

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW***  
**KARYA ILMIAH : PROSIDING**

Judul Karya Ilmiah : Wireless sensor network design for landslide warning system in IoT architecture  
Jumlah Penulis : 5 orang (**Aghus Sofwan**, Sumardi, M. Ridho, A. Goni, Najib)  
Status Pengusul : Penulis Ke-1  
Identitas Prosiding : a. Judul Prosiding : **The 2017 4th International Conference on Information Technology, Computer, and Electrical Engineering**  
b. ISBN/ISSN : 978-1-5090-1434-7  
c. Thn Terbit, Tempat Pelaks. : 18-19 Oktober 2017  
d. Penerbit/Organiser : IEEE Xplore (Institute of Electrical and Electronics Engineers)  
e. Alamat Repository/Web : <https://ieeexplore.ieee.org/document/8257718>  
Alamat Artikel : [https://doc-pak.undip.ac.id/7641/1/Wireless\\_Sensor\\_Network\\_Design.pdf](https://doc-pak.undip.ac.id/7641/1/Wireless_Sensor_Network_Design.pdf)  
f. Terindeks di (jika ada) : Scopus

Kategori Publikasi Makalah : ☐ *Prosiding* Forum Ilmiah Internasional  
(beri ✓ pada kategori yang tepat) ☐ *Prosiding* Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi prosiding (10%)	2,50	2,50	2,50
b. Ruang lingkup dan kedalaman pembahasan (30%)	7,00	6,50	6,75
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	7,00	7,00	7,00
d. Kelengkapan unsur dan kualitas terbitan/prosiding(30%)	7,50	7,50	7,50
<b>Total = (100%)</b>	<b>24,00</b>	<b>23,50</b>	<b>23,75</b>
<b>Nilai Pengusul = (60% x 23,75) = 14,25</b>			

Semarang,

Reviewer 2



Dr. Wahyudi, S.T., M.T.  
NIP. 196906121994031001  
Unit Kerja : Teknik Elektro FT UNDIP

Reviewer 1



Dr. Eng. Wahyul Amien Syafei, ST, MT  
NIP. 197112181995121001  
Unit Kerja : Teknik Elektro FT UNDIP

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW***  
**KARYA ILMIAH : PROSIDING**

Judul Karya Ilmiah : Wireless sensor network design for landslide warning system in IoT architecture  
 Jumlah Penulis : 5 orang (**Aghus Sofwan**, Sumardi, M. Ridho, A. Goni, Najib)  
 Status Pengusul : Penulis Ke-1  
 Identitas Prosiding : a. Judul Prosiding : **The 2017 4th International Conference on Information Technology, Computer, and Electrical Engineering**  
 b. ISBN/ISSN : 978-1-5090-1434-7  
 c. Thn Terbit, Tempat Pelaks. : 18-19 Oktober 2017  
 d. Penerbit/Organiser : IEEE Xplore (Institute of Electrical and Electronics Engineers)  
 e. Alamat Repository/Web : <https://ieeexplore.ieee.org/document/8257718>  
 Alamat Artikel : [https://doc-pak.undip.ac.id/7641/1/Wireless\\_Sensor\\_Networ\\_k\\_Design.pdf](https://doc-pak.undip.ac.id/7641/1/Wireless_Sensor_Networ_k_Design.pdf)  
 f. Terindeks di (jika ada) : Scopus

Kategori Publikasi Makalah : ☐ Prosiding Forum Ilmiah Internasional  
 (beri ✓ pada kategori yang tepat) ☐ Prosiding Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding		Nilai Akhir Yang Diperoleh
	Internasional <div>25</div>	Nasional <div></div>	
a. Kelengkapan unsur isi prosiding (10%)	2,50		2,50
b. Ruang lingkup dan kedalaman pembahasan (30%)	7,50		7,00
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	7,50		7,00
d. Kelengkapan unsur dan kualitas terbitan/prosiding(30%)	7,50		7,50
<b>Total = (100%)</b>	<b>25,00</b>		<b>24,00</b>
<b>Nilai Pengusul = (60% x 24,00) = 14,40</b>			

**Catatan Penilaian Paper oleh Reviewer :**

- Kesesuaian dan kelengkapan unsur isi paper:** Makalah telah ditulis sesuai dengan kelengkapan penulisan proceeding IEEE. Terdapat abstract, introduction, system architecture yang memuat metodologi penelitian, result and discussion, conclusion, dan references.
- Ruang lingkup dan kedalaman pembahasan:** Ruang lingkup berupa desain wireless sensor network (wsn) dalam arsitektur IoT. Makalah menampilkan desain dan pengujian sensor-sensor dalam wsn
- Kecukupan dan kemutakhiran data/informasi dan metodologi:** Referensi dan data yang ditampilkan cukup mutakhir. Terdapat 10 dari 12 referensi berada dalam rentang 5 tahun terakhir.
- Kelengkapan unsur dan kualitas terbitan:** Makalah telah terbit di proceeding dan terindeks di IEEEExplore dan Scopus.

Semarang,  
 Reviewer 1



Dr. Eng. Wahyul Amien Syafei, ST, MT  
 NIP. 197112181995121001  
 Unit Kerja : Teknik Elektro FT UNDIP

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW***  
**KARYA ILMIAH : PROSIDING**

Judul Karya Ilmiah : Wireless sensor network design for landslide warning system in IoT architecture  
 Jumlah Penulis : 5 orang (**Aghus Sofwan**, Sumardi, M. Ridho, A. Goni, Najib)  
 Status Pengusul : Penulis Ke-1  
 Identitas Prosiding : a. Judul Prosiding : **The 2017 4th International Conference on Information Technology, Computer, and Electrical Engineering**  
 b. ISBN/ISSN : 978-1-5090-1434-7  
 c. Thn Terbit, Tempat Pelaks. : 18-19 Oktober 2017  
 d. Penerbit/Organiser : IEEE Xplore (Institute of Electrical and Electronics Engineers)  
 e. Alamat Repository/Web : <https://ieeexplore.ieee.org/document/8257718>  
 Alamat Artikel : [https://doc-pak.undip.ac.id/7641/1/Wireless\\_Sensor\\_Networ\\_k\\_Design.pdf](https://doc-pak.undip.ac.id/7641/1/Wireless_Sensor_Networ_k_Design.pdf)  
 f. Terindeks di (jika ada) : Scopus

Kategori Publikasi Makalah : ☐ Prosiding Forum Ilmiah Internasional  
 (beri ✓ pada kategori yang tepat) ☐ Prosiding Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding		Nilai Akhir Yang Diperoleh
	Internasional <div>25</div>	Nasional <div></div>	
a. Kelengkapan unsur isi prosiding (10%)	2,50		2,50
b. Ruang lingkup dan kedalaman pembahasan (30%)	7,50		6,50
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	7,50		7,00
d. Kelengkapan unsur dan kualitas terbitan/prosiding(30%)	7,50		7,50
<b>Total = (100%)</b>	<b>25,00</b>		<b>23,50</b>
<b>Nilai Pengusul = (60% x 23,50) = 14,10</b>			

**Catatan Penilaian Paper oleh Reviewer :**

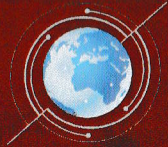
- Kesesuaian dan kelengkapan unsur isi paper:** Unsur makalah lengkap sesuai yang dibutuhkan, seperti pendahuluan, metodologi, pembahasan, kesimpulan dan daftar putaka
- Ruang lingkup dan kedalaman pembahasan:** ruang lingkup pembahasan bukan sesuatu yang baru, pembahasan bukan dengan membandingkan, alasan tidak disampaikan
- Kecukupan dan kemutakhiran data/informasi dan metodologi:** metodologi yang digunakan sudah banyak dipelajari, namun data yang digunakan cukup baru
- Kelengkapan unsur dan kualitas terbitan:** Kelengkapan unsur terbitan bagus dan penelitian pada seminar terindeks Scopus

