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PROCEEDING

ELECTRICAL ENGINEERING
COMPUTER SCIENCE AND INFORMATICS
EECSI 2015
CONFERENCE

📅 19-21 Agustus 2015

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Palembang, Indonesia

iaes
Institute of Advanced Engineering and Science

PROCEEDING
The 2nd International Conference on
Electrical Engineering, Computer Science and Informatics (EECSI 2015)

Foreword from General Chair EECSI 2015

In the name of Allah, Most Gracious, Most Merciful

Welcome to the 2nd International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2015) in Palembang City, Land of Sriwijaya, Indonesia.

EECSI 2015 provides a forum for researchers, academicians, professionals, and students from various engineering fields and with cross-disciplinary working or interested in the field of Computer Science, Informatics, Signal, Image, Video Processing, Electronics Engineering, Electrical Power Engineering, Instrumentation and Control Engineering, and Telecommunication Engineering.

I would like to express my hearty gratitude to all participants for coming, sharing and presenting your research findings in this conference. There are more than 120 papers submitted to EECSI 2015, however only high quality selected papers are accepted to be presented in this event, so we are also thankful to all the international reviewers and steering committee for their valuable work. I would like to give a compliment to all partners in publications and sponsorships for their valuable supports.

Organizing such an prestigious conference was incredibly challenging and would have been impossible without our outstanding committee, so I would like to extend my sincere appreciation to all committees and volunteers from Universitas Sriwijaya as a host, Universitas Ahmad Dahlan, Universitas Islam Sultan Agung and Universitas Diponegoro for providing me with much needed support, advice, and assistance on all aspects of the conference. We do hope that this event will encourage the collaboration among us in the future.

I wish you all find opportunity to get rewarding technical program, intellectual inspiration, renew friendships and forge innovation, and that everyone enjoys some of what Palembang City has to offer!.

Deris Stiawan.Ph.D
General Chair EECSI 2015

Foreword from Rector Universitas Sriwijaya

In the name of Allah, Most Gracious, Most Merciful

The International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2015) is now held in Palembang, Indonesia and being organized under the collaborative committee effort among Universitas Sriwijaya and Institute Advanced Engineering and Science (IAES) supported by well known universities such as Universitas Ahmad Dahlan, Universitas Islam Sultan Agung, and Universitas Diponegoro.

The goals of the conference are to obtain and extend the knowledge of the recent issues, opinions, bright ideas about the development of a comprehensive green technology constructively from distinguish scholars, researchers, and academics.

Furthermore, this forum is expected to bring new innovations in technology for a better future, especially in the field of information technology, computers, and electrical en engineerings and also create cooperation between institutions of science at the college level, industries and government.

It is a great pleasure to welcome all the participants of this conference and also several keynote speakers from Wilkes University – United State of America, Universiti Teknologi Malaysia and Bandung Institute of Technology Indonesia.

I do hope that this conference to be a valuable forum for engineers and scientist to share their precious researches and this event will give significant contributions to the development of Electrical Engineering and Computer Science. It is hope that this conference will raise the awareness of scientific community members in bringing better life.

I hope that the conference will be stimulating and memorable for you. So, enjoy your time in Land of Sriwijaya – Palembang.

Prof. Dr. Hj. Badia Perizade, M.B.A.
Rector
Universitas Sriwijaya, Palembang – Indonesia

Foreword from IAES – Indonesia Section

In the name of Allah, Most Gracious, Most Merciful

Welcome to our colleagues from Asia and around the world to attend the 2nd International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2015) in Palembang, Land of Sriwijaya, Indonesia.

EECSI 2015 is an event in the field of Electronics Engineering, Electrical Power Engineering, Instrumentation and Control Engineering, Telecommunication Engineering, Computer Science, Informatics, Signal, Image, Video Processing, and also other related fields.

I would like to express my sincere gratitude to all participants for coming down to Palembang to share and present your research findings. We are also thankful to all the international reviewers and steering committee for ensuring high quality of all the accepted papers. I would like to give a tribute to all partners in publications and sponsorships for their valuable supports. The conference is believed to be a gate to show great development of our research to the world.

I would like to extend my deep appreciation to all the organizing committee especially from Universitas Sriwijaya as a host, Universitas Ahmad Dahlan, Universitas Islam Sultan Agung and Universitas Diponegoro for working very hard to make this conference as today. We do wish that this kind of collaboration will be improved and developed better in the future

We wish you a happy conference and success in Palembang.

