayes algorithm and genetic algorithms as applied feature selection. Selection features aim to classify text for the review of online fashion companies. This measurement results in the classification of text in form of positive text and negative text. Measurements are based on the accuracy of naïve Bayes before addition of genetic algorithms and after addition of genetic algorithms as feature selection. Validation using 10 fold cross-validation. For measurement accuracy using confusion matrix and ROC curve. The purpose of the study is to calculate the increased accuracy of naïve Bayes algorithm if using genetic algorithms for feature selection. The results showed that the genetic algorithm was able to improve the accuracy.

**KeyWord**—*sentiment analysis, fashion online companies, text classification, genetic algorithm, naïve bayes*

## I. INTRODUCTION

The review is a rich and useful resource for marketing, social and others for excavations and mining opinions such as views, moods, and behavior. The reviews describe perceptions of something, such as review of the product, review of airline services, reviews of restaurant and others. A review can describe the views, attitudes or nature of someone about something. Review available on the internet we can use to be processed in order to produce a knowledge and useful information. The available reviews are a very useful resource in various fields, such as marketing, social and others[1].

Some of the studies that have been conducted on the review include, Analysis sentiment for restaurant reviews using naïve Bayes algorithm [2]. The main problem in text classification is the high dimension of the feature space, this is often the case with text that has tens of thousands of features. Most of these features are irrelevant and not used for text classification can even reduce accuracy and a high number of features can slow down the classification process or even make some classifiers inapplicable [3].

Many consumers are expressing their experiences through social media such as facebook, twitter or other media sites. An online sales company review is a channel that connects consumers to another, they can express opinions about the company in which they have made a purchase transaction.

The purpose of the study is to calculate the increased accuracy of naïve Bayes if using genetic algorithms for feature selection.

## II. LITERATURE

### A. Sentiment Analysis

Detection of text sentiment has attracted much attention and has grown rapidly in recent years, due to the increased availability of online reviews in digital form. The review is a rich and useful resource for marketing, social and others for excavations and mining opinions such as views, moods, and behavior. For example, whether a review of a positive or negative product, how the mood among bloggers at that time, how the public reflects on political affairs [1].

The analysis of sentiment is an ongoing field of text-based research. The analysis of sentiment or opinion mining is the study of ways to solve problems of public opinion, attitudes, and emotions of an entity, in which the entity may represent individuals, events or topics [4].

Consumer reviews affect whether or not an online sales company is good. Internet becomes an important part of the life. Now, not only from family and friends but also from foreigners located all over the world who may have used

products, shop online on sites, visit places or destinations and see movies can pour their opinions online.

### B. Pre-Processing

If the data has been structured data and a numeric value, the data can be presented as a source of data that can be processed further.

The processes performed in pre-processing are:

- 1) Tokenization  
Tokenize used to separate words or letters of punctuation marks and symbols.
- 2) Stopwords Removal  
Remove words that are considered unnecessary in the processing of data, for example if, the, of, or, etc.
- 3) Steaming  
The process of converting a word into a basic word. This method of converting word forms into basic words adjusts the language structure used in the steaming process.

### C. Naïve Bayes

Naïve Bayes is an algorithm that is often used in text categorization. The basic idea is to combine the probability of words and categories to estimate the probability of the category of a document [5]. Naïve Bayes is an approach that leads to Bayes theorem, combining previous knowledge with new knowledge. So this is one of the simplified classification algorithms but has high accuracy. [6]

Bayesian Classification is based on the Bayes theorem that has similar classification capabilities to the decision tree and neural network. Bayesian Classification is proven to have high accuracy and speed when applied to databases with large data.

### D. Genetic Algorithm

The Genetic Algorithm is one of the optimization algorithms, which was created to mimic some of the processes observed in natural evolution. The Genetic Algorithm is also a strong stochastic algorithm based on the principles of natural and natural genetic selection that is quite successfully applied in machine learning and optimization problems. [7]

The success of the Genetic Algorithm is highly dependent on two factors, population diversity, and selective pressure. There is a strong influence between these two factors. An increase in selection pressure can increase the number of chromosomes directly copied from the previous generation. In contrast, an increase in population diversity can decrease the proportion of inherited chromosomes and lose the opportunity for them to evolve according to offspring. [8]

### E. Validation and Evaluation

Confusion matrix provides the decisions obtained in the transfers and testing, the Confusion matrix provides an assessment of the classification performance by object correctly or falsely [9]. Confusion matrix contains the actual information and predictions on the classification system.