Semarang,  
 Reviewer 2



Dr. Wahyudi, S.T., M.T.  
 NIP. 196906121994031001  
 Unit Kerja : Teknik Elektro FT UNDIP





**ICITACEE 2017**

THE 4<sup>th</sup> INTERNATIONAL CONFERENCE ON INFORMATION  
TECHNOLOGY, COMPUTER, AND ELECTRICAL ENGINEERING

Green TECHNOLOGY for the Better Future  
in Information Technology, Electrical, and  
COMPUTER ENGINEERING Implementation



# Certificate

Awarded to

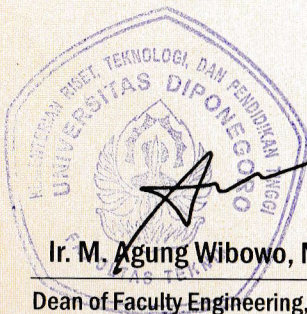
**AGHUS SOFWAN**

as

**PRESENTER**

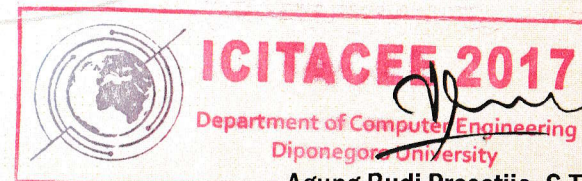
**THE 4<sup>th</sup> INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY, COMPUTER, AND ELECTRICAL ENGINEERING  
( ICITACEE 2017 )**

Department of Computer Engineering, Diponegoro University  
Semarang, 18 - 19 October 2017



**Ir. M. Agung Wibowo, M.M., M.Sc., Ph.D**

Dean of Faculty Engineering, Diponegoro University



**Agung Budi Prasetyo, S.T., M.IT., Ph.D.)**

General Chair



Document details

< Back to results | < Previous 5 of 15 Next >

Export Download Print E-mail Save to PDF Add to List More... >

View at Publisher

Proceedings - 2017 4th International Conference on Information Technology, Computer, and Electrical Engineering, ICITACEE 2017  
Volume 2018-January, 12 January 2018, Pages 280-283  
4th International Conference on Information Technology, Computer, and Electrical Engineering, ICITACEE 2017; The Wujil Resort and Conventions Semarang; Indonesia; 18 October 2017 through 19 October 2017; Category number CFP1789Z-PRT; Code 134244

Wireless sensor network design for landslide warning system in IoT architecture (Conference Paper)

Sofwan, A.<sup>a</sup>, Sumardi<sup>a</sup>, Ridho, M.<sup>a</sup>, Goni, A.<sup>a</sup>, Najib<sup>b</sup>

<sup>a</sup>Department of Electrical Engineering, Diponegoro University, Semarang, Indonesia  
<sup>b</sup>Department of Geology Engineering, Diponegoro University, Semarang, Indonesia

Abstract

View references (12)

Landslide disaster is frequently happened in Indonesia, which has climate characteristic, area topography, and geological structure that make this country has many landslide potential areas. During the rainy season, the load on the slopes grows due to the increase in water content in the soil, which can lead to landslide. Landslide early warning system can be built based on geological structure and some physical environment parameters using sensors using the wireless sensor network. The communication networks with Internet technology support a substantial backbone for communication. IoT architecture can accommodate wireless sensor network for landslide early warning system. This paper describes the system uses an Arduino ATmega 2560 microcontroller to collect data from many sensors. The measured and actual physical parameters are obtained, which indicates the system succeeds in providing sensed data.  
© 2017 IEEE.

SciVal Topic Prominence ⓘ

Topic: Landslides | Monitoring | landslide monitoring

Prominence percentile: 53.039 ⓘ

Author keywords

Internet of Things landslide wireless sensor network

Indexed keywords

Engineering controlled terms: Computer architecture Geology Internet of things Landslides Network architecture

Engineering uncontrolled terms: Climate characteristics Early Warning System Geological structures Increase in water content Internet technology Physical environments Physical parameters Wireless sensor network designs

Engineering main heading: Wireless sensor networks

Metrics ⓘ View all metrics >

1 Citation in Scopus

3.80 Field-Weighted Citation Impact

PlumX Metrics ⌵

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

Cited by 1 document

Implementation of vehicle traffic analysis using background subtraction in the Internet of Things (IoT) architecture

Sofwan, A. , Surur, F.A. , Arfan, M.  
(2018) 2018 6th International Conference on Information and Communication Technology, ICoICT 2018

View details of this citation

Inform me when this document is cited in Scopus:

Set citation alert >

Set citation feed >

Related documents

A study on disaster detection and management using WSN in Himalayan region of Uttarakhand

Pant, D. , Verma, S. , Dhuliya, P.  
(2018) Proceedings - 2017 3rd International Conference on Advances in Computing, Communication and Automation (Fall), ICACCA 2017

Implementation of vehicle traffic analysis using background subtraction in the Internet of Things (IoT) architecture

Sofwan, A. , Surur, F.A. , Arfan, M.

Elite immune parallel  
evolutionary algorithm for  
maximizing the monitored  
percentage in self-organizing  
wireless sensor networks

Zhou, J. , Tian, M.  
(2017) *Proceedings - 9th  
International Conference on  
Intelligent Human-Machine  
Systems and Cybernetics, IHMSC  
2017*

View all related documents based  
on references

Find more related documents in  
Scopus based on:

Authors > Keywords >

## References (12)

[View in search results format >](#)

☐ All ☐ Export ☐ Print ☐ E-mail ☐ Save to PDF ☐ Create bibliography

- ☐ 1 Romdhane, R.F., Lami, Y., Genon-Catalot, D., Fourty, N., Lagrèze, A., Jongmans, D., Baillet, L.  
**Wireless sensors network for landslides prevention**  
(2017) *2017 IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications, CIVEMSA 2017 - Proceedings*, art. no. 7995330, pp. 222-227. Cited 3 times.  
ISBN: 978-150904252-4  
doi: 10.1109/CIVEMSA.2017.7995330

[View at Publisher](#)

- ☐ 2 Akyildiz, I.F., Su, W., Sankarasubramaniam, Y., Cayirci, E.  
**A survey on sensor networks**  
(2002) *IEEE Communications Magazine*, 40 (8), pp. 102-105. Cited 9794 times.  
doi: 10.1109/MCOM.2002.1024422

[View at Publisher](#)

- ☐ 3 Jun, Z., Abbas, J.  
**Introduction to wireless sensor networks**  
(2009) *Wireless Sensor Networks: A Networking Perspective*, pp. 1-18.  
Wiley-IEEE Press

- ☐ 4 Xu, J., Yang, G., Chen, Z., Wang, Q.  
**A survey on the privacy-preserving data aggregation in wireless sensor networks**  
(2015) *China Communications*, 12 (5), art. no. 7112038, pp. 162-180. Cited 15 times.  
<http://ieeexplore.ieee.org/search/searchresult.jsp?newsearch=true&queryText=China+Communications+&x=54&y=17>  
doi: 10.1109/CC.2015.7112038

[View at Publisher](#)

- ☐ 5 Ali, A., Hamouda, W., Uysal, M.  
**Next generation M2M cellular networks: Challenges and practical considerations**  
(2015) *IEEE Communications Magazine*, 53 (9), art. no. 7263368, pp. 18-24. Cited 49 times.  
doi: 10.1109/MCOM.2015.7263368

[View at Publisher](#)

- ☐ 6 Holler, J., Tsiatsis, V., Mulligan, C., Avesand, S., Karnouskos, S., Boyle, D.  
**From Machine-To-Machine to the Internet of Things**  
(2014) *From Machine-To-Machine to the Internet of Things*, pp. 1-331. Cited 149 times.  
<http://www.sciencedirect.com/science/book/9780124076846>  
ISBN: 978-012407684-6  
doi: 10.1016/C2012-0-03263-2

[View at Publisher](#)

- ☐ 7 Culman, M., Portocarrero, J.M.T., Guerrero, C.D., Bayona, C., Torres, J.L., De Farias, C.M.  
**PalmNET: An open-source wireless sensor network for oil palm plantations**  
  