Associate Professor Dr. Mochammad Facta
IAES – Indonesia Section

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International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2015)
CONFERENCE PROGRAM

WEDNESDAY, 19 AUGUST 2015

Time				
7:30 - 8:00	Registration			
8:00 - 9:15	Opening ceremony and signing of Memorandum of Understanding (MoU)			
9:15 - 9:30	Coffee break			
9:30 - 10:30	Invited speaker 1: Prof. Dr. Vijay K. Arora (*Wilkes University, Pennsylvania, USA*) *Quantum Nanoengineering Nonequilibrium High-Electric-Field Transport for Signal Propagation*			
10:30 - 12:00	Parallel session 1			
	ROOM 1 *Computer Sciences*	ROOM 2 *Electronics and Instrumentation*	ROOM 3 *Electrical & Power Engineering*	ROOM 4 *Information Systems*
12:00 - 13:00	LUNCH BREAK			
13:00 - 13:45	Invited speaker 2: Dr. Tri Desmana Rachmilda *(Institut Teknologi Bandung, Indonesia)* *Power Electronic Circuit Control Using Hybrid Approach*			
13:45 - 15:15	Parallel session 2			
	ROOM 1 *Computer Sciences*	ROOM 2 *Electronics and Instrumentation*	ROOM 3 *Robotics and Control*	ROOM 4 *Computer Sciences*
15:15 - 15:30	coffee break			
15:30 - 17:00	Parallel session 3			
	ROOM 1 *Computer Sciences*	ROOM 2 *Information System*	ROOM 3 *Robotics and Control*	ROOM 4 *Telecommunication & Wireless*
18:00 - 20:00	*GALA DINNER*			

THURSDAY, 20 AUGUST 2015

Time	
8:00 - ...	*cultural program (city tours)* * (*with additional arrangement)*

TIME	NO	CODE	TITLE	PRESENTERS
ROOM 1				
PARALLEL SESSION 1 (10.30 - 12.00)	1	CS-01	Indonesian Hoax News Classification using Feature Selection	Errissya Rasywir and Ayu Purwarianti (Bandung Institute of Technology, Indonesia)
	2	CS-02	Design of Knowledge Acquisition Model in Glaucoma Medical Treatments Recommender System	Cut Fiarni (ITHB, Indonesia)
	3	CS-03	Novice Assistance Tool and Methodology: Design Decision and Task-Pattern Mapping	Meei Hao Hoo (Universiti Tunku Abdul Rahman, Malaysia); Azizah Jaafar (Universiti Kebangsaan Malaysia, Malaysia)
	4	CS-04	Comparison of feature extraction methods for head recognition	Panca Mudjirahardjo (Universitas Brawijaya, Indonesia)
	5	CS-05	The Application of fuzzy time series Singh for forecasting bandwidth network demand	Aryanti dan Ikhthison Mekongga (Politeknik Negeri Sriwijaya, Indonesia)
	6	CS-06	Numerical Solution for Solving Space-Fractional Diffusion Equations using Half-Sweep Gauss-Seidel Iterative Method	A. Sunarto, J. Sulaiman, A. Saudi (Universiti Malaysia Sabah (UMS) Malaysia, Malaysia)
PARALLEL SESSION 2 (13:45 - 15:15)	7	CS-07	Decision Support System For Potential Sales Area of Marketing Product Marketing Using Data Mining	Evasaria Sipayung (Institut Harapan Bangsa, Indonesia)
	8	CS-08	Generalized MINLP of Internet Pricing Scheme under Multi Link QoS Networks	Fitri Maya Puspita and Irmeilyana Saidi Ahmad (Universitas Sriwijaya, Indonesia)
	9	CS-09	NET.OS:Network Server Operating Systems Based on Open Source	Evan Enza Rizqi, Idhawati Hestingsih, Mardiyono (Politeknik Negeri Semarang, Indonesia)
	10	CS-10	The Optimized K-Means Clustering Algorithms To Analyzed the Budget Revenue Expenditure in Padang	Dony Novaliendry (State University of Padang & National Kaohsiung University of Applied Sciences, Taiwan); Cheng-Hong Yang (National Kaohsiung University of Applied Sciences, Taiwan); Yeka Hendriyani and Hafilah Hamimi (State University of Padang, Indonesia)
	11	CS-11	Performance Analysis on Text Steganalysis Method Usin A Computational Intelligence Approach	Roshidi Din, Shafiz Affendi Mohd. Yusof (UUM, Malaysia); Azman Samsudin (USM, Malaysia); Angela Amphawan UUM Kedah & MIT Malaysia); Hanizan Shaker Hussain, Md Hanafizah Ya'acob Hanafiza Yaacob and Siti Nazuha Jamaludin (Kolej Poly-Tech MARA (KPTM), Malaysia)
	12	CS-12	Pattern Recognition on Paper Currency's Feature using LVQ Algorithm	Dewanto Harjunowibowo (Sebelas Maret University, Indonesia)
PARALLEL SESSION 3 (15.30 - 17.15)	13	CS-13	Enhanced Ridge Direction for the Estimation of Fingerprint Orientation Fields	Saparudin (Universitas Sriwijaya, South Sumatera, Indonesia)
	14	CS-14	Virtualization Technology for Optimizing Server Resource Usage	Edwar Ali (STMIK-AMIK RIAU, Indonesia)
	15	CS-15	Nonlinear Programming Approach of Wireless Pricing Models	Irmeilyana Saidi Ahmad (Universitas Sriwijaya, Indonesia)
	16	CS-16	Segmentation of Urdu Nastaliq Script using Structural Features	Aliya Khan (National University of Science and Technology, Pakistan)
	17	CS-17	New Framework for Constructing a Virtual Routing Table in the IGP Networks	Radwan Abujassar (Bursa Orhangazi University, Turkey)
	18	CS-18	Implementation of Audio Watermarking using Fast Fourie Transform for AudioDigital Copyright Protection	Megah Mulya, Yogha Saputra Utama (Universitas Sriwijaya, Indonesia)
	19	CS-19	Application of NFC Technology for Cashless Payment System in Canteen	Evizal Abdul Kadir (Faculty of Computing , Universiti Teknologi Malaysia, Malaysia); Sri Listia Rosa (Universitas Islam Riau, Indonesia)
	20	CS-19	Application of NFC Technology for Cashless Payment System in Canteen	Evizal Abdul Kadir (Faculty of Computing , Universiti Teknologi Malaysia, Malaysia); Sri Listia Rosa (Universitas Islam Riau, Indonesia)

