

# BUKTI TERIDEX SCOPUS

<https://www.scopus.com/authid/detail.uri?authorId=57209412854>

Scopus Preview

Author search Sources [Create account](#) [Sign in](#)

This author profile is generated by Scopus [Learn more](#)

## Riswanto, E.

[Informatics Engineering, Yogyakarta, Indonesia](#)

[Connect to ORCID](#) [Is this you? Connect to Mendeley account](#)

[Edit profile](#) [Set alert](#) [Potential author matches](#) [Export to SciVal](#)

---

**Metrics overview**

2 Documents by author

0 Citations by 0 documents

0 h-index

**Document & citation trends**

Year	Documents	Citation@2020
2019	1	0
2020	1	0

**Most contributed Topics 2016–2020**

Collaborative Filtering; Recommender Systems; Implicit Feedback  
[1 document](#)

Quality Function Deployment (QFD); House of Quality; Customer Requirements  
[1 document](#)

[View all Topics](#)

Scopus Preview - Riswanto, E. - x

2 Documents Cited by 0 Preprints 5 Co-Authors Topics 0 Awarded grants

**Note:**  
Scopus Preview users can only view an author's last 10 documents, while most other features are disabled. Do you have [access](#) through your institution? Check your institution's access to view all documents and features.

Export all Add all to list Sort by Date (newest)

> View list in search results format  
> View references  
Set document alert

Conference Paper • Open access  
**TOPSIS Method for Decision Support Systems in Determining the Interests of Medical Student**  
Riswanto, E., Melany, D.R., Wiratama, B.S., Syafianto  
*Journal of Physics: Conference Series*, 2020, 1577(1), 012013  
[Show abstract](#) [Related documents](#) 0 Citations

Conference Paper • Open access  
**Mobile Recommendation System for Culinary Tourism Destination using KNN (K-nearest neighbor)**  
Riswanto, E., Robi'In, B., Suparyanto  
*Journal of Physics: Conference Series*, 2019, 1201(1), 012039  
[Show abstract](#) [Related documents](#) 0 Citations



International Conference on  
Electronics Representation and  
Algorithm

# PROCEEDING

---

International Conference on Electronics  
Representation and Algorithm  
December, 12-13th 2019  
Yogyakarta, Indonesia

Hosted by:



# 2nd 2019 International Conference on Electronics Representation and Algorithm



2nd 2019 International Conference on Electronics Representation and Algorithm took place 12-13 December 2019 in Yogyakarta, Indonesia.

Publication : Journal of Physics: Conference Series (JPCS)

Vol/No/Year : 1201/2019

URL : <https://iopscience.iop.org/journal/1742-6596>

**Copyright and Reprint Permission:** The content in IOP Publishing's Conference Series journals are all published on a gold open access basis. All of our conference series articles are currently published under a CC BY licence. For further information on what the CC BY licence allows, please refer to this page. Older conference series articles (published from around prior to November 2012), were not published under a CC BY licence. You should check the licence on the article itself prior to use. If the article was not published under a CC BY licence or the article does not state what licence the article was published under, please contact [permissions@iop.org](mailto:permissions@iop.org) to request permission if you wish to reuse any content from the article.

PAPER • OPEN ACCESS

## Preface

To cite this article: 2020 *J. Phys.: Conf. Ser.* **1577** 011001

View the [article online](#) for updates and enhancements.

## You may also like

- [A new construction algorithm of the digital economy innovation system](#)  
Zhengang Zhai, Nannan Wu, Yunya Zhu et al.
- [The mapping and analysis of minapolitan innovation network-based on capture fisheries, Pekalongan City](#)  
O Sumule, W I Angkasa and H W Retno
- [Efficiency of innovation sector development: the linear and non-linear models of innovative economy building development](#)  
M Karlova and T Fomina



The Electrochemical Society  
Advancing solid state & electrochemical science & technology

242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Abstract submission deadline: **April 8, 2022**

Connect. Engage. Champion. Empower. Accelerate.

**MOVE SCIENCE FORWARD**



Submit your abstract



## Preface

A product-oriented conversion process often consists of 3 stages, namely input, conversion process, and output. In the world of technological innovation, input usually consists of materials and knowledge. If it is in the form of materials, the process of conversion is to manufacturing, but if the input is in the form of knowledge, then the process requires research and development to produce a design that will be incorporated into manufacturing. The output from the manufacturing process is certainly in the form of a product. Scientific knowledge requires appropriate technological concepts to produce product design stages.

There are three stages of the process that can be done in technological innovation. The first stage consists of setting goals, identifying projects, and selecting projects. In this stage, fostering an innovation climate is needed to build innovation investments so that organizational structure development needs to be improved in order to support predetermined innovations. The second stage is research and development. This stage of information search, basic research, and initial planning is needed to design, engineer, and test a prototype in addition to modifying the devices and the needs needed. The third stage is diffusion, which is developing a formal market plan to introduce the resulting innovative products while knowing the response to market needs.

In addition to the system built in the innovation, the dimension of innovation must also consider form, function, development, and time so that innovation can be directed in adopting technology, improving markets, and building sustainable organizations. The role of science and engineering is very important in building innovation and transformation for best practices in the global community. Hopefully, these published papers will have a significant impact even though the impact is not too large, but they are quite capable to support the development of innovation in science and technology in the future.