(2017) *Proceedings of the 2017 IEEE 14th International Conference on Networking, Sensing and Control, ICNSC 2017*, art. no. 8000190, pp. 783-788. Cited 3 times.  
ISBN: 978-150904428-3  
doi: 10.1109/ICNSC.2017.8000190  
  
[View at Publisher](#)
- 

- ☐ 8 Mat, I., Mohd Kassim, M.R., Harun, A.N., Mat Yusoff, I.  
**IoT in Precision Agriculture applications using Wireless Moisture Sensor Network**  
  
(2016) *ICOS 2016 - 2016 IEEE Conference on Open Systems*, art. no. 7881983, pp. 24-29. Cited 12 times.  
ISBN: 978-150902603-6  
doi: 10.1109/ICOS.2016.7881983  
  
[View at Publisher](#)
- 

- ☐ 9 Bathiya, B., Srivastava, S., Mishra, B.  
**Air pollution monitoring using wireless sensor network**  
  
(2016) *WIECON-ECE 2016 - 2016 IEEE International WIE Conference on Electrical and Computer Engineering*, art. no. 8009098, pp. 112-117. Cited 6 times.  
ISBN: 978-150903745-2  
doi: 10.1109/WIECON-ECE.2016.8009098  
  
[View at Publisher](#)
- 

- ☐ 10 Benkhelifa, I., Nouali-Taboudjemat, N., Moussaoui, S.  
**Disaster management projects using wireless sensor networks: An overview**  
  
(2014) *Proceedings - 2014 IEEE 28th International Conference on Advanced Information Networking and Applications Workshops, IEEE WAINA 2014*, art. no. 6844704, pp. 605-610. Cited 18 times.  
ISBN: 978-147992652-7  
doi: 10.1109/WAINA.2014.99  
  
[View at Publisher](#)
- 

- ☐ 11 Bhosle, A.S., Gavhane, L.M.  
**Forest disaster management with wireless sensor network**  
  
(2016) *International Conference on Electrical, Electronics, and Optimization Techniques, ICEEOT 2016*, art. no. 7755194, pp. 287-289. Cited 7 times.  
ISBN: 978-146739939-5  
doi: 10.1109/ICEEOT.2016.7755194  
  
[View at Publisher](#)
- 

- ☐ 12 Sumardi, Nurhayati, O.D., Prasetyo, Muh.N., Widiyanto, E.D.  
**Expert system for campus environment indexing in wireless sensor network**  
  
(2016) *ICITACEE 2015 - 2nd International Conference on Information Technology, Computer, and Electrical Engineering: Green Technology Strengthening in Information Technology, Electrical and Computer Engineering Implementation, Proceedings*, art. no. 7437795, pp. 183-186. Cited 2 times.  
ISBN: 978-147999861-6  
doi: 10.1109/ICITACEE.2015.7437795  
  
[View at Publisher](#)
-

THE 2017 4<sup>th</sup> INTERNATIONAL CONFERENCE  
ON INFORMATION TECHNOLOGY, COMPUTER,  
AND ELECTRICAL ENGINEERING

**ICITACEE 2017**

OCTOBER 18 -19, 2017



The Wujil Resort and Conventions  
**Semarang, October 18 - 19, 2017**



DEPARTMENT OF COMPUTER ENGINEERING  
FACULTY OF ENGINEERING  
DIPONEGORO UNIVERSITY







[HOME](#)   [ABOUT](#)   [LOG IN](#)   [ACCOUNT](#)   [SEARCH](#)   [CURRENT CONFERENCES](#)   [ARCHIVE](#)  
[ANNOUNCEMENTS](#)   [TOPICS AND SCOPES](#)   [AUTHOR GUIDELINES & SUBMISSION](#)   [CFP](#)

Home > International Conference on Information Technology, Computer and Electrical Engineering (ICITACEE) > **The 2017 4th International Conference on Information Technology, Computer and Electrical Engineering (ICITACEE)**

## The 2017 4th International Conference on Information Technology, Computer and Electrical Engineering (ICITACEE)

The Wujil Resort & Conventions

October 18, 2017 – October 19, 2017

The 2017 4<sup>th</sup> International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE) provides a forum for researchers, academicians, professionals, and students from various engineering fields and with cross-disciplinary working or interest in the development and design of information technology, computer system, and electrical engineering to interact and disseminate the latest issues and researches. It also offers opportunity to enjoy the heritage and the beauty of Semarang.

ICITACEE is an annual conference organized both by Department of Electrical Engineering and Department of Computer Engineering and in 2017 this conference will be organized by Department of Computer Engineering.

The papers accepted and presented will be forwarding for consideration to be published in the IEEE Xplore Digital Library. Several media types will be produced for Proceeding with the following ISBN and catalog numbers:

Media Type	Part Number	ISBN
XPLORE COMPLIANT	CFP1789Z-ART	978-1-5386-3947-4
USB	CFP1789Z-USB	978-1-5386-3945-0
PRINT	CFP1789Z-PRT	978-1-5386-3946-7

Three distinguish Professors will share the latest information of Information Technology, Electrical and Computer Engineering in the plenary discussion as the **key note speakers:**

1. Prof. Dr. Ir. Riri Fitri Sari, M.Sc., M.M. (University of Indonesia).
2. Azli Yahya, B.Eng., M.Sc., Ph.D. (Universiti Teknologi Malaysia).
3. Assoc. Prof. Dr. Mohamad Noorman Masrek (Universiti Teknologi Mara).

### Reviewers :

- Abdul Syakur (Diponegoro University, Indonesia)
- Achmad Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia)
- Achmad Hidayanto (University of Indonesia, Indonesia)
- Aghus Sofwan (Diponegoro University, Indonesia)
- Agung Prasetyo (Diponegoro University, Indonesia)
- **Ahmed Lutfi Elgreatly (Port Said University - Egypt)**
- **Ali Samoud (Science , Tunisia)**
- Arbai Yusuf (Universitas Indonesia, Indonesia)

### USER

Username

Password

☐ Remember me

### FONT SIZE

### NOTIFICATIONS

- [View](#)
- [Subscribe / Unsubscribe](#)

