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

Judul Karya Ilmiah/Prosiding	:	IOD and ENSO-Related Time Series Variability and Forecasting of Dengue and Malaria Incidence in Indonesia
Jumlah Penulis	:	5 (Lima)
Status Pengusul	:	~~Penulis pertama~~/ penulis ke 2./~~penulis korespondensi~~ **
Penulis Karya Ilmiah	:	Kurnianingsih; **Anindya Wirasatriya**; Lutfan Lazuardi; Naoyuki Kubota; Nawi Ng
Identitas Karya Ilmiah	:	a. Nama Proseding : 2020 International Symposium on Community-centric Systems (CcS) 23-26 Sept. 2020
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		c. Nomor,Volume, bln, thn : Vol. 20065316 Tahun 2020
		d. Penerbit : IEEE
		e. DOI Prosiding (jika ada) : 10.1109/CcS49175.2020.9231358
		f. Alamat Web Prosiding :
		- Url Prosiding : https://ieeexplore.ieee.org/xpl/conhome/9226399/proceeding?isnumber=9231308&pageNumber=2
		- Url Prosiding : https://ieeexplore.ieee.org/document/9231358/authors#authors
		g. Terindeks di Scimagojr/Thomson Reuter ISI knowledge atau di..

Kategori Publikasi Makalah : [✓] *Prosiding* Forum Ilmiah Internasional Terindeks Scopus ....**4)**

(beri ✓pada kategori yang tepat) [ ] *Prosiding* Forum Ilmiah Nasional

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b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8,2
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9		8,2
d. Kelengkapan unsur dan kualitas penerbit (30%)	9		8,0
Total = (100%)	**30**		**26,5**

Catatan Penilaian Paper oleh Reviewer:
Abstrak disini yang ditulis lebih ke pernyataan umum, belum menunjukkan hasilnya. Metode analisis yang digunakan sangat sederhana, padahal dengue incidence penyebabnya mungkin tidak hanya IOD dan Enso. Nilai = 0,4/4 x 26,5 = **2,65**

Semarang,
Reviewer 1

Prof. Ir. Muslim, M.Sc., Ph.D
NIP. 196004041987031002
Unit Kerja : FPIK UNDIP

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Komponen Yang Dinilai .....5)	Nilai Maksimal *Prosiding* ..... 6)		Nilai Yang Diperoleh ..... 7)
	Internasional	Nasional	
	30		
a. Kelengkapan unsur isi Prosiding (10%)	3		3
b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9		8
d. Kelengkapan unsur dan kualitas penerbit (30%)	9		9
Total = (100%)	**30**		**28**

Catatan Penilaian Paper oleh Reviewer:

a) Prosiding *International Symposium on Community-centric Systems (CcS) 23-26 Sept. 2020*, merupakan prosiding seminar internasional. Artikel yang diterbitkan dinilai memiliki unsur unsur jurnal ilmiah yang lengkap sesuai dengan kaidah jurnal ilmiah, terdiri dari Abstract, Introduction, Related Works, Experimental Setup, Results and Discussion, Conclusion and Future Work, Acknowledgments, References.

b) Ruang lingkup artikel ini sangat sesuai dengan bidang penulis yakni oceanografi. Artikel ini menyampaikan penelitian tentang Penelitian ini menyediakan peramalan deret waktu pada kejadian demam berdarah dan malaria di seluruh provinsi di Indonesia menggunakan arsitektur *Long Short-Term Memory* (LSTM).. Pembahasan yang disampaikan dinilai cukup mendalam karena data IOD and ENSO kaitannya dengan penyakit demam berdarah dan malaria dan didukung dengan 47 pustaka, dimana yang lebih dari 10 tahun ada 12 pustaka

c) Artikel ilmiah ini dinilai telah memberikan data dan informasi yang mencukupi. Paper ini disusun berdasarkan data kejadian demam berdarah mapun malaria selama 14 tahun (2005-2018) serta data IOD dan ENSO. Penulis menggunakan Dipole Mode Index (DMI) dan the Oceanic Niño Index (ONI)

d) Prosiding *International Symposium on Community-centric Systems (CcS) 23-26 Sept. 2020* diterbitkan oleh IEEE. Penerbit ini dikenal sebagai penerbit prosiding seminar internasional yang terindeks di Scopus, sehingga memiliki unsur yang dinilai lengkap, dengan kualitas penerbitan dinilai baik. Nilai = 0,4/2 x 28 = **2,8**