Editor of the 2nd ICERA 2019

Ferry Wahyu Wibowo



# Other reviewers

## Additional Reviewers

Nor Hanim Abd. Rahman	Universiti Teknologi MARA	Malaysia
Joshua A. Abolarinwa	Federal University of Technology Minna.	Nigeria
Anang Kukuh Adisusilo	University of Wijaya Kusuma, Surabaya	Indonesia
Nisar Ahmed	King Khalid University	Saudi Arabia
Qurrotul Aini	Syarif Hidayatullah State Islamic University Jakarta	Indonesia
Hussain Al Abdulqader	University of Nizwa	Oman
Muftah Hilal Muftah Aldabbar	UKM	Malaysia
Mohammed Ibrahim Alghamdi	Al-Baha University	Saudi Arabia
Qutaiba Ibrahim Ali	University of Mosul	Iraq
Muhammad Arrofiq	Universitas Gadjah Mada	Indonesia
Wipawadee Auyporn	Chulalongkorn University	Thailand
Azizul Azizan	Universiti Teknologi Malaysia (UTM)	Malaysia
Eduard Babulak	Liberty University	USA
Aslina Baharum	Universiti Malaysia Sabah	Malaysia
Balaji Bakthavatchalam	Malaysia	Malaysia
Jana Bhaskara Rao	Anil Neerukonda Institute of Technology and Sciences	India
Salah Bourennane	Ecole Centrale Marseille	France
Ayan Chatterjee	Cranfield University	United Kingdom (Great Britain)
Rizalafande Che Ismail	Universiti Malaysia Perlis	Malaysia
Domenico Ciuonzo	University of Naples Federico II, IT	Italy
Maria Grazia D'Elia	University of Salerno	Italy
Bima Sena Bayu Dewantara	Politeknik Elektronika Negeri Surabaya	Indonesia
Mochammad Facta	Diponegoro University	Indonesia
Soheli Farhana	MIIT, UniKL	Malaysia
Omar Farooq	Aligarh Muslim University, Aligarh	India
Wajeb Gharibi	University of Missouri-Kansas City	USA
Alireza Ghasempour	ICT Faculty	USA
Frederick Ray I. Gomez	STMicronics, Inc.	Philippines
Brij Gupta	National Institute of Technology Kurukshetra	India
Dirman Hanafi	Universiti Tun Hussein Onn Malaysia	Malaysia
Seng Hansun	Universitas Multimedia Nusantara	Indonesia
Nuryazmeen Farhan Haron	Universiti Teknologi MARA	Malaysia
Roberto Carlos Herrera Lara	National Polytechnic School	Ecuador

Ida Hussain	Universiti Tenaga Nasional	Malaysia
Norezmi Jamal	Universiti Tun Hussein Onn Malaysia	Malaysia
Samuel Ndueso John	Nigerian Defence Academy	Nigeria
Katerina Kabassi	Ionian University	Greece
Raveendranathan Kalathil Chellappan	College of Engineering Thiruvananthapuram	India
Pantea Keikhosrokiani	Universiti Sains Malaysia	Malaysia
Chutisant Kerdvibulvech	National Institute of Development Administration	Thailand
Zeashan Hameed Khan	Air University	Pakistan
Lai Khin Wee	Universiti Malaya	Malaysia
Shigeru Kuwano	Daido University	Japan
Massudi Mahmuddin	Universiti Utara Malaysia	Malaysia
Venkata Krishna Chaithanya Manam	Purdue University	USA
TC Manjunath	Dayananda Sagar College of Engineering, Bangalore, Karnataka	India
Arief Marwanto	Universiti Islam Sultan Agung (UNISSULA) Semarang	Indonesia
Zahéra Mekkioui	University of tlemcen	Algeria
Yousif Ismail Mohammed	Al anbar University/ Engineering College/ Electrical Departement	Iraq
N Mohankumar	Amrita Vishwa Vidyapeetham	India
Ata Jahangir Moshayedi	Assoc. Prof	China
Amrit Mukherjee	Jiangsu University	China
Rizal Munadi	Syiah Kuala University	Indonesia
Arif Muntasa	Trunojoyo University	Indonesia
Suresh Haasana Nagesh Rao	Malnad College of Engineering, Hassan	India
Arun Nambiar	California State University	USA
Okfalisa Okfalisa	University Islamic Suska Riau	Indonesia
Giovanni B Palmerini	Sapienza Università di Roma	Italy
Harry Prabowo	Universitas Gadjah Mada	Indonesia
Pakawan Pugsee	Chulalongkorn University	Thailand
Safanah M Raafat	University of Technology Baghdad	Iraq
Budi Rahmani	STMIK Banjarbaru	Indonesia
Vijaya Prakash Rajanala	SR Engineering College	India
Grienggrai Rajchakit	Maejo University	Thailand
Alif Ramdhani	STMIK El Rahma	Indonesia
Houari Sabirin	Skymatix, Inc.	Japan
Ghasem Sadeghy Bajestani	Imam Reza International University	Iran
Wael A. Salah	Palestine Technical University - Kadoorie	Palestine
Nadir Kamal Salih, nks	Harbin Institute of Technology	Oman
Rahmat Sanudin	Universiti Tun Hussien Onn Malaysia	Malaysia
Tomonobu Sato	Hitachi ICT Business Services, Ltd.	Japan