### ANNOUNCEMENTS

ATOM	1.0
RSS	2.0
RSS	1.0

- Ardyono Priyadi (ITS, Indonesia)
- Arif Muntasa (Trunojoyo University, Indonesia)
- Aris Triwiyatno (Diponegoro University, Indonesia)
- Arman Jaya (Electronics Engineering Polytechnic Institute of Surabaya, Indonesia)
- **Auzani Jidin - Universiti Teknikal Malaysia Melaka (UTeM)**
- Budi Setiyanto (Universitas Gadjah Mada, Indonesia)
- Danang Wijaya (UGM, Indonesia)
- Darlis Herumurti (Institut Teknologi Sepuluh Nopember, Indonesia)
- Dwiana Hendrawati (Institut Teknologi Sepuluh Nopember, Indonesia)
- Elin Cahyaningsih (University of Indonesia, Indonesia)
- Endra Joelianto (Institut Teknologi Bandung, Indonesia)
- Fahmi (University of Sumatera Utara, Indonesia)
- Fajar Hardoyono (Universitas Gadjah Mada, Indonesia)
- Fakhriy Hario (Brawijaya University, Indonesia)
- Gunawan Wibisono (University of Indonesia, Indonesia)
- Haikal Satria (Universiti Teknologi Malaysia, Malaysia)
- Haniza Nahar (Universiti Teknikal Malaysia, Malaysia)
- Hanung Adi Nugroho (Universitas Gadjah Mada, Indonesia)
- Harishchandra Dubey (University of Texas at Dallas, USA)
- Heri Suryoatmojo (Institut Teknologi Sepuluh Nopember, Indonesia)
- Hermawan (Diponegoro University, Indonesia)
- Imamul Muttakin (CTECH Labs Edwar Technology Co., Indonesia)
- Irrine Sulistiawati (Institut Teknologi Sepuluh Nopember Surabaya Indonesia, Indonesia)
- Iwan Setiawan (Universitas Diponegoro, Indonesia)
- Kartiko Nugroho (Universiti Teknologi Malaysia, Malaysia)
- Kurniawan Martono (Diponegoro University, Indonesia)
- Lukito Nugroho (Universitas Gadjah Mada, Indonesia)
- M Arfan (Diponegoro University, Indonesia)
- Mauridhi Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
- Mochammad Facta (Diponegoro University, Indonesia)
- Mohd Helmy Abd Wahab (Universiti Tun Hussein Onn Malaysia, Malaysia)
- Muhammad Anshari (Universiti Brunei Darussalam, Brunei Darussalam)
- Muhammad Rivai (Institut Teknologi Sepuluh Nopember, Indonesia)
- Munawar Riyadi (Diponegoro University, Indonesia)
- Nazrulazhar Bahaman (Univeristi Teknikal Malaysia Melaka, Malaysia)
- Noor Ahmad Setiawan (UGM, Indonesia)
- Norshita Mat Nayan (National University of Malaysia, Malaysia)
- Oky Nurhayati (Diponegoro University, Indonesia)
- Paulus Insap Santosa (Universitas Gadjah Mada, Indonesia)
- Prapto Nugroho (Universitas Gadjah Mada, Indonesia)
- R Rizal Isnanto (Diponegoro University, Indonesia)
- Riyanarto Sarno (Institut Teknologi Sepuluh Nopember, Indonesia)
- Rizal Munadi (Syiah Kuala University, Indonesia)
- Shahrin Md Ayob - Universiti Teknologi Malaysia (UTM)
- Sharul Kamal Abdul Rahim - Universiti Teknologi Malaysia (UTM)
- Sigit Wibowo (Gadjah Mada University, Indonesia)
- Siti Rochimah (Institut Teknologi Sepuluh Nopember, Indonesia)
- Siti Sendari (Universitas Negeri Malang, Indonesia)
- Slamet Riyadi (Soegijapranata Catholic University, Indonesia)
- Suharyanto (Gadjah Mada University, Indonesia)
- Susatyo Handoko (Universitas Diponegoro, Indonesia)
- Teguh Prakoso (Diponegoro University, Indonesia)
- Trias Andromeda (Universitas Diponegoro, Indonesia)
- **Tsuyoshi Usagawa (Kumamoto University, Japan)**
- Wahyudi (Departemen Teknik Elektro UNDIP, Indonesia)
- Wahyul Syafei (Diponegoro University, Semarang, Indonesia)
- Widyawardana Adiprawita (Institut Teknologi Bandung, Indonesia)
- Yoanes Bandung (Institut Teknologi Bandung, Indonesia)

## Announcements

### ICITACEE 2018 on IEEE Xplore and Scopus

Kindly accept our congratulations for having your published paper of ICITACEE 2018 is recently indexed in IEEE Xplore and Scopus.

Posted: 2018-12-17

[More...](#)

# **The 2017 4th International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE)**

## **Conference Committee**

**General Chair** : Agung Budi Prasetyo (Universitas Diponegoro)  
**Co-Chair** : Aghus Sofwan (Universitas Diponegoro)  
**Secretary** : Dania Eridani

### **Organizing Committee:**

Munawar Agus Riyadi  
R. Rizal Isnanto  
Risma Septiana  
Andi Widiasmoro  
Melati Mawas Titi  
Eko Didik Widiyanto  
Yudi Eko Windarto  
Kurniawan Teguh Martono  
Adnan Fauzi

### **Steering Committee:**

Hiroshi Ochi (Kyushu Institute of Technology, Jepang)  
Hiroshi Furukawa (Kyushu University, Jepang)  
Kuncoro Wastuwibowo (IEEE Indonesia Section)  
Trio Adiono (IEEE Solid State Circuits Indonesia Chapter)  
Mauridhi Hery Purnomo (Sepuluh Nopember Institute of Technology)  
Razali Ismail (University Teknologi Malaysia)  
Taufik (California Polytechnic State, USA)

### **Technical Program Committee:**

Mochammad Facta (Diponegoro University, Indonesia)  
Masayuki Kurosaki (Kyushu University, Japan)  
Trio Adiono (Bandung Institute of Technology, Indonesia)  
P. Insap Santosa (Gadjah Mada University, Indonesia)  
Hermawan (Diponegoro University, Indonesia)  
Mauridhi Hery Purnomo (Sepuluh Nopember Institute of Technology, Indonesia)  
Khoirul Anwar (Japan Advanced Institute of Science and Technology, Japan)  
Wahyudi (Diponegoro University, Indonesia)  
Tole Sutikno (Ahmad Dahlan University, Indonesia)  
Wahyul Amien Syafei (Diponegoro University, Indonesia)  
Munawar Agus Riyadi (Diponegoro University, Indonesia)  
Sidiq Syamsul Hidayat (Semarang State Polytechnics, Indonesia)  
Supari (Semarang University, Indonesia)  
Slamet Riyadi (Soegijapranoto Catholic University, Indonesia)  
M. Haddin (Sultan Agung Islamic University, Indonesia)



Onil Nazra Persada (CIRELA, France)

Zolkafle Buntat (Universiti Teknologi Malaysia)

Taufik (California Polytechnic State University, USA)

Hashim Uledi Iddi (University of Dar es Salaam, Tanzania)

Aris Triwiyatno (Diponegoro University, Indonesia)

Pandu Sandi Pratama (Pusan National University, South Korea)

Razali Ismail (Universiti Teknologi Malaysia, Malaysia)

Ismail Saad (University Malaysia Sabah, Malaysia)

Oky Dwi Nurhayati (Diponegoro University, Indonesia)

# TABLE OF CONTENTS

## Computer Science

- 1 Mapping Multiple Databases to Resource Description Framework with Additional Rules as Conclusions Drawer  
*Atleiya Julianita, Saptadi Nugroho, Banu Wirawan Yohanes*
- 5 Designing Android Reward System Application in Education to Improve Learning Quality  
*Ratih Isnaini, Basori Basori, Rosihan Ari Yuana, Dwi Maryono*
- 11 Location Prediction Model using Naïve Bayes Algorithm in a Half-open Building  
*Banu Wirawan Yohanes, Samuel Yanuar Rusli, Hartanto Kusuma Wardana*
- 16 A System Engineering Approach to the Implementation of the Internet of Things (IoT) in a Country  
*Muhammad Suryanegara, Ajib Setyo Arifin, Muhamad Asvial, Gunawan Wibisono*
- 20 Application of Design Patterns and Quality Measurement on Academic Information Systems  
*Siti Rochimah, Afif Ishamsyah Hantriono, Rizky Januar Akbar, Andreyan Rizky Baskara*
- 27 Part of Speech Features for Sentiment Classification based on Latent Dirichlet Allocation  
*Eka Surya Usop, R. Rizal Isnanto, Retno Kusumaningrum*
- 31 A Multiple Classifiers Broadcast Protocol for VANET  
*Sami S. Alwakeel, Hesham A. Altwaijry, Agung B. Prasetyo*
- 37 Buy/Sell Signal Detection in Stock Trading with Bollinger Bands and Parabolic SAR with Web Application for Proofing Trading Strategy  
*Agung B. Prasetyo, Takdir A. Saputro, Ike P. Windasari, Yudi E. Windarto*
- 41 Hoax Detection System on Indonesian News Sites Based on Text Classification using SVM and SGD  
*Agung B. Prasetyo, R. Rizal Isnanto, Dania Eridani, Yosua Alvin Adi Soetrisno, M. Arfan, Aghus Sofwan*
- 46 Analysis of Custody Transfer on Moving Bundle Protocol of Wireless Router in Delay Tolerant Network (DTN)  
*Fitri Noviani, Deris Stiawan, Sri Desy Siswanti, Tri Wanda Septian, Munawar A. Riyadi, Fahad Aljaber, Rahmat Budiarto*