Equation model of Confusion Matrix:

- 1) Accuracy value is the proportion of the number of correct predictions.

$$Accuracy = \frac{(TP+TN)}{(TP+TN+FP+FN)} \quad 1$$

- 2) Sensitivity was used to compare the proportion of TP to positive tuples.

$$Sensitivity = \frac{TP}{TP+FN} \quad 2$$

- 3) Specificity was used to compare the proportion of TN to negative tuples.

$$Specificity = \frac{TN}{TN+FP} \quad 3$$

- 4) PPV (positive predictive value) is the proportion of cases with a positive diagnosis.

$$PPV = \frac{TP}{TP+FP} \quad 4$$

- 5) NPV (negative predictive value) is the proportion of cases with a negative diagnosis.

$$NPV = \frac{TN}{TN+FN} \quad 5$$

The ROC curve shows accuracy and compares the classification visually. The ROC curve expresses the confusion matrix. ROC is a two-dimensional graph with false positive as horizontal and true positive lines as vertical lines.

Guidelines for classifying the accuracy using the AUC: [9].

- 0.90 - 1.00 = Excellent Classification;
- 0.80 - 0.90 = Good Classification;
- 0.70 - 0.80 = Fair Classification;
- 0.60 - 0.70 = Poor Classification;
- 0.50 - 0.60 = Failure.

## III. METHOD

The following are the steps of the research method:

1. Data Collection  
This study uses data taken from websites that provide online reviews. Many of the reviews available from the site include customer reviews of online fashion companies. The data used in this study as many as 200 data consisting of 100 positive reviews and 100 negative reviews.
2. Initial Data Processing  
The next stage is the initial data processing. Dataset used as many as 200 data, 100 positive reviews and 100 negative reviews are used as data training. This dataset in the preprocessing stage must go through three processes.



- The processes are tokenization, stop word removal, and stemming.
3. **Proposed Model**  
The model that researchers propose is to use the feature selection method of the genetic algorithm. Genetic algorithms are used so that the accuracy of using naïve Bayes may increase. The picture below illustrates the model proposed in this study.

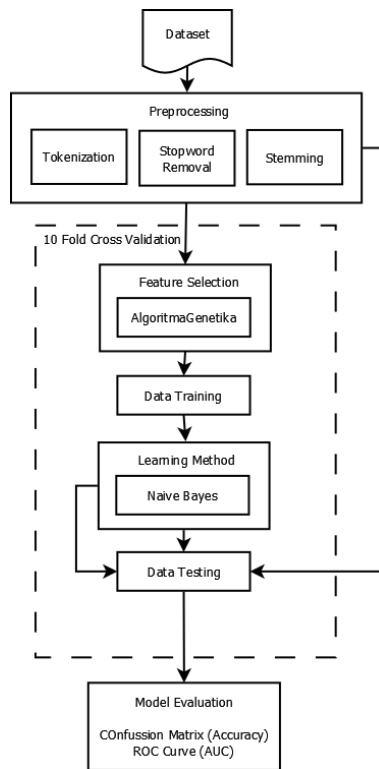


Fig. 1. The Model Proposed

4. **Experiments and Testing Models**
  - a. Setting up datasets for experiments
  - b. Input reviews that have not been previously classified
  - c. if the text has been inputted all then do pre-process
  - d. Design the Naïve Bayes algorithm architecture and do the training and testing and record the accuracy and AUC.
  - e. Perform testing with 10 fold cross-validation and look for the value of feature selection.
  - f. Designing the naïve Bayes algorithm architecture, the feature selection algorithm is the genetic algorithm and performs.
  - g. Training and testing and record the accuracy and AUC.
  - h. Perform parameter optimization on genetic algorithm to find out the highest accuracy and AUC.

5. **Evaluation and Validation of Results**  
The final stage will evaluate the previously tested data by evaluating the comparison results of the whole experiment between using naïve Bayes algorithm with naïve Bayes algorithm and genetic algorithm. The higher value of accuracy, indicating the proposed model is the best.

#### IV. RESEARCH RESULTS

##### A. Model by Classification Method Using Naïve Bayes

In the study show 10 data from a total of 200 data. 5 words related to the sentiment and most often appears that recommend, disappoint, horrible, good and great.

Validation used 10-fold cross validation for model testing, where each section will be randomly generated. Principle 10-fold cross validation is 1: 9, 1 part becomes data testing and other data into training data, so that 10 part is the chance to be data testing.