Md. Shohel Sayeed	Multimedia University	Malaysia
Toufik Sebbagh	University of Skikda	Algeria
Iwan Setiawan	Indonesian Institute of Sciences	Indonesia
Suhail Najm Shahab	Northern Technical University	Iraq
S. Sarifah Radiah Shariff	Universiti Teknologi MARA	Malaysia
Abdul Samad Shibghatullah	UCSI University	Malaysia
Amit Prakash Singh	Guru Gobind Singh Indraprastha University	India
Kasthuri Subaramaniam	UCSI University	Malaysia
George Suciu	Politehnica University of Bucharest	Romania
Srinivasulu Tadisetty	Kakatiya University College of Engineering and Technology	India
Pooya Taheri	SFU	Canada
Choo Kim Tan	MMU	Malaysia
Ramayah Thurasamy	Universiti Sains Malaysia	Malaysia
Ivanna Timotius	Satya Wacana Christian University	Indonesia
Apriana Toding	Universitas Kristen Indonesia Paulus	Indonesia
Claudio Leao Torres	Federal Center of Technological Education of Maranhao	Brazil
Antonio Trigo	Instituto Politécnico de Coimbra, ISCAC	Portugal
Rosyidah Vijaya	Universitas Amikom Yogyakarta	Indonesia
Wei Wei	Xi'an University of Technology	China
Leong Wen Chek	University of Malaya	Malaysia
Widodo Widodo	University of Indonesia	Indonesia
Dedy Rahman Wijaya	Telkom University	Indonesia



# Table of contents

Volume 1577

**2020**

◀ Previous issue    Next issue ▶

**The 2nd 2019 ICERA: International Conference on Electronics Representation and Algorithm  
"Innovation and Transformation for Best Practices in Global Community" 12-13 December  
2019, Yogyakarta, Indonesia**

Accepted papers received: 16 June 2020

Published online: 15 July 2020

Open all abstracts

---

## Preface

**OPEN ACCESS** 011001

Preface

+ Open abstract     View article     PDF

---

**OPEN ACCESS** 011002

Sponsors

+ Open abstract     View article     PDF

---

**OPEN ACCESS** 011003

Peer review statement

+ Open abstract     View article     PDF

---

## Computational Methods

**OPEN ACCESS** 012001

Decision Support System for Determining Floating Dock Locations in Maluku Islands  
Using AHP-TOPSIS

M Tukan, B J Camerling, M T Afifudin and Hozairi

+ Open abstract     View article     PDF

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see  
our Privacy and Cookies policy.

**OPEN ACCESS** 012002 

## Deep Contextual of Document Using Deep LSTM Meet Matrix Factorization to Handle Sparse Data: Proposed Model

Hanafi, N Suryana and ASH Basari

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012003

## Deep learning-based object detection and geographic coordinate estimation system for GeoTiff imagery

B M Pratama, D Gunawan and R A G Gultom

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012004

## Electroencephalography based Emotion Recognition using Fisher's Linear Discriminant Analysis on Support Vector Machine

I N Yulita, D Novita, A Sholahuddin and Emilliano

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012005

## Fuzzy Logic System Implementation with Mamdani Method in Computer-Based Intelligence Quotient Test to Determining the Type of Intelligence Dimension

G N Putri, B Dirgantoro, P Aulia and C Setianingsih

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012006

## Generate Contextual Insight of Product Review Using Deep LSTM and Word Embedding

Hanafi, N Suryana and ASH Basari

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012007

## Implementation of Support Systems for Determination of Amphibious Vehicle Landing in Disaster Emergency Response Using Fuzzy Takagi Sugeno

Abdurahman, G Harsono, Y Prihanto and R A G Gultom

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012008

## Information System of Agricultural Commodities Mapping Based on Machine Learning

D Nur, C Riyanti and M Olivya

[+ Open abstract](#) [View article](#) [PDF](#)

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.



---

**OPEN ACCESS**

012009

Least-Square Support Vector Machine (LS-SVM) Parameters Optimization using Hybrid Cuckoo Search and Harmony Search Algorithm for Pre Collision Warning on Driver Assistance System (DAS)

A Sumarudin, A Puspaningrum and A Suheryadi

[+ Open abstract](#)   [View article](#)   [PDF](#)

---

**OPEN ACCESS**

012010

Non-periodic Noisy Signals Denoising Using Adaptive Neuro-Fuzzy Inference System (ANFIS)

I Santoso, A Warsito, T Prakoso, A Sofwan, A A Zahra, Y Christyono and M A Riyadi

[+ Open abstract](#)   [View article](#)   [PDF](#)

---

**OPEN ACCESS**

012011

Predicting Rainfall Intensity using Naïve Bayes and Information Gain Methods (Case Study: Sleman Regency)

I G W Sena, J W Dillak, P Leunupun and A J Santoso

[+ Open abstract](#)   [View article](#)   [PDF](#)

---

**OPEN ACCESS**

012012

The Medical Facilities Selection Based on Location-Based Services Application Using SAW and TOPSIS Algorithm

M Z Rohman, Irwansyah and W E Sari

[+ Open abstract](#)   [View article](#)   [PDF](#)

---

**OPEN ACCESS**

012013

TOPSIS Method for Decision Support Systems in Determining the Interests of Medical Student

E Riswanto, D R Melany, B S Wiratama and Syafrianto

[+ Open abstract](#)   [View article](#)   [PDF](#)