## Electric Power

- 50 A Bi-directional Boost Converter-Based Non-Isolated DC-DC Transformer with Modular Solid-State Switches for Medium-/High-Voltage DC Grids  
*Ahmed Elserougi, Ahmed Massoud, Shehab Ahmed*
- 56 Enhancing the DC Voltage Utilization of Twelve- Switch Voltage Source Inverter Feeding Symmetrical/Asymmetrical Nine-Phase Loads  
*Ahmed Elserougi, Ibrahim Abdelsalam, Ahmed Massoud, Shehab Ahmed*
- 62 Determination of the Conduction Angle for Switched Reluctance Motor Drive  
*Slamet Riyadi*
- 67 Load Shedding and Forecasting in Distribution Systems with PV-based Distributed Generation and Electric Vehicles  
*Anas Tahir, Ahmed Massoud*
- 73 A Three-Level Common-Emitter Current Source Inverter with Reduced Device Count  
*Suroso Suroso, Daru Tri Nugroho, Winasis Winasis*
- 77 Reduction of Cogging Torque on Brushless Direct Current Motor with Segmentation of Magnet Permanent  
*Rudy Setiabudy, Herlina Herlina, Yudha Sasmita Putra*
- 83 Optimal Photovoltaic Placement at the Southern Sulawesi Power System for Stability Improvement  
*Ardiaty Arief, Muhammad Bachtiar Nappu, Sitti Marwah Rachman, Mustadir Darusman*

- 89 Feature Extraction Using Hilbert-Huang Transform for Power System Oscillation Measurements  
*Buyung Sofiarto Munir, Muhamad Reza, Agung Trisetyarso, Bahtiar Saleh Abbas*
- 93 Audit of Harmonic on Residential Loads in Central Java  
*Sapto Nisworo, Deria Pravitasari*
- 98 Harmonics Monitoring of Car's Inverter using Discrete Fourier Transformation  
*Mat Syai'in, N.H. Rohiem, R. K. Tobing, M.A. Atmoko, M. F. Adiatmoko, A. Soeprijanto, A.M Hatta, Sekartedjo Sekartedjo*
- 104 Voltage Sag Mitigation Due To Short Circuit Current Using Dynamic Voltage Restorer Based On Hysteresis Controller  
*Nizamul Muluk, Agung Warsito, Juningtyastuti Juningtyastuti, Iwan Setiawan*
- 109 Design Analysis of Photovoltaic Systems as Renewable Energy Resource in Airport  
*Hermawan Hermawan, Karnoto Karnoto*
- 113 Design and Development of Data Acquisition for Leakage Current at Electrical Tracking Test  
*Jumrianto Jumrianto, Wahyudi Wahyudi, Abdul Syakur*
- 119 Experimental Study on Lightning Air Terminal Performance based on Material Type  
*Abdul Syakur, Agung Nugroho, Anastasia Br. Napitupulu*
- 123 Comparison of Cost Estimation Methods in Power Wheeling for Java-Bali Interconnection System  
*Hermawan Hermawan, Trias Andromeda*
- 127 Optimization of Gas Turbine Power Plant Economic Dispatch using Cuckoo Search Algorithm Method  
*Tejo Sukmadi, Ariya Dwi Wardhana, Munawar Agus Riyadi*

### ***Electronics, Robotics and Instrumentation***

- 132 Ball Detection Algorithm for Robot Soccer based on Contour and Gradient Hough Circle Transform  
*Ane Cornelia, Iwan Setyawan*
- 138 Hardware Design of Queuing Free Environmental Friendly Automatic Toll Gate Using RFID  
*W. A. Syafei, A. F. Listyono, Darjat Darjat*
- 143 Smart Meter based on Time Series Modify and Constructive Backpropagation Neural Network  
*M. F. Adiatmoko, Adi Soeprijanto, Mat Syai'in, Nasyith Hananur R*
- 150 The Development of Soil Water Content Detector  
*Amin Suharjono, Muhammad Mukhlisin, Nur Khodijah M. Alfisyahrin*
- 154 Applying Maritime Wireless Communication to Support Vessel Monitoring  
*Zahir Zainuddin, Wardi Wardi, Yurika Nantan*
- 158 Design of Lungs Volume Measuring Instrument using Pressure Sensor Based on Arduino Uno R3 with Bluetooth Integration  
*Gayuh Nurul Huda, Eko Didik Widiyanto, Oky Dwi Nurhayati*
- 166 Designing and Implementing the Arduino-based Nutrition Feeding Automation System of a Prototype Scaled Nutrient Film Technique (NFT) Hydroponics using Total Dissolved Solids (TDS) Sensor  
*Dania Eridani, Olivia Wardhani, Eko Didik Widiyanto*
- 172 Door And Light Control Prototype Using Intel Galileo Based Internet of Things  
*Yudi Eko Windarto, Dania Eridani*
- 177 Particle Swarm Optimization (PSO)-Based Self Tuning Proportional, Integral, Derivative (PID) for Bearing Navigation Control System on Quadcopter  
*Sumardi Sumardi, Muhammad Surya Sulila, Munawar Agus Riyadi*
- 183 Design of Integrated SCADA Systems in Piston Production Manufacturing Case Study on the Conveyor, the Coolant, the Hydraulic, and the Alarm Systems using PLC CJ1M and CJ1W-ETN21  
*Syahril Ardi, Agus Ponco, Rizky Awaludin Latief*
- 188 Design of Pokayoke Systems to Increase the Efficiency of Function Check Oxygen Sensor Machine using Programmable Logic Controller in Manufacturing Industry  
*Syahril Ardi, Harits Abdurrahman*

### ***Image and Signal Processing***

- 193 Pattern Recognition Analysis of Herbal Leaves Based on Distance-Based Similarity Measures Using the Gray Level Co-Occurrence Matrix Feature Extraction  
*M. Fahmi Awaj, R. Rizal Isnanto, Munawar Agus Riyadi*



- 199 StegoCrypt Method using Wavelet Transform and One-Time Pad for Secret Image Delivery  
*Andik Setyono, De Rosal Ignatius Moses Setiadi, Muljono Muljono*
- 204 A Secure Image Watermarking using Chinese Remainder Theorem Based on Haar Wavelet Transform  
*Usman Sudibyo, Fatma Eranisa, De Rosal Ignatius Moses Setiadi, Christy Atika Sari*
- 209 Plant Age Identification System of Outdoor Hydroponic Cultivation Based on Digital Image Processing  
*Arif Nursyahid, Mochammad Rizal Wibisono, Eni Dwi Wardihani, Helmy Helmy, Thomas Agung Setyawan*
- 215 Herb Leaves Recognition Using Combinations of Hu's Moment Variants - Backpropagation Neural Network and 2-D Gabor Filter - Learning Vector Quantization (LVQ)  
*R. Rizal Isnanto, Achmad Hidayatno, Ajub Ajulian Zahra, Eskanesiari Eskanesiari, Aditya Indra Bagaskara, Risma Septiana*