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INVITED SPEAKERS

TRACK: COMPUTER SCIENCE AND INFORMATICS

THE APPLICATION OF FUZZY TIME SERIES SINGH FOR FORECASTING BANDWIDTH NETWORK DEMAND

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Abstract- The purpose of this research is to develop information system which forecast bandwidth network demand by using Fuzzy time series Singh. Data were taken in State Polytechnic of Sriwijaya during learning hour starting from 07.00 am - 06.00 pm from Monday to Saturday in odd semester of Academic Year 2011/2012. Next, the data were processed by fuzzy time series Singh in order to get forecasted data. Then, the forecasted data were compared to the actual data in order to get validity of the data. The forecasted data using fuzzy time series Singh was nearly precise to the actual data with mean absolute percentage error of 8.523 %.

BACKGROUND

Fuzzy time series is a new concept established fuzzy relations on time series data having linguistic values for forecasting future values. Previous related research was done by Song and Chissom. It focused on the implementation of fuzzy relational equation and fuzzy logic for forecasting the total number of students who registered in Alabama University [4]. Singh in his research related to fuzzy implemented a simplified computational approach to develop relational equation using complicated max-min composition and shorten Song and Chissom deffuzyfication process. This method can develop the right defuzzyfication procedure that resulted in more precise output crisp values [5]. Meanwhile Niu, et. al (2011) studied the application of volatility forecast to efficient resource allocation that provides probabilistic service level guarantees to user groups and volatility reduction from diversification, and its implications to new strategies for cost-effective server management [3]. The main difference between the previously reseraches and this research is the use of Fuzzy time series Singh to develop bandwidth network demand forecasting. The data were from daily traffic data which processed by software system-Borland C#.

CURRENT RESULTS

Data were taken from daily historical data: Monday, Tuesday, Wednesday, Thursday, Friday and Saturday starting from 07.00 a.m. to 06.00 pm. This data were the input data of Fuzzy Time Series Singh research. For data validity, the input data were separated into two groups, first group was used for forecasting using Fuzzy time series Singh and the second group was used for validating. Based on the academic calendar, the total number of the effective weeks for learning were 7 weeks starting from 7 November