TABLE I  
Accuracy results using Naïve Bayes algorithm

Accuracy: 68.50% +/- 4.50% (mikro: 68.50%)			
	true negatif	true positif	class precision
pred.negatif	78	41	65.55%
pred.positif	22	59	72.84%
class recall	78.00%	59.00%	

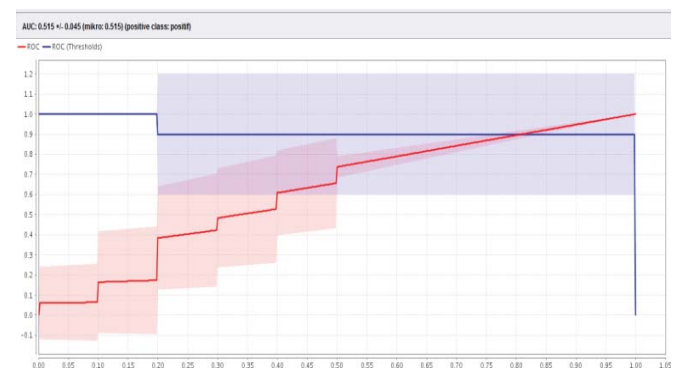


Fig. 2. Graph Area Under Curve (AUC) using Naïve Bayes Algorithm

##### B. Model with Classification Method Using Naïve Bayes and Selection of Genetic Algorithm Features

The optimal parameters in Genetic Algorithm were obtained with population size 50, the number of generation 30, p crossover 0.8 and p mutation 0.08 [10].

To get the highest accuracy results required parameters that require adjustment. Here are the parameters that are adjusted.



TABLE 2  
Experiment Plan

Maximum Number of Generation	Population Size	P Crossover	P Mutation	Accuracy	AUC
30-100	5-50	0.5-1.0	0.5-1.0	?	?

TABLE 3  
Experimental Results

Maximum Number of Generation	Population size	P Crossover	P Mutation	Accuracy	AUC
40	45	0.5	0.5	87.50%	0.819
40	45	0.5	0.6	87.50%	0.819
40	45	0.5	0.7	87.50%	0.819
40	45	0.5	0.8	87.50%	0.819
40	45	0.5	0.9	87.50%	0.819
40	45	0.5	1.0	87.50%	0.819

The final adjustment of p mutation parameter starting from 0.5-1.0 and there was no change in the value of accuracy and AUC. Therefore, the adjustment of p mutation is taken from the default value of 0.5. From the experimental process that has been done, it can be concluded that to obtain the highest accuracy and AUC value, the optimal parameters for the maximum number of generation values are 40, population size 45, p crossover 0.5 and p mutation 0.5.

TABLE 4  
Confusion Matrix Naïve Bayes Algorithm after added selection features of Genetic Algorithm

Accuracy: 87.50% +/- 7.50% (mikro: 87.50%)			
	true negatif	true positif	class precision
pred.negatif	81	6	93.10%
pred.positif	19	94	83.19%
class recall	81,00%	94,00%	

Accuracy value of confusion matrix naïve bayes algorithm after the addition of genetic algorithm are:

$$Accuracy = \frac{(TP+TN)}{(TP+TN+FP+FN)} \quad 6$$

$$Accuracy = \frac{(81+94)}{(81+6+94+19)} = \frac{175}{200} = 0,875 = 87,50\% \quad 7$$

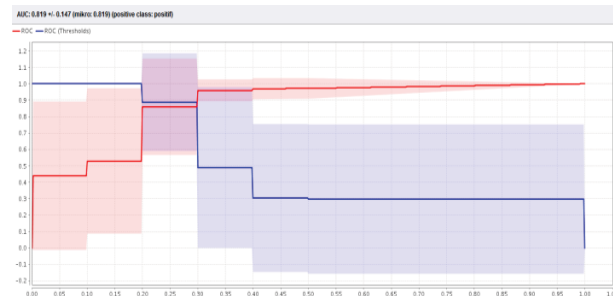


Fig. 3. Graph Area Under Curve (AUC) Naïve Bayes Algorithm after addition selection feature of Genetic Algorithm

TABLE 5  
Naïve Bayes Algorithm model before and after using feature selection

	Naïve Bayes Algorithm	Naïve Bayes Algorithm + Genetic Algorithm
Successful classification of positive reviews	59	94
Successful prediction of negative reviews	78	81
Accuracy	68.50%	87.50%
AUC	0.515	0.819

Based on results of the above evaluation is known that naïve Bayes algorithm after addition of genetic algorithm feature selection can increase the accuracy value for online fashion company review. Figure 4 is a graph showing the accuracy of the naïve Bayes algorithm and the naïve Bayes algorithm and the genetic algorithm. Figure 5 is a graph showing a value of AUC.