## **Information Technology**

- 221 Review on the Application of Financial Technology for the Wayang Orang Ngesti Pandowo Cultural Creative Industry  
*Albertus Dwiyooga Widiatoro, Ridwan Sanjaya, Tjahjono Rahardjo, Rahmat Djati*
- 226 Online Judging System for Programming Contest using UM Framework  
*I Made Wirawan, Agusta Rakhmat Taufani, Irawan Dwi Wahyono, Irham Fadlika*
- 231 Regulatory Framework Creation Analysis to Reduce Security Risks The Use of Social Media in Companies  
*Oktavianus Teguh Prayitno, Ofelia Cizela da Costa Tavares, Amaya Andri Damaini, Djoko Budiyo Setyohadi*
- 235 Student Learning Styles and Emotional Tendencies Detection Based on Twitter  
*Robet Habibi, Djoko Budiyo Setyohadi, Kartika Imam Santoso*
- 240 Inter-Organizational Information System Affect Organization Structure for Supply Chain Management Using Method SET and Method TREV  
*Rakotovao Andriamitovo Andry Michel, Ginanjar Setyo Nugroho, Chaken Charles Z Slarmanat, Djoko Budiyo Setyohadi*
- 245 Integration Of Pharmacy And Drug Manufacturers In RSUD Dr Samratulangi Tondano By ESB WSO2 To Improve Service Quality (A Case Study of RSUD Dr Samratulangi Tondano, Minahasa Regency, North Sulawesi)  
*Damar Suryo Sasono, Frendy Rocky Rumambi, Ressa Priskila, Djoko Budiyo Setyohadi*
- 251 Analysis and Design of Web-Geographic Information System for Tropical Diseases-Prone Areas: A Case Study of East Java Province, Indonesia  
*Anik Vega Vitianingsih, Dwi Cahyono, Achmad Choiron*
- 257 Smartphone Application Development for Monitoring and Early Warning on Environmental Health  
*Kodrat Iman Satoto, Eko Didik Widiyanto, Sumardi Sumardi*
- 262 Sentiment Analysis on Twitter Posts: An analysis of Positive or Negative Opinion on GoJek  
*Ike Pertiwi Windasari, Fajar Nurul Uzzi, Kodrat Iman Satoto*
- 266 Design of Learning Media for Fish Classification with Augmented Reality Technology  
*Kurniawan Teguh Martono, Adnan Fauzi*
- 272 Sentiment Analysis on Travel Destination in Indonesia  
*Ike Pertiwi Windasari, Dania Eridani*
- 276 Wireless Sensor Network Design for Landslide Warning System in IoT Architecture  
*Agbus Sofwan, Sumardi Sumardi, M. Ridho, Abdul Goni, Najib Najib*
- 280 Enterprise Architecture Analysis and Design of Manufacturer Company Based on TOGAF ADM 9.1: Case Study on Sales Marketing and Technology Function in PT. XYZ  
*Rahmat Mulyana, Jihan Herdiyanti Syafira*
- 286 Evaluation of IT Governance Using the Cobit 5 Framework on PTPN 7  
*Ibrahim Ibrahim, Arnisa Stefanie*
- 290 Automatic detection of epilepsy using Wavelet Transformation and ELM  
*Siswandari Noertjahjani, Adhi Susanto, Risanuri Hidayat, Samekto Wibowo*

## ***Wireless and Telecommunication***

- 296 Design of Measurement System for HF MIMO NVIS Channel  
*Sarah Lasroma Manalu, Gamatyo Hendrantoro, Achmad Mauludiyanto*
- 302 Design and Analysis of Slimjim Dual Band VHF and UHF Antenna with Crossarm Variation  
*Yuli Christyono, Ihsan Atmaji, Teguh Prakoso*
- 308 Bandwidth Enhancement of Circular Microstrip Antenna Using Characteristic Mode Analysis  
*Teguh Prakoso, Liya Y. Sabila, Denti A. Damayanti, Aghus Sofwan, Munawar A. Riyadi, Sudjadi Sudjadi, Sukiswo Sukiswo, Enda W. Sinuraya, Karnoto Karnoto*

# Wireless Sensor Network Design for Landslide Warning System in IoT Architecture

Aghus Sofwan, Sumardi, M. Ridho, Abdul Goni,  
Department of Electrical Engineering,  
Diponegoro University  
Semarang, **Indonesia**

Najib  
Department of Geology Engineering  
Diponegoro University  
Semarang, Indonesia

**Abstract**—Landslide disaster is frequently happened in Indonesia, which has climate characteristic, area topography, and geological structure that make this country has many landslide potential areas. During the rainy season, the load on the slopes grows due to the increase in water content in the soil, which can lead to landslide. Landslide early warning system can be built based on geological structure and some physical environment parameters using sensors using the wireless sensor network. The communication networks with Internet technology support a substantial backbone for communication. IoT architecture can accommodate wireless sensor network for landslide early warning system. This paper describes the system uses an Arduino ATmega 2560 microcontroller to collect data from many sensors. The measured and actual physical parameters are obtained, which indicates the system succeeds in providing sensed data.

**Keywords**—*landslide; wireless sensor network; Internet of Things;*

## I. INTRODUCTION

Landslide disaster is fair often occurred in some regions of the world. On a worldwide scale, this disaster causes up to one thousand deaths, and also destructs many building [1]. Indonesia has climate characteristic, area topography, and geological structure that make this country has many landslide potential areas. Indonesia's tropical marine-monsoon climate is known to have high average rainfall characteristics. Moreover, human population may also significantly contribute to rise of landslide occurrence. The people may deforest for a certain need without considering the nature. Rainfall is a trigger for landslides. During the rainy season, there is an increase in the load on the slopes due to the increase in water content in the soil, which eventually leads to landslide. Therefore, it is indeed that science, e.g.; geological science, electrical, and communication science; should contribute to provide a system that can predict the landslide disaster. Hence, landslide early warning system can be built based on geological structure and some physical environment parameters using sensors.

A wireless sensor network is a type of network, which is composed by nodes that perform collectively to gather information of physical parameters in real time [2] [3]. A wireless sensor network may have up to thousands sensor nodes, a sink node, and a gateway. Each node, usually, is

equipped with many sensors, a microcontroller, and transceiver. The node senses, and then forward the sensed data into the communication network through a gateway. Nodes are resource-limited equipment regarding memory and computational capabilities and also energy capacity [4].

Nowadays, the communication networks with Internet technology support a significant spine for communication system, which delivers the idea of anytime and anywhere connectivity in the Internet of Things (IoT) architecture [5] [6]. This introduces a recent model of communication, which bolsters communication between machines. This machine-to-machine communication may be in another form as wireless sensor network. Furthermore, IoT architecture can accommodate wireless sensor network for any requirement.

Deployment of wireless sensor network, which is integrated with IoT is proposed in many implementations, such as in agriculture [7] [8], in air pollution solution [9], in disaster management [10], in handling forest disaster [11], and in providing green environment [12]. In [7], the authors proposed wireless sensor network for soil's condition measurement to monitor oil palm plantations regarding to agricultural meteorological practices. In [8], the authors implemented a network of sensors and connectivity, which provide application to optimize agriculture irrigation. The system considers wireless sensor network and wireless moisture sensor network as components of IoT. In [9], the authors developed low cost sensors in conjunction with wireless sensor network in gathering detailed pollution map. In [10], the authors described wireless sensor network implementation for some managing specific disasters, e.g.; earthquakes, air pollution, landslide, and healthcare. In [11], the authors proposed an architecture for disaster management in forest. The proposed architecture considers deployment many sensors in a separated area. In [12], the authors proposed implementation of expert system for green campus environment in the wireless sensor network.

This paper describes the design of wireless sensor network for landslide warning system in IoT architecture. This system uses an Arduino ATmega 2560 microcontroller to collect data from many sensors. A GSM communication modem is attached to each node as a gateway. The GSM cellular network is used to propagate the collected data to the web server.



# A Bi-directional Boost Converter-Based Non-Isolated DC-DC Transformer with Modular Solid-State Switches for Medium-/High-Voltage DC Grids

Ahmed Elserougi<sup>1,2</sup>, Ahmed Massoud<sup>1</sup>, and Shehab Ahmed<sup>3</sup>

<sup>1</sup>Electrical Dept., Qatar University, Doha, Qatar

<sup>2</sup>Electrical Dept., Alexandria University, Alexandria, Egypt

<sup>3</sup>Electrical Dept., Texas A&M University at Qatar, Doha, Qatar

**Abstract**— In this paper, a bi-directional non-isolated dc-dc transformer is proposed, which can be used for connecting different dc voltage levels in medium-/high-voltage dc grids. The proposed dc-dc transformer is based on the conventional bi-directional boost converter, but with modular solid-state switches to avoid the complexity of employing series-connected Insulated Gate Bipolar Transistors (IGBTs) to meet the high-voltage requirement. The modular solid-state switch consists of cascaded modules, where each module consists of Half-Bridge Sub-Module (HB-SM) along with clamping IGBT. Small module capacitance is required in the proposed architecture as it is used typically to clamp the module voltage, not to store the energy to be delivered to the load. This affects positively the lifetime of the dc-dc transformer. On the other hand, clamping IGBTs ensure a successful operation with balanced capacitors' voltages without the need for voltage or current measurements. A detailed illustration for the proposed architecture is presented along with its operational modes and controller. Simulation results for a 2MW 10 kV/25 kV dc-dc transformer are presented to show the viability of the proposed architecture.