Semarang, 30 Mei 2022
Reviewer 2

Prof. Dr. Ir. Ambariyanto, M.Sc
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IOD and ENSO-Related Time Series Variability and Forecasting of Dengue and Malaria Incidence in Indonesia

Kurnianingsih[a]; Wirasatriya, Anindya[b]; Lazuardi, Lutfan[c]; Kubota, Naoyuki[d]; Ng, Nawi[e]
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Abstract

Dengue and malaria are mosquito-borne infectious diseases driven by climate change and have an endemic impact in tropical and subtropical regions of the world, particularly in South and South-East Asia. Most studies examined the effect of local climate variability, temperature, and precipitation on

dengue and malaria incidence. Nevertheless, the effects of Indian Ocean Dipole (IOD) and El Niño Southern Oscillation (ENSO) on dengue incidence are still rarely discussed. Besides, the study of the influence of IOD and ENSO on malaria incidence remain unexplored. This paper examined the influence of IOD and ENSO on the interannual variability of dengue and malaria incidence in all Indonesia provinces using Pearson correlation. Historical time series data on dengue and malaria incidence in all Indonesia provinces from 2005 to 2018 were investigated for time series prediction using deep Long Short-Term Memory (LSTM). © 2020 IEEE.

Author keywords

Deep LSTM; dengue; ENSO; IOD; malaria

Indexed keywords

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Recently, the importance community-centric systems (CcS) is increasing as a new paradigm in highly aging society. The emerging synthesis ICT, and robot technology (RT) is one of the most promising approaches towards information support for the next generation in both personal and public areas. Human-centric systems (HcS) can enhance the accessibility and usability of complicated systems and devices supporting human activities, communication, and interactions. Furthermore, the HcS can improve quality of life (QOL), in particular, information support, physical care, and mental care to maintain autonomy and independency in activities of daily living. If the improvement of QOL is done by the bottom-up construction, QOC can be considered as a top-down constraint to the human daily life. Another issue is that demands in improving QOL and QOC can differ from region to region and from community to community. Novel techniques are necessary for solving the problems related to QOL and QOC. CcS 2020 invites papers on community-centric systems with particular interests in the following topics:

Important Dates

- 2020 March 1 — Organized Session Proposal
- April 1 — Deadline for Full paper Submission
- June 1 — Notification of Acceptance
- July 1 — Early Bird Registration
- July 15 — Deadline for Final Manuscripts
- 23rd-25th September 2020 — CcS 2020 Tokyo, Japan

Contributed Papers: http://www.comp.sd.tmu.ac.jp/CcS2020/PaperSubmission.html
The maximum length for the manuscript is typically 6 pages in IEEE manuscript templates (https://www.ieee.org/conferences/publishing/templates.html). Accepted papers that are not physically presented by one of the authors at CcS 2020 will be excluded from the IEEE Xplore. Selected quality paper will be recommended for CcS 2020 special issues of Journal of Advanced Computational Intelligence and Intelligent Informatics with further review.

Special Sessions: http://www.comp.sd.tmu.ac.jp/CcS2020/SpecialSessions.html
The conference features special sessions focusing on new research topics and innovative applications. Papers in these sessions undergo a regular review process as those in general sessions. A special session has to contain at least four papers. Prospective organizers are invited to contact special session chairs to propose tracks with the title of the session, its scope, list of topics, and organizer names, by March 1, 2020. Each special session may have an invited talk as well. If the organizer(s) is(are) interested in an invited talk, please contact the special session chair (Zhaojie Ju, University of Portsmouth, UK, zhaojie.ju@port.ac.uk and special session co-chairs (Takenori Obo, Tokyo Polytechnic University, Japan, t.obo@cs.t-kougei.ac.jp and Kurnianingsih, Politeknik Negeri Semarang, Indonesia kurnianingsih.k.id@ieee.org).