---

## Computer Graphics and Vision

---

**OPEN ACCESS**

012014

A New Image Segmentation of Leptomeningeal Metastasis in Leukemia Patients

H Z Ilmadina, A M Arymurthy and Rosalina

[+ Open abstract](#)   [View article](#)   [PDF](#)

---

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see [our Privacy and Cookies policy.](#)

**OPEN ACCESS**

012015



## An Analysis and Comparison Performance of DNA and Chaotic Method Combination for Image Encryption

V Saputra, D R I M Setiadi and E H Rachmawanto

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012016

## Detecting Ictal and Interictal Condition of EEG Signal using Higuchi Fractal Dimension and Support Vector Machine

I Wijayanto, S Hadiyoso, S Aulia and B S Atmojo

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012017

## Detecting the Burned Area in Volcanic Region by Using Multitemporal Landsat-8 OLI (Case Study: Mt. Sumbing, Central Java)

I Prasasti, D Triyono and Suwarsono

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012018

## Finite State Machines for Building Believable Non-Playable Character in the Game of Khalid ibn Al-Walid

K Fathoni, R Y Hakkun and H A T Nurhadi

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012019

## Real Time Video Analytics Based on Deep Learning and Big Data for Smart Station

F Hidayat, F Hamami, I A Dahlan, S H Supangkat, A Fadillah and A Hidayatuloh

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012020

## Shallot Quality Classification using HSV Color Models and Size Identification based on Naive Bayes Classifier

A Susanto, Z H Dewantoro, C A Sari, D R I M Setiadi, E H Rachmawanto and I U W Mulyono

[+ Open abstract](#) [View article](#) [PDF](#)

---

## Modeling and Simulation

---

**OPEN ACCESS**

012021

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.



N Deborah Lynn, A I Sourav and A J Santoso

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012022

Automatic Guided Vehicle that detects *Dactylopius Opuntiae* in Cactus Pears

N J Luwes, J C Ogochukwu and B P Rskotsoane

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012023

Automatic Question Generator System Conceptual Model for Mathematic and Geometry Parallel Question Replication

A A B Prasetyanto, T B Adji and I Hidayah

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012024

Collaborative Decision-Making for Human-Technology Interaction - A Case Study Using an Automated Water Bottling Plant

J Coetzer, R B Kuriakose and H J Vermaak

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012025

Development of Radar-based Sensor System for Smart Level Crossing Technology

M Rosyidi, N Irawati, S Nugroho, S Bismantoko, T Widodo, A Harvono and U Chasanah

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012026

Distributed Classifier for SDGs Topics in Online News using RabbitMQ Message Broker

A Nugroho, Widyawan and S S Kusumawardani

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012027

Generation of Synthetic Continuous Numerical Data Using Generative Adversarial Networks

A H Aziira, N A Setiawan and I Soesanti

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012028

Identification of the Maturity Level of Carica Papaya Using the K-Nearest Neighbor

[our Privacy and Cookies policy.](#)



I B Suban, A Paramartha, M Fortwonatus and A J Santoso

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012029

### Interference Mitigation using Adaptive Beamforming with RLS Algorithm for Coexistence between 5G and Fixed Satellite Services in C-Band

C B Muhammad and K Anwar

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012030

### Navigation system for an automatic guided vehicle

E M Ngandu, N Luwes and K Kusakana

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012031

### Networked Control System in Quadrotor Altitude Control with Time Delay Compensation

R Panuntun, O Wahyunggoro, S Herdjunto, A R Rafsanjani and N Setiawan

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012032

### Securing Text Messages using the Beaufort-Vigenere Hybrid Method

E Sugiarto, D R I M Setiadi, A Fahmi, E H Rachmawanto, C A Sari, Md K Sarker and B Widjanto

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012033

### Self Adaptive and Simulated Annealing Hyper-Heuristics Approach for Post-Enrollment Course Timetabling

H M Kartika and M Ahmad

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012034

### System Identification of Two-Wheeled Robot Dynamics Using Neural Networks

N Uddin

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012035

### Wireless communication design of internet of things based on FPGA and WiFi Module

our Privacy and Cookies policy.



F W Wibowo

[+ Open abstract](#) [View article](#) [PDF](#)

---

## Scientific Analysis and Workflow

---

**OPEN ACCESS** 012036

A Cost-Aware Strategy for Deadline Constrained Scientific Workflows

S Manam, K Moessner and S Vural

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS** 012037

A survey of technical efficiency in crane systems using POET structure

SF Phiri, K Kusakana and BP Numbi

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS** 012038

CFD Analysis of Airflow Through Prism Obstacles Inside Solar Air Heater Channel

L Diana, A G Safitra, D Ichsani and S Nugroho

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS** 012039

Comparison and Analysis of Stator Plate Holder on Yokeless and Segmented Armature Machine

A F Desanti, D A Asfani, M N Yuniarto and Y U Nugraha

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS** 012040

Comparison of EMD, VMD and EEMD Methods in Respiration Wave Extraction Based on PPG Waves

S Hadiyoso, E M Dewi and I Wijayanto

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS** 012041

Design of Phishing Simulation Dashboard Using Analytic Data Concepts

R Septiana and R K Julian

[+ Open abstract](#) [View article](#) [PDF](#)

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our [Privacy and Cookies policy](#).