**Keywords**— *Bi-directional converter; dc-dc transformer; modular solid-state switch.*

## I. INTRODUCTION

The dc-dc transformer is an essential component in medium-/high-voltage dc grids for connecting two different dc voltage levels [1]. The dc-dc transformer can be classified into isolated [2-5] and non-isolated [6-10]. In the isolated type, an isolation transformer is employed to isolate between the high- and low-voltage sides.

The conventional non-isolated dc-dc boost converters are not normally used for applications requiring high voltage gains because of the difficulties with the main switch stresses [1], as the employed switches are rated at the higher voltage level. To meet the required high-voltage rating of the switch, series-connection of IGBTs [11], or multi-module dc-dc transformer configurations [9] can be used. In case of series connection of IGBTs, there are some challenges related to static and dynamic voltage sharing among the involved IGBTs. Active gate control can be deployed, yet with increasing system complexity [11].

While in case of multi-module converters, there are two possible connections [9]: cascaded converters and series converters. In cascaded converters [9], the first converter has intermediate voltage stresses and high current stresses, while the second converter has high voltage stresses and low current

stresses. In addition, there is a difficulty in the control due to the interaction between converters. In case of series converters with one dc input [9], each converter processes only half of the input power, which enhances the system efficiency, and the employed switches are rated at half of the total voltage stress, which is still high for one IGBT. To reduce the voltage rating of employed switches, multi-module (generally,  $n$  modules) can be employed by connecting their output in series, but their inputs should be isolated which necessitates isolating transformers.

In order to meet the required high-voltage rating of switches in medium-/high-voltage applications without employing series-connection of switches nor multi-module converters, multi-module-cascaded high-voltage composite switch can be employed which enables recruiting low-voltage IGBTs in high-voltage applications.

In [12], a high-voltage composite switch, which is based on Modular Multilevel Converter (MMC), is proposed. This composite switch entails cascaded modules, where each module consists of a dc capacitor, a resistor, and four IGBTs (i.e. a Full-Bridge Sub-Module (FB-SM)). The voltage balancing is guaranteed automatically during the conduction modes of this configuration. The main drawback is that the number of required gate drivers is four times that with the series-connected IGBTs.

In this paper, a modular high-voltage switch with a reduced number of IGBTs is proposed for a bi-directional boost converter-based dc-dc transformer. The proposed modular switch entails cascaded modules, where each module consists of Half-Bridge SM (HB-SM) (each SM has two IGBTs and a small dc capacitor) along with clamping IGBT. The capacitance of the HB-SM is small, as the dc capacitor is used as a snubber circuit to clamp the voltage of the HB-SM not to store the energy to be delivered to the load. While clamping IGBTs are employed to ensure balanced capacitors' voltages during the operation without the need for voltage or current measurement. The modular switch's modules are operated with Marx concept, i.e. basic cell for Marx [13] is employed, where the capacitors are connected in parallel during the bypass mode (turn-on) of the modular switch, and are connected in series during the turn-off period of the modular switch. The HB-SMs' capacitances should be selected small enough to ensure insignificant effect on the boost converter operation and to limit the inrush current emanated from the repetitive switching of modules' capacitors during the operation. Detailed illustration and design for the proposed architecture are presented in the following sections.

# Regulatory Framework Creation Analysis to Reduce Security Risks The Use of Social Media in Companies

Oktavianus Teguh Prayitno<sup>1</sup>, Ofelia Cizela da Costa Tavares<sup>2</sup>, Amaya Andri Damaini<sup>3</sup>, and Djoko Budiyanto Setyohadi<sup>4</sup>

<sup>1,2,3,4</sup>Magister Teknik Informatika, Universitas Atma Jaya Yogyakarta, Yogyakarta, Indonesia

<sup>1</sup>Departement of Port Management, Akademi Maritim Nusantara Cilacap, Cilacap, Indonesia

<sup>2</sup>Department of Computer Science Faculty of Engineering and Science, **Institute of Technology Dili, Dili, Timor Leste**  
otegoohp@gmail.com, ofelia\_tavares@yahoo.com, amayaandridamaini@gmail.com, djoko.bdy@gmail.com

**Abstract**— Companies, agencies and individuals currently use social media as a means of communication and business facilities, because through social media the staffs can connect globally in expressing ideas, feelings or emotions. However, social media users need to be aware of the security risk to their organization. In this paper, we present a perception of the risks, benefits, and strategies of social media applications developed from societies that use social media in the company by discussing existing regulations and how they apply to the use of social media by companies/institutions also to overcome this challenge. From this research, a solution is made for companies whose security rules are being used by the public. This regulatory framework can serve as a basis for establishing company internal policies for the use of social media by its employees. With the creation of policies that are the result of this study, companies that have the maximum ability in the field of information technology.  
**Keywords**— *Social media, security risk, privacy, Security policy*

## I. INTRODUCTION

Social media are common today. Social media is used for communication, from sending messages to sharing many things with the community and the people closest. The popularity of social media in the internet world has been widely used to build a network of friends to business networks, this forces businesses to adapt marketing strategies and involve social media as a marketing tool[1]. Some companies today are even actively creating specialized corporate social media communities such as corporate Twitter channels, YouTube channels, or Facebook fan pages. Social media are generally used for communication facilities in the company or as a media campaign and marketing[2].

The popularity of social media cannot be separated from the security risks that threaten users. The threat of this risk certainly affects the companies that are actively involved in social media and not alert[3]. Mistakes in using social media can lead to customer attacks, negative publicity and reputation damage to the company[4].

In addition to this, organizations are also facing threats from their own employees who often post on social media on behalf of the organization either through their personal

accounts or company accounts. Other risks received can include phishing, information leakage, malware to hacking.

Social media policies are seen as an important part of the organization[5]. The regulatory framework is an important aspect of controlling the use of social media within corporations[6]. In this paper, we find the risks of using social media to develop more effective strategies to decrease the security threat by social media to companies through the establishment of a regulatory framework.

## II. SOCIAL MEDIA SECURITY RISKS

The development of an increasingly modern era encourages the change of the system, either directly or indirectly, as in a company. Technological advances, especially the internet make the limitations of distance, time and cost can be easily overcome. Implementation of technology, in this case, to improve business, sales and buy of products is to use electronic commerce[7]. Company policies that are made for enterprise information security from social media are often only accepted for that purpose without being read and understood by users. The implications are privacy and security[8].

Through good communication, a company will feel comfortable and cut the perception of corporate risk, and ultimately can influence consumers in determining decisions in a company through social media. In accordance with research conducted by Khailil Leonil (2015) which states that perceived risk perception of consumers have a significant impact on online decisions, and related to the existence of online fraud, the company always pay attention to the quality of service in terms of risk perception, this is due to perception Risk contains uncertainty of a risk situation in a company that is product risk, transaction risk and psychological risk[9].