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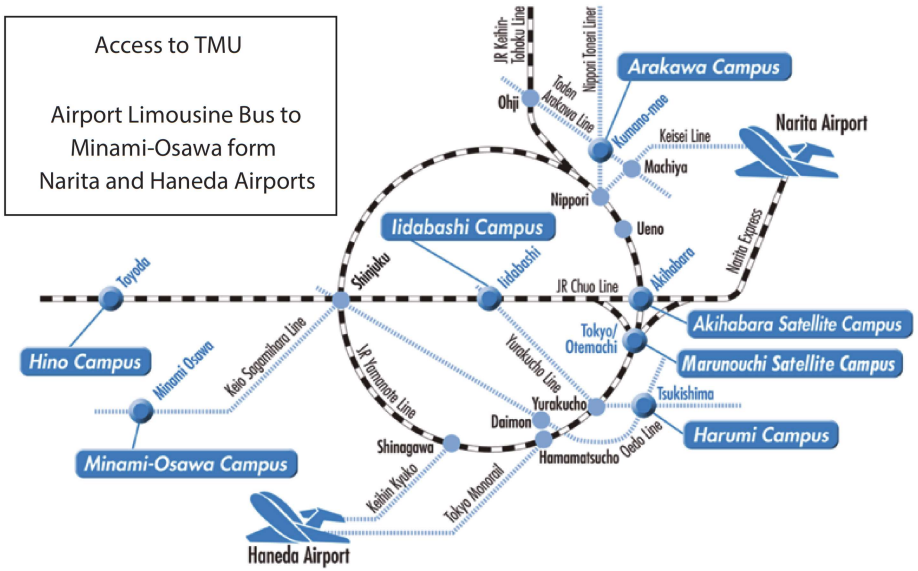

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Pixel Histogram based Background Modeling for Moving Target Detection

Jiang Hua; Liangcai Zeng; Gongfa Li; Hongwei Wang; Zhaojie Ju

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Abstract HTML

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A Study on AI-FML Robotic Agent for Student Learning Behavior Ontology Construction

Chang-Shing Lee; Mei-Hui Wang; Wen-Kai Kuan; Zong-Han Ciou; Yi-Lin Tsai; Wei-Shan Chang; Lian-Chao Li; Naoyuki Kubota; Tzong-Xiang Huang; Eri Sato-Shimokawara; Toru Yamaguchi

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Pixel Histogram based Background Modeling for Moving Target Detection

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***Abstract*— Existing moving target detection methods mainly include inter-frame differences, background differences, optical flow and so on. For the recognition of human motions in the process of human-computer collaboration, existing algorithms are usually difficult to meet the requirements of real-time processing and easily interfered by lighting or image noises. In this paper, a method for establishing a static background model based on pixel histogram is proposed. The effect of moving targets and noises on the background model is excluded due to the selectivity of the new algorithm to the gray values, so it can detect the real background more reliably. Compared with other moving target detection methods, this method has the characteristics of fast speed, strong anti-interference ability, and the ability to identify human body movement quickly and accurately.**

Keywords—moving target detection; human motions; static background model; pixel histogram

I. INTRODUCTION

Moving target detection is the process of subtracting the redundant information in time and space of the image through the method of computer vision, and effectively identifying moving targets. It is the basis for applications such as target classification, motion recognition, and behavior understanding, and a key skill in video sequence image processing. At present, the methods of moving target detection mainly include inter-frame difference, background difference, optical flow and so on [1]. Due to the complexity of the optical flow method, it is generally difficult to meet the requirements of real-time processing and susceptible to interference from lighting and image noise. The inter-frame difference method directly compares the difference in gray values of corresponding pixels in two or three consecutive frames of the video sequence, and then sets the threshold to extract the motion area of the image [2]. However, the time interval between adjacent frames is so short that the overlapping part of the target is not easy to detect. Therefore it is generally used for simple real-time motion detection to avoid creating a large amount of holes.

The key of the background difference method is the establishment of the background model. Many studies have been done on this. Gloyer et al. adopts the median value of the pixels of consecutive frames as the background gray value to establish a background model, but this method requires a large amount of calculation and deviations often occur with changing lighting [3]. In response to this limitation, Wren et al. assume that pixel values meet a certain distribution model, such as Gaussian distribution. Then you can get a better background update method by judging whether the pixel belongs to the foreground based on the threshold, and constantly update its distribution parameters through training [4]. However, the single Gaussian model cannot accurately describe the complex background model, so Stauffer et al. regard each pixel gray value as a weighted mixture of multiple Gaussian models to propose a hybrid Gaussian model background modeling method. This method cannot only adapt well to complex scenes, but also automatically calculate model parameters through adjusting the background model. But the actual complex backgrounds do not always conform to the Gaussian distribution, so the method based on Gaussian model will cause many problems [5]. Elgammal et al. proposed a parameter-free detection method based on kernel density estimation, which does not need to make assumptions about the density distribution of the background, but uses several image sample information to estimate pixels based on a standard kernel function [6]. However, there is no common known parameter model in different environments and the kernel density function is estimated from the data, so the consumption is too large and the real-time performance is not good [7].