**OPEN ACCESS**

012042

## Development of Web-based Research and Community Service Database at Universitas Negeri Surabaya

Warju, S E Cahyaningrum, Nurkholis, L Saksono, S R Nudin and S R Ariyanto

[+](#) Open abstract [View article](#) [PDF](#)

---

### OPEN ACCESS

012043

## Energy Management Methodology for Sustainable Water Development and Servicing, Considering the POET Based Concept

P B Ngancha, K Kusakana and E D Markus

[+](#) Open abstract [View article](#) [PDF](#)

---

### OPEN ACCESS

012044

## Evaluation on EMG Electrode Reduction in Recognizing the Pattern of Hand Gesture by Using SVM Method

H A Winarno, A I Poernama, I Soesanti and H A Nugroho

[+](#) Open abstract [View article](#) [PDF](#)

---

### OPEN ACCESS

012045

## IoT Water Monitor Implementation Strategy

G A Gericke and R B Kuriakose

[+](#) Open abstract [View article](#) [PDF](#)

---

### OPEN ACCESS

012046

## IT Governance Audit and Determination of Work Priorities Using Analytical Hierarchy Process: Case Study the Government of North Maluku, Indonesia

A Arief, D Natsir, A Khairan and D I Sensuse

[+](#) Open abstract [View article](#) [PDF](#)

---

### OPEN ACCESS

012047

## Machine to Machine Communication Protocol for SMART Manufacturing Units

G A Gericke, R B Kuriakose, H J Vermaak and Ole Madsen

[+](#) Open abstract [View article](#) [PDF](#)

---

### OPEN ACCESS

012048

## Naïve Bayes Method to Determine Learning Specialization for New Students

M Wahyu, A A Munaji, R A Halim and A J Santoso

[+](#) Open abstract [View article](#) [PDF](#)

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.





---

**OPEN ACCESS**

012049

Optimal energy management of Ice thermal energy storage-based air conditioning system for commercial buildings in real-time – A review based on POET framework

O Y Odufuwa, K Kusakana and B P Numbi

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012050

PAMELA-CL: Partition Membership Based on Lazy Classifier for Neuromarketing

I N Yulita, A Sholahuddin, Emilliano and D Novita

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012051

Performance Analysis of Algorithms on Different Types of Health Related Datasets

N N Khanom, F Nihar, S S Hassan and L Islam

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012052

POET Structured energy management and efficiency improvement of a grid-integrated electric vehicle energy Charging Stations

L Bokopane, K Kusakana and H Vermaak

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012053

Prototype of Integrated Livestock Recording Application with Animal Identification and Certification System in Kebumen

U Subagyo and D Ardiansyah

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012054

Reverse Engineering Website Navigation Using an Information Architecture Approach (Case Study: Kanal Pengetahuan Universitas Gadjah Mada)

M Fikri, S S Kusumawardani and R Ferdiana

[+ Open abstract](#) [View article](#) [PDF](#)

---

**OPEN ACCESS**

012055

Surface Deformation due to the 2017-2018 Agung Volcano Eruption from Interferometric Synthetic Aperture Radar (InSAR) Sentinel-1 TOPS

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.



[+ Open abstract](#)   [View article](#)   [PDF](#)

---

**OPEN ACCESS**

012056

**The Comparison of Cloud Migration Effort on Platform as a Service**

R B Suryawan, R Ferdiana and Widyawan

[+ Open abstract](#)   [View article](#)   [PDF](#)

**JOURNAL LINKS**

---

[Journal home](#)

---

[Journal Scope](#)

---

[Information for organizers](#)

---

[Information for authors](#)

---

[Contact us](#)

---

[Reprint services from Curran Associates](#)

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our [Privacy and Cookies policy](#).



PAPER • OPEN ACCESS

## TOPSIS Method for Decision Support Systems in Determining the Interests of Medical Student

To cite this article: E Riswanto *et al* 2020 *J. Phys.: Conf. Ser.* **1577** 012013

View the [article online](#) for updates and enhancements.

You may also like

- [Mechatronics Fault Prediction and Diagnosis Based on Multi Sensor Information Fusion](#)  
Jinghua Yu
- [Application of Artificial Intelligence Technology in Basketball Games](#)  
Zhenghao Liu
- [Validity and practicality of buffer solution module based on discovery learning with a scientific approach to increase the critical thinking ability of 11<sup>th</sup> grade high school students](#)  
Ririn Ade Lestari, Hardeli, Indang Dewata et al.



The Electrochemical Society  
Advancing solid state & electrochemical science & technology

242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Abstract submission deadline: **April 8, 2022**

Connect. Engage. Champion. Empower. Accelerate.

**MOVE SCIENCE FORWARD**



Submit your abstract



# TOPSIS Method for Decision Support Systems in Determining the Interests of Medical Student

E Riswanto<sup>1</sup>, D R Melany<sup>2</sup>, B S Wiratama<sup>3</sup> and Syafrianto<sup>4</sup>

<sup>1</sup> Informatics Engineering Department, STMIK El Rahma, Jl. Sisingamangaraja No 76 Yogyakarta 55153 Indonesia

<sup>2</sup> Informatics Engineering Department, STMIK El Rahma, Jl. Sisingamangaraja No 76 Yogyakarta 55153 Indonesia

<sup>3</sup> Biostatistics, Epidemiology and Population Health, Faculty of Medicine, Public Health, and Nursing Gadjah Mada University Indonesia

<sup>4</sup> Informatics Engineering Department, STMIK El Rahma, Jl. Sisingamangaraja No 76 Yogyakarta 55153 Indonesia

**Abstract.** Learning modules selected at Medical Education Study Program of Gadjah Mada University is not accordance with the student's interests and abilities. Some modules does not give a detailed information. Student tend to choose the recommended modules with highly subjective consideration, following recommendation from classmates or senior. This study uses the TOPSIS method. it is used in decision support systems. The system developed is not a decision making tool, but a system that helps decision makers with information from data that has been processed. Results of implementing decision support system using TOPSIS method are module chosen according to student's interest. Through interest test, the student completes the questions that are available in each module block. Student not need to read the entire module overview. Decision support system display an appropriate module overview through ranking result from the prediction analysis of student interest and abilities.