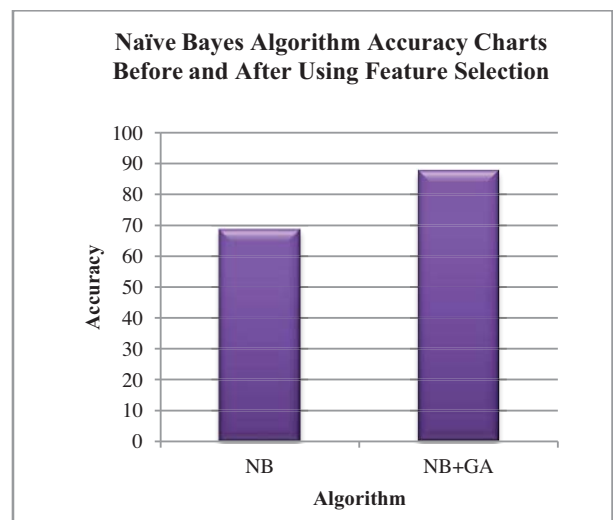


Fig. 4. Naïve Bayes Accuracy Charts before and after using feature selection

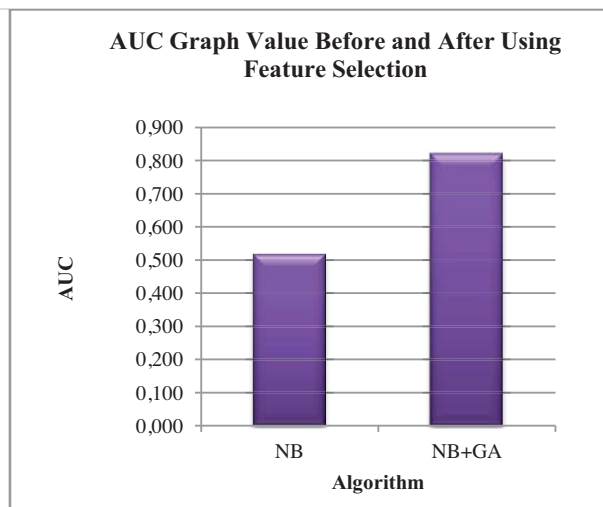


Fig. 5. AUC Graph Value before and after using feature selection

- [10] S. Günel, "Hybrid feature selection for text classification," *Turkish J. Electr. Eng. Comput. Sci.*, vol. 20, no. SUPPL.2, pp. 1296–1311, 2012.

#### CONCLUSION

Based on the data processing that has been done, merging the naïve Bayes algorithm with selection features of genetic algorithm can improve the accuracy. Online fashion company review can be classified well into positive and negative reviews. Accuracy naïve Bayes algorithm before using feature selection of 68.50% and AUC 0.515. While accuracy after using genetic algorithm feature selection of 87.50% and AUC 0.819. Accuracy increased in the amount of 19.00% and the accuracy of testing using AUC included in Good Classification category.

#### REFERENCES

- [1] H. Tang, S. Tan, and X. Cheng, "Expert Systems with Applications A survey on sentiment detection of reviews," *Expert Syst. Appl.*, vol. 36, no. 7, pp. 10760–10773, 2009.
- [2] H. Kang, S. J. Yoo, and D. Han, "Senti-lexicon and improved Naïve Bayes algorithms for sentiment analysis of restaurant reviews," *Expert Syst. Appl.*, vol. 39, no. 5, pp. 6000–6010, 2012.
- [3] J. Chen, H. Huang, S. Tian, and Y. Qu, "Feature selection for text classification with Naïve Bayes," *Expert Syst. Appl.*, vol. 36, no. 3 PART 1, pp. 5432–5435, 2009.
- [4] W. Medhat, A. Hassan, and H. Korashy, "Sentiment analysis algorithms and applications: A survey," *Ain Shams Eng. J.*, vol. 5, no. 4, pp. 1093–1113, 2014.
- [5] Z. Zhang, Q. Ye, Z. Zhang, and Y. Li, "Sentiment classification of Internet restaurant reviews written in Cantonese," *Expert Syst. Appl.*, vol. 38, no. 6, pp. 7674–7682, 2011.
- [6] S. F. Rodyansyah and E. Winarko, "Klasifikasi Posting Twitter Kemacetan Lalu Lintas Kota Bandung Menggunakan Naive Bayesian Classification," *FMIPA UGM*, vol. 6, no. 1, pp. 91–100, 2012.
- [7] P. Guo, X. Wang, and Y. Han, "The Enhanced Genetic Algorithms for the Optimization Design," no. Bmei, pp. 2990–2994, 2010.
- [8] W. Song, C. H. Li, and S. C. Park, "Expert Systems with Applications Genetic algorithm for text clustering using ontology and evaluating the validity of various semantic similarity measures," *Expert Syst. Appl.*, vol. 36, no. 5, pp. 9095–9104, 2009.
- [9] F. Gorunescu, *Data mining: concepts and techniques*. 2011.