At the same time as the development of moving target detection methods based on statistical theory, scholars have also proposed a variety of moving target detection methods with different theoretical foundations, such as cluster theory-based methods, fuzzy theory-based methods, background prediction methods and neural network methods [8-10]. These studies extend the application fields of the skill.

Generally, complex algorithms will naturally have better results, but the calculation time is too long to meet the real-time requirement [11]. Therefore, the commonly used target detection method in human-computer interaction is the mean method [12]. Using the average value of the current image sequence as a reference model, a background image similar to the current static scene is generated. However, if

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A Comparative Study on Three-mode Fuzzy Co-clustering Based on Co-occurrence Aggregation Criteria

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***Abstract*—Three-mode fuzzy co-clustering is a promising technique for analyzing relational co-occurrence information among three mode elements. This paper proposes a modified version of the three-mode fuzzy clustering for categorical multivariate data (3FCCM) algorithm, which was constructed with the aggregation criterion of three elements based on the fuzzy c-means (FCM) concept and often suffers from careful tuning of three independent fuzzification parameters. In the modified algorithm, a novel clustering criterion is proposed based on a probabilistic concept, where we can easily tune the fuzziness degree of three-mode fuzzy partition by comparing with the probabilistic standard. The characteristics of the two algorithms are discussed through comparative experiments such that the modified version is more useful in tuning the influences of the fuzziness parameters and is more promising in real applications than the conventional one.**

***Index Terms*—Fuzzy logic, Data analysis, Fuzzy clustering, Three-mode co-clustering**

I. Introduction

Fuzzy co-clustering is a promising technique for capturing the intrinsic co-cluster structures among co-occurrence information such as document-keyword frequencies in document analysis [1], [2] and customer-product purchase transaction in market analysis [3]. Fuzzy clustering for categorical multivariate data (FCCM) [4] is a basic fuzzy co-clustering algorithm, which achieves dual fuzzy partition of objects and items by maximizing the aggregation criterion of co-occurrence degrees supported by the fuzzy c-means (FCM) like concept [5]. The FCCM algorithm, however, needs to carefully tune the fuzziness parameters for two types of fuzzy memberships: object memberships and item memberships although it is often difficult to find the optimal combination of the two parameters.

Considering the conceptual similarity among the FCCM criterion and the pseudo-log-likelihood of multinomial mixture models (MMMs) [6], fuzzy co-clustering induced by multinomial mixture models (FCCMM) [7] was constructed, in which the intrinsic fuzziness degree of MMMs can be arbitrarily tuned by introducing an additional penalty weight. The direct transition from the probabilistic mixture model to a fuzzy co-clustering model contributes not only to improving the partition quality of MMMs but also to making it easy to select the optimal fuzziness weight under the comparison with the probabilistic standard.

In the recent Big Data Era, it is often the case that we can also utilize additional co-occurrence information rather than the original single co-occurrence data. For example, in food preference analysis with the goal being to reveal users' preferences on foods considering user-food co-occurrences, users' preferences can be influenced by implicit relation among users and cooking ingredients of each food even though ingredient information is not explicitly presented in the original user-food co-occurrences. In such cases, if we have not only co-occurrence information among users and foods but also intrinsic relation among foods and cooking ingredients, we can expect to find more useful food preference tendencies from three-mode co-occurrence information data.

Three-mode fuzzy co-clustering [8] is an extension of the conventional fuzzy co-clustering, where the goal is to simultaneously estimate three types of fuzzy memberships of objects, items and ingredients such that mutually familiar pairs of the three elements have larger memberships in a certain cluster. Three-mode FCCM (3FCCM) [9] is a three-mode extension of FCCM, which adopts the aggregation degree of three elements as the clustering criterion of an FCM-like process. Although the three-step iterative algorithm of 3FCCM is useful for finding the co-cluster structure considering the intrinsic co-occurrence relation among three elements, we often suffer from the difficulty of selecting the optimal fuzziness penalty

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IOD and ENSO-Related Time Series Variability and Forecasting of Dengue and Malaria Incidence in Indonesia
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Predicting the Risk of Preeclampsia using Soft Voting-based Ensemble and Its Recommendation
Oknalita Simbolon; Melyana Nurul Widyawati; Kurnianingsih Kurnianingsih; Naoyuki Kubota; Nawi Ng
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Sensor2Vec: an Embedding Learning for Heterogeneous Sensors for Activity Classification
Junpei Zhong; Ahmad Lotfi

IOD and ENSO-Related Time Series Variability and Forecasting of Dengue and Malaria Incidence in Indonesia