## 1. Introduction

Decision support systems (DSS) have an important role to assist decision makers in understanding information, when processes are needed, and in what form decisions are made [1]. DSS can be used to help make decisions based on data and models to solve problems[2]. DSS is built to solve various managerial problems and corporate organizations. DSS increases the effectiveness and productivity of managers to solve problems with the help of computer technology[3].

University of Gadjah Mada University Medical Study Program applies a block system to its learning. Learning blocks have themes in accordance with the curriculum using problem based on learning strategies. Block module is chosen by students in the fourth year, block module discusses subjects related to medicine that have not been discussed intensively in other blocks.

Block module consists of elective courses. Block module contains topics outside the core curriculum. The purpose of the block module is to enrich the knowledge, skills and behaviors that support career development. Each student must choose two modules.

Selection of the Block module is done freely with a quota system. Students in selecting modules use subjective considerations such as friends in choosing modules, references from seniors about the modules selected, and lecturers who teach modules. Study program has provided a guideline book which contains the Terms of Reference (TOR) regarding information on each module offered. Number



of modules offered causes students not to receive detailed information about the contents of each module.

To get the results of the prediction analysis of medical students' interest, a decision support system application is needed using the TOPSIS method. Method is based on the concept that the best chosen alternative not only has the shortest distance from the positive ideal solution but also has the longest distance from the negative ideal solution[4]. Using DSS students get module recommendations according to their interests and abilities. Students get detailed information on the chosen modules to be chosen more quickly and accurately.

## 2. Current Research

Several kinds of research use the TOPSIS method to produce recommendations. It is used to select the best employees. The criteria used in the selection of the best employees are work discipline, behavior, work quality and job responsibilities. The final results of the best prospective employees are used as the best employee selection decision making tool by top management [5].

Likewise, research of Khosravi [6], also uses the TOPSIS method for selecting rice milling systems. The Criteria used to make decisions include the percentage of rice damage, market attractiveness, energy requirements, capacity and cost of rice milling.

Whereas Habibi [7] conducts research using the TOPSIS method, Moora and the combination of those methods to determine hospital ranking. The study was conducted based on six criteria, namely Registration, Payment, Outpatient, Inpatient, Emergency and Pharmacy. The results showed that the combination method, MOORA, and TOPSIS determined the same hospital for rank 1 to rank 7. Then, for ranking 8 to rank 10, the TOPSIS method got different results from other methods. The results of the final analysis in this study can be used as recommendations for hospital managers and the government to improve the quality of public health services.

In contrast to Listyaningsih [8], she combines the TOPSIS and the methods of building a decision support system that determines the performance of village governments. The AHP method is used for weighting while the TOPSIS method is used for ranking the performance of the village government. The system has a dynamic nature for the required evaluation criteria. Assessment criteria can be adjusted to the regulations or requirements needed. From the test results, it was found that 86.67% of users agreed that the prototype could be implemented and used to evaluate the performance of the village government in the Secang sub-district.

## 3. Methodology

### 3.1 Analysis of Medical Students Interest with the TOPSIS Method

Case studies: Medical students choose modules to be studied in the block module to enrich knowledge, skills and behaviors that support career development. Alternative modules consist of:

- 1) A1 = Advance Anthropometry
- 2) A2 = Lifestyle Nutrition
- 3) A3 = The Management Of Chronic Disease
- 4) A4 = Sport Science

Three criteria are used as a reference in decision making, namely:

- 1) C1 = Not interested
- 2) C2 = Pretty interested
- 3) C3 = Very interested

The importance of each criteria, assessed from 1 to 3, namely:

- 1) C1 = Not Important
- 2) C2 = Quite Important
- 3) C3 = Very important

Decision support systems give preference weights to each criteria :

$$W = (1, 2, 3)$$

### 3.2 Application of Steps in TOPSIS

- 1) Determine criteria that will be used as a reference for decision making, namely  $C_i$  and nature of each criteria

**Table 1.** Weight of Criteria

Criteria Name	Nature of Criteria	Weight
C1 = Not interested	Positive. Reason: inappropriate statement describing Student's self.	1
C2 = Pretty interested	Negative. Reason: statement describing self-doubting Student	2
C3 = Very interested	Positive. Reason: appropriate statement describing Student self	3

- 2) Determine the suitability rating of each alternative on each criterion. Criteria value on all alternatives is obtained from the accumulation of student answers.