Understanding the perception of risk is needed[10]. Every person within a company has different perceptions of risk. A member of the IT department will see viruses or malware as a risk that could impact data loss on the company,

# A Multiple Classifiers Broadcast Protocol for VANET

Sami S. Alwakeel, Hesham A. Altwaijry  
Department of Computer Engineering  
CCIS – King Saud University  
Riyadh, Kingdom of Saudi Arabia  
{swakeel, twaijry}@ksu.edu.sa

Agung B. Prasetijo  
Department of Computer Engineering  
Faculty of Engineering – Diponegoro University  
Semarang, Indonesia  
agungprasetijo@ce.undip.ac.id

**Abstract**—Many types of artificial intelligent machines have been used for decision making purposes. In VANET broadcast protocols, vehicles must decide the received messages are to be rebroadcast or not. Several attributes such as sender-to-receiver distance, sender-receiver speed difference, number of neighboring vehicles, as well as vehicle's movement direction are important measures to take the broadcast decision. As the relationships of attributes to the broadcast decision cannot be mathematically defined, the use of a classifier-based artificial intelligence may approximately predict the relationships of all the incorporated attributes to such a decision. As the decision is based on prediction, the use of multiple classifiers in decision making may increase accuracy. Therefore, this research employs a combined-classifiers at an abstract level to provide firmer broadcast decisions on VANET. Our research results justify that the performance of our combined multiple-classifiers outperformed a single-classifier scheme. The multi-classifiers scheme contributes to an average increase of 2.5% in reachability compared to that of the efficient counter-based scheme (ECS). The combined multi-classifiers scheme also improves the saving in rebroadcast tries by 38.9%.

**Keywords**—Broadcast-storm, classifier, VANET, vehicular attribute.

## I. INTRODUCTION

An efficient broadcast has always been a hot issue in broadcast protocol area. Several schemes have been available, from heuristic (e.g. probability-based, counter-based broadcast) to topology-based broadcast (e.g. distance-based broadcast). However, most of the solutions have used mostly only a few attributes (whether local or global), such as the use of sender-to-receiver distance, number of message duplicates received, or even only employing probability to reduce the number of nodes/vehicles that rebroadcast messages to mitigate the broadcast-storm problem (the massive message redundancy, contention and collision) [1, 2, 3, 4].

In reality, considering many attributes in the broadcast decision mechanism may lead to a more efficient broadcast scheme. For example, a vehicle having a greater distance from the sender vehicle is more potential to rebroadcast messages than that of having a smaller distance. Likewise, a vehicle that has a higher speed differential to the sender is considered to be a better broadcast candidate as it will go out from the sender's

radio coverage fast. The number of neighboring vehicles can also be used to select the rebroadcast candidates. The denser the neighbors, the smaller the probability for a vehicle to rebroadcast. Therefore, a multiple-attributes scheme are more probable to outperform a single-attribute scheme if such attributes are properly treated.

To properly handle the attributes, a classification algorithm (known as a classifier or an expert) can be used to examine all the possible situations of the attributes dealing with current vehicular network situation. For example, a greater distance threshold should be applied for vehicles deserved rebroadcast in a dense network. However, a smaller threshold is required to maintain high network reachability. A classifier is able to recognize the input conditions of the attributes and to make decisions based on the knowledge obtained from prior training (called as model). Our work employs the following attributes: sender-to-receiver distance, number of message copies, vehicular density, as well as speed differential and movement direction.

Discussion of the research are presented in what follows. Research in broadcast protocols are presented in section 2. Sections 3 and 4 discuss how our experiments are set up and experimented. Results of the study are presented and discussed in section 5 and conclusions can be found in section 6.

## II. THE BROADCAST-STORM MITIGATION SCHEMES

One simple method to reduce the broadcast-storm is to use a probabilistic approach. The probabilistic based scheme uses probability mechanism for node selection rather than using a threshold mechanism (such as in distance-based threshold) for determining rebroadcast nodes. Basic broadcast techniques in VANETs follow either a  $l$ -persistence or a  $p$ -persistence scheme. The  $l$ -persistence scheme has the advantages of low complexity and high penetration rate, but creates massive redundancy. The  $p$ -persistence scheme may reduce message redundancy but may increase in total latency and degraded penetration rate. For example, literature [5] proposed three schemes: weighted  $p$ -persistence, slotted  $l$ -persistence, and slotted  $p$ -persistence broadcast schemes, whilst literature [6] proposed an adaptive probabilistic based scheme that senses idle channel time to represent the broadcast probability.



# Analysis of Custody Transfer on Moving Bundle Protocol of Wireless Router in Delay Tolerant Network (DTN)

Fitri Noviani<sup>1</sup>, Deris Stiawan<sup>\*1</sup>, Sri Desy Siswanti<sup>1</sup>, Tri Wanda Septian<sup>1&2</sup>, Munawar A Riyadi<sup>3</sup>, Fahad Aljaber<sup>4</sup>, Rahmat Budiarto<sup>5</sup>

<sup>1</sup> Department of Computer Engineering, Faculty of Computer Science, Universitas Sriwijaya

<sup>2</sup> Faculty of Electrical Engineering and Computer Science, National **Taipei University of Technology**

<sup>3</sup> Department of Electrical Engineering, Diponegoro University, Semarang, Indonesia

<sup>4</sup> College of Engineering, Albaha University, Saudi Arabia

<sup>5</sup> College of Computer Science & IT, Albaha University, Saudi Arabia

fitrinoviani13@yahoo.com, {deris, desysiswanti}@unsri.ac.id, t106998406@ntut.edu.tw, rahmat@bu.edu.sa

**Abstract**—Delay Tolerant Network (DTN) is a network architecture to provide a solution for networks which have intermittent connectivity, long delay, a different data rate and high error rate. DTN is used as an alternative solution for communication networks in remote areas. DTN communications model based on the nodes mobility to transmit data between nodes which geographically separated so if disconnection problem happens when data transfer is running, bundle which already has been sent will remain stored in the last node where the data reached, and then when connection reconnects, the data transfer process can be continued without repeating the process from the beginning until the data reaches the destination node. This paper analyzes the custody transfer on moving bundle protocol of wireless router in a DTN. The analysis uses a delivery data scenario that implements a wireless router moving on a DTN Network by showing custody transfer bundle protocol and takes into account the time of transfer in any data from DTN log. The scenario considers two conditions, namely the LoS (Line of Sight) and n-LoS (near Line of Sight) with distance and data variation. Experimental results show the important role of the custody transfer agent in DTN network.

**Keywords**—Delay Tolerant Network; Custody Transfer; Bundle Protocol; Wireless Router; Digital Courier

## I. INTRODUCTION

The concept of Delay Tolerant Network (DTN) can be applied on the network by utilizing the tools which acts as a digital courier to spread data from one place to another [1]. Digital courier itself is in the form of wireless routers which move to the area which requires network access and data collection. The digital courier moves to a place which has the connection access and processes those requests so that internet services can be applied and presented to an area which has the following characteristics: long delay, high rate of loss, and the low level of connectivity [2]. Bundle layer or bundle protocol is the main protocol used in DTN. Bundle layers have role to save and forward the whole or a portion of the bundle between the nodes.

In DTN, there is a term called the custody transfer. Custody transfer [3] is a mechanism to improve reliability of delivery using the hop-by-hop reliability, one or more hops, with no end-to-end connectivity thru more reliable and responsible transferring of delivery. Custody Transfer gives responsibility in every data transfer to destinations between its nodes (node to node one another). In this work people are modelled as carrier routers (digital couriers) with intermediate delivery of data between servers and clients using DTN.

The rest of the paper is organized as follows. Related works on mapping research area is described in Section 2. Section 3 presents the experimental scenario. Section 4 discusses the result. Finally, Section 5 provides our conclusion and identified potential future work to be carried out in this area.

## II. RELATED WORKS

Bundle layer or bundle protocol [4] is the main protocol which used in DTN. Bundle layer is in charge of storing and forwarding the whole or part of bundles between nodes. A bundle layer protocol is used when across all networks (region) in the DTN, it supports resending the data from one node to another, which being damaged and lost on both transport layer and bundle. Unfortunately, in a proposal by [5] there was not a single transport layer which works end-to-end at DTN. It means that the end-to-end reliability can only be implemented in the bundle layer.

Meanwhile, proposals by [3] and [6] described the custody transfer or "sending custody data" was performed on nodes which have been successfully received a bundle. This node which will send a bundle will ask the next node to send bundle acknowledgment. If the next node was ready to accept a bundle then the acknowledgment will be sent to the previous node.

## III. EXPERIMENTAL SCENARIO

The research is conducted through a series of experiments using simulation consisting of three devices (laptops) which act as server, router, and a client. Scenarios consider two