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***Abstract*—Dengue and malaria are mosquito-borne infectious diseases driven by climate change and have an endemic impact in tropical and subtropical regions of the world, particularly in South and South-East Asia. Most studies examined the effect of local climate variability, temperature, and precipitation on dengue and malaria incidence. Nevertheless, the effects of Indian Ocean Dipole (IOD) and El Niño Southern Oscillation (ENSO) on dengue incidence are still rarely discussed. Besides, the study of the influence of IOD and ENSO on malaria incidence remain unexplored. This paper examined the influence of IOD and ENSO on the interannual variability of dengue and malaria incidence in all Indonesia provinces using Pearson correlation. Historical time series data on dengue and malaria incidence in all Indonesia provinces from 2005 to 2018 were investigated for time series prediction using deep Long Short-Term Memory (LSTM).**

Keywords—dengue, malaria, IOD, ENSO, Deep LSTM

I. INTRODUCTION

Changes in human populations, human mobility, landscape, land use, biodiversity, and climate affect the emergence or re-emergence of infectious diseases. The intrinsic vulnerability of mosquitoes to weather and climate raises the likelihood that mosquito transmissions can be the most likely to be affected by climate change in infectious diseases. Mosquito vectors are widely spread all over the world, except in Antarctica. Malaria is a parasite infection spread by anopheline mosquitoes, which causes an estimated 219 million deaths worldwide, resulting in over 400,000 deaths per year [1]. Whilst, dengue is the most prevalent viral infection spread by Aedes mosquitoes and is at risk of contracting dengue with over 3.9 billion people in over 129 countries [1]. Increased climatic variables such as temperatures, wind, humidity, and precipitation will profoundly influence not only population dynamics of mosquito vectors, but also disease transmission dynamics [2]. Mosquito-borne diseases have become a primary global concern for human health, particularly in Indonesia, with the recent rise in the incidence of dengue and malaria.

Among the interannual global climate variabilities, Indian Ocean Dipole (IOD) and El Niño-Southern Oscillation (ENSO) bring the most impact on the Indonesian climate [3]. IOD events are driven by changes in the tropical Indian Ocean which were characterized by the sustained changes in the difference between normal sea surface temperatures in the tropical western and eastern Indian Ocean [4]. ENSO is a natural phenomenon of fluctuating ocean temperatures in the central and eastern equatorial Pacific Ocean, along with atmospheric changes [5]. Both ENSO and IOD events consist of two opposing phases and a neutral phase (N). When El Niño (EN) and IOD positive (IOD+) co-occurred, they cause anomalously hot and dry conditions [6]. Meanwhile, when La Niña (LN) and IOD negative (IOD−) events were concurrently occurred, the temperature decreased, and the precipitation increased significantly [7]. The previous study has been demonstrated the impact of ENSO and IOD on the environment within Indonesia [8].

Dengue and malaria dynamics are driven by complex interactions among hosts, vectors, viruses, and environmental and climatic factors. Several studies examined the influences of local and regional climate variation on dengue incidence [9-11] and malaria incidence [12, 13]. However, the role of Indian Ocean Dipole (IOD) and El Niño Southern Oscillation (ENSO) events on dengue and malaria incidence remain unexplored. This study analyses the effect of IOD and ENSO on dengue and malaria incidence and its forecasted trends in all provinces in Indonesia.

Unlike predictive modelling for regression, time series is a difficult predictive modelling problem. Existing regression methods for predictive modelling are poor in handling time series data. The methods are inadequate in modelling variable length and ignore the long-term dependencies. Deep learning, which has been widely employed in various recognition tasks [14, 15], holds a great potential in constructing end-to-end systems through increasing the depth of neural network. Studies in deep learning have been attempted to address the challenge of long-term dependencies.

Long Short-Term Memory (LSTM), introduced by Hochreiter and Schmidhuber, is a type of recurrent neural network (RNN) used in deep learning [16]. LSTM works well on complex problems unaddressed by previous recurrent network algorithms and can learn long-term dependencies. However, the scarce uses of LSTM in health care research have been limited to predicting life expectancy [17], healthcare usage based on medical records [18], and

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The safety and health of all conference participants is our priority. Upon reviewing and analyzing the announcements, advice, and news released by relevant national departments, we have made the decision, that CcS 2020 will continue as scheduled on 23-25 September, by being converted to an exciting, entirely virtual conference, and will not be physically held in Tokyo.

General Chair

Naoyuki Kubota

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