Table 4.2 show list of question statement to determine students interest in choosing modules as alternatives

**Table 2.** Question Statement

ID	Question Statement	A1	A2	A3	A4
P01	I am interest to know basic anthropometry	v	v		v
P02	I am interest understanding health issue related to anthropometry	v	v		
P03	I am interest understanding health diagnosis using anthropometry.	v			
P04	I am interest understanding benefit using anthropometry in health diagnosis	v			
P05	I am interest having expertise to apply anthropometry in health diagnostics	v	v		
P06	I am interest learning correct use tools of anthropometrics	v	v		v
P07	I am interest using an evidence based approach to assess the nutritional status of patient and determine effectiveness of intervention		v	v	v
P08	I am interest understanding role of family doctors in primary care				v
P9	I am interest understanding the Chronic Disease Program in primary care.				v
P10	I am interest understanding the natural history of disease, five levels of prevention and environmental problem that can contribute to an individual's health.				v
P11	I am interest in effective communication with family and community about patient condition, therapy, diet, and prevention of chronic diseases.		v	v	
P12	I am interest understanding interprofessional collaboration in managing chronic disease patient.		v	v	
P13	I am interest understanding application of family practices Indonesia health care system.				v
P14	I am interest writing good recipe			v	v
P15	I am interested in the application of sports anthropometry	v			v
P16	I am interest knowing anthropometric assessment on athlete.				v
P17	I am interest knowing the application of sports nutrition.		v		v
P18	I am interest knowing differences in performance in anthropometry, biomechanics, aerobic capacity, oxidative stress parameters in serum and nutrition between endurance, endurance athlete and non athlete.	v			v
<b>TOTAL</b>		<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>

**Table 3.** Matrix A criteria value for each alternative

Alternatif	Criteria		
	C1	C2	C3
A1	3	3	2
A2	2	4	2
A3	1	5	2
A4	2	4	2

- 3) Make a normalized decision matrix. TOPSIS requires a performance rating of each Ai alternative on each normalized Cj criterion.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^m x_{ij}^2}} \dots \dots \dots (1)$$

**Table 4.** Matrik A ternormalisasi

Matrik A			Matrik R (Normalisasi)		
3	3	2	0.7071	0.3693	0.5000
2	4	2	0.4714	0.4924	0.5000
1	5	2	0.2357	0.6155	0.5000
2	4	2	0.4714	0.4924	0.5000

- 4) The multiplication between the weights and the value of each attribute to form the Y matrix can be determined based on the normalized weight ranking (yij).

$$y_{ij} = w_i r_{ij} \dots \dots \dots (2)$$

**Table 5.** Matrik Y

0.7071	0.7385	1.5000
0.4714	0.9847	1.5000
0.2357	1.2309	1.5000
0.4714	0.9847	1.5000

- 5) Determine the matrix of a negative ideal solution and a positive ideal solution

$$\begin{aligned}
 Y_j^+ &= \begin{cases} \max_i y^{ij} & \text{if } j \text{ is the profit attribute} \\ \min_i y^{ij} & \text{if } j \text{ is the cost attribute} \end{cases} \\
 Y_j^- &= \begin{cases} \min_i y^{ij} & \text{if } j \text{ is the cost attribute} \\ \max_i y^{ij} & \text{if } j \text{ is the cost attribute} \dots \dots \dots (3) \end{cases}
 \end{aligned}$$

**Table 6.** Y + and Y- matrix values

Criteria Name	Nature of the criteria	Y+	Y-
C1 = Not interested	Positif	Max (0.7971;0.4714;0.2357.0.04714) = 07071	Min (0.7971;0.4714;0.2357;0.04714) = 0.2357
C2 = Pretty interested	Negatif	Min {0.7385; 0.9847; 1.2309; 0.9847}=0.7385	Max {0.7385; 0.9847; 1.2309; 0.9847}=1.2309
C3 = Very interested	Positif	Max {1.5000; 1.5000; 1.5000; 1.5000}=1.5000	Min {1.5000; 1.5000; 1.5000; 1.5000}=1.5000
Can be concluded		A+ {0.7071;0.7385;15000}	A- = {0.2357;1.2309;15000}

- 6) Determine the distance between the value of each alternative and the positive and negative ideal solution matrices.

The formula for the value of D + positive solution distance:

$$D_i^+ = \sqrt{\sum_{j=1}^n (y_i^+ - y_{ij}^+)^2} \dots\dots\dots (4)$$

The formula the D-distance value of the negative ideal solution:

$$D_i^- = \sqrt{\sum_{j=1}^n (y_{ij}^- - y_i^-)^2} \dots\dots\dots (5)$$

The distance between the value weights from each alternative to the positive ideal solution S<sub>+</sub> can be calculated by:

$$D_{1+} = \sqrt{(Y_{11} - Y_{1+})^2 + (Y_{12} - Y_{2+})^2 + (Y_{13} - Y_{3+})^2}$$

$$D_{1+} = \sqrt{(0.7071 - 0.7071)^2 + (0.7385 + 0.7385)^2 + (15000 - 15000)^2} = 0.0000$$

$$D_{2+} = \sqrt{(0.4714 - 0.7071)^2 + (0.9847 + 0.7385)^2 + (15000 - 15000)^2} = 0.3408$$

$$D_{3+} = \sqrt{(0.2357 - 0.7071)^2 + (1.2309 + 0.7385)^2 + (15000 - 15000)^2} = 0.6816$$

$$D_{4+} = \sqrt{(0.4714 - 0.7071)^2 + (0.9847 + 0.7385)^2 + (15000 - 15000)^2} = 0.3408$$

The distance between the weighted values of each alternative to S<sub>i</sub>-negative ideal solutions can be calculated with

$$D_{1-} = \sqrt{(Y_{11} - Y_{1-})^2 + (Y_{12} - Y_{2-})^2 + (Y_{13} - Y_{3-})^2}$$

$$D_{1-} = \sqrt{(0.7071 - 0.2357)^2 + (0.7385 + 1.2309)^2 + (15000 - 15000)^2} = 0.6816$$

$$D_{2-} = \sqrt{(0.4714 - 0.2357)^2 + (0.9847 + 1.2309)^2 + (15000 - 15000)^2} = 0.3408$$

$$D_{3-} = \sqrt{(0.2357 - 0.2357)^2 + (1.2309 + 1.2309)^2 + (15000 - 15000)^2} = 0.0000$$

$$D_{4-} = \sqrt{(0.4714 - 0.2357)^2 + (0.9847 + 1.2309)^2 + (15000 - 15000)^2} = 0.3408$$

- 7) Determine the preference value for each alternative. A greater V<sub>i</sub> value indicates the alternative A<sub>i</sub> that is preferred.

$$V_i = \frac{D_i^-}{D_i^- + D_i^+} \dots\dots\dots (6)$$



**Table 7.** Calculation result of TOPSIS method

1	A1	1.0000	<i>Advance Anthropometry</i>
2	A2	0.5000	<i>Lifestyle Nutrition</i>
3	A4	0.5000	<i>Sport Science</i>
4	A3	0.0000	<i>The Management Of Chronic Disease</i>

#### 4. Conclusion

TOPSIS method can be applied to the Medical Education Student Interest Decision Support System to find out which module recommendations are offered. The recommended module blocks are in accordance with the interests and abilities of the Student. weight value uses a three criteria scale that is not interested, quite interested and very interested in answering questions related to the module offered.

#### 5. References

- [1] V. L. Sauter, *Decision Support System for Business Intelligence Second Edition*. New Jersey: John Wiley & Sons, Inc., 2010.
- [2] M. R. Alizadeh, "Application of multiple criteria decision making system compensatory ( TOPSIS ) in selecting of rice milling system Application of Multiple Criteria Decision Making System Compensatory ( TOPSIS ) in Selecting of Rice Milling System," no. March, 2017.
- [3] L. K. W. Amanda Ayu Larasati, Anif Hanifa Setyaningrum, "Development Decision Support System of Choosing Medicine using TOPSIS Method," 2016.
- [4] M. V. T. Lokare, "Using the AHP and TOPSIS methods for Decision Making In Best Course Selection after HSC," 2016.
- [5] A. P. Robbi Rahim, S Supiyandi, A P U Siahaan, Tri Listyorini, M. K. Utomo, Wiwit Agus Triyanto, Yudie Irawan, Siti Aisyah, and S. S. and K. K. Khairunnisa, "TOPSIS Method Application for Decision Support System in Internal Control for Selecting Best Employees," no. June, 2018.
- [6] J. Khosravi, M. A. Asoodar, M. R. Alizadeh, and M. H. Peyman, "Application of Multiple Criteria Decision Making System Compensatory ( TOPSIS ) in Selecting of Rice Milling System," vol. 13, no. 11, pp. 2306–2311, 2011.
- [7] K. R. Alfin Niam Habibi, Sungkono, "Determination of Hospital Rank by Using Technique For Order Preference by Similiarity to Ideal Solution ( TOPSIS ) and Multi Objective Optimization on the Basis of Ratio Analysis ( MOORA )," *2019 Int. Semin. Appl. Technol. Inf. Commun.*, no. 2, pp. 574–578, 2019.
- [8] V. Listyaningsih and E. Utami, "Decision Support System Performance-Based Evaluation of Village Government using AHP and TOPSIS Methods: Secang Sub-district of Magelang Regency as a Case Study," no. April, pp. 18–28, 2018.



**SEKOLAH TINGGI MANAJEMEN INFORMATIKA DAN ILMU KOMPUTER  
EL RAHMA YOGYAKARTA**

● JL. Sisingamangaraja 76 Karangajen Brontokusuman Mergangsan Yogyakarta ☎ (0274) 377982 Fax (0274) 377982 ●

**SURAT TUGAS**

Nomor : 033.2/LPPM/ST/XI/2019

Yang bertanda tangan dibawah ini :

Nama : Andri Syafrianto, S.Kom., M.Cs  
NPP : 201230047  
Jabatan : Ketua LPPM STMIK El Rahma Yogyakarta

Memberikan tugas kepada :

Nama : Eko Riswanto, S.T., M.Cs  
NIP : 197501152005011002

Untuk mempublikasikan jurnal dengan judul *TOPSIS Method for Decision Support Systems in Determining the Interests of Medical Student*, pada *Journal of Physics: Conference Series, Volume 1577, The 2nd 2019 ICERA: International Conference on Electronics Representation and Algorithm "Innovation and Transformation for Best Practices in Global Community" 12-13 December 2019, Yogyakarta, Indonesia*

Demikian surat tugas ini dibuat untuk dilaksanakan dengan sebaik-baiknya dan penuh tanggung jawab.

Yogyakarta, 20 November 2019  
Ketua LPPM STMIK El Rahma



Andri Syafrianto, S.Kom., M.Cs  
NPP, 201230047