2011 - 24 December 2011, data taken from the first to the sixth week were used for forecasting dan data of the seventh week were used for validating. The greater the number of data, the better the result will be. The process model used in the construction of this software was linear sequential model or also known as the waterfall model. The linear sequential model includes activities in Fig 2. Linear sequential model. Table 2. consists of forecasting result at learning hour condition of Singh method max error is 13,293%, min error is 0,041% and average error is 4,392%. Error percentage per hour of bandwidth forecasting demand in Fig 3. Graphics *Error* at learning hour condition.This graphic forecasts bandwidth at learning hour condition with mean error of 4,392%. Fig 4. Graph of Forecasting Results in Course Condition. Based on the result of bandwidth demand forecasting using Fuzzy time series Singh, the forecasted result is good and it is nearly precise the actual data in Fig 4. Mean absolute percentage error of 8,523% for forecasted bandwidth using Fuzzy time series Singh. It means bandwidth demand forecasting using Fuzzy time series Singh is good as the alternative method in forecasting bandwidth demand. For minimizing forecasting error, we can narrow the interval of fuzzy set and availability of lots of bandwidth data.

It is suggested for the future development of this system for forecasting at semester break or special date of academic calendar in which the result of the research can be used as information system reference in determining bandwidth demand so that it is beneficial for administrators or IT officials in determining the needed bandwidth.

REFERENCES

[1]   Agus F, Suyatno A, dan Supianto, 2010. Optimalisasi Management Bandwidth pada Jaringan Internet Universitas Mulawarman, Jurnal Informatika Mulawarman, Vol. 5, No. 1, Februari.

[2]   Chapman and Stephen N, 2006. The Fundamentals of Production Planning and Control. Pearson-Prentice Hall. New Jersey.

[3]   Di Niu, Zimu Liu, Baochun Li, and Shuqiao Zhao, 2011. Demand Forecast and Performance Prediction in Peer-Assisted on-Demand streaming System, in the proceedings of IEEE INFOCOM Mini-Conference, Shanghai, China.

[4]   Q Song and B.S. Chissom, 1993. Forecasting Enrollments with Fuzzy Time Series – part I, Fuzzy Sets and Systems 54 (1993), pp. 1-9.

[5]   S.R. Singh, 2007. A Simple Time Variant Method for Fuzzy Time Series Forecasting, Cybernetics and System: An Int. Journal 38 (2007), pp. 305-321.
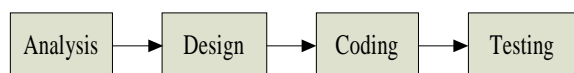
[6]   Trimantaraningsih R, Muarifah, dan Istiqomul, 2008. Implementasi Mikrotik sebagai Management Bandwidth, Paper Teknik Informatika.Yogjakarta FTI, IST AKPRIND

Table 1. *Bandwidth* Data

bandwidth Data	Max value *bandwidth*	Min value *bandwidth*	Number of data	*Fuzzy* set
Course	26164000	66800	432	401

Fuzzy Time Series
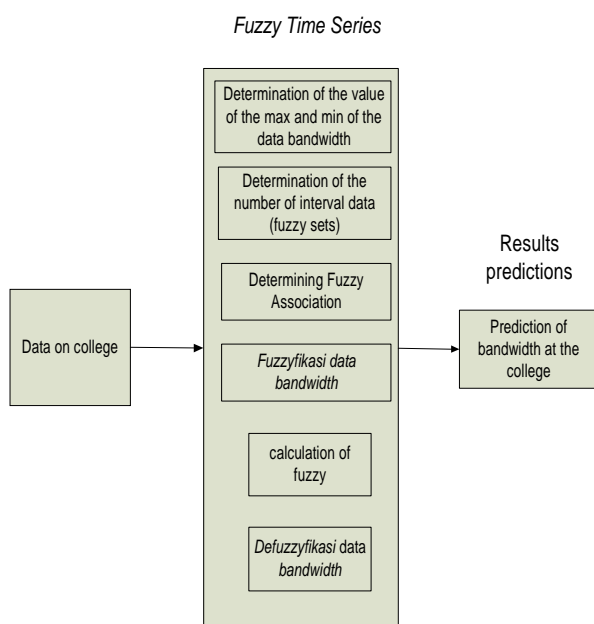
Fig 1. The procedures of Fuzzy Time Series Singh

Fig 2. Linear sequential model

Table 2. Forecasting result of *Bandwidth*at learning hour condition

|	Hour	Forecasting Result Singh	Target	MAPE Singh
Monday	7	66800,00	68804,00	2,913
	8	12332484,00	13130000,00	6,074
	9	11745297,00	11260600,00	4,304
	10	19101445,25	16940000,00	12,759
	11	17290952,00	17010000,00	1,652
	12	24012854,83	23843000,00	0,75
	13	20292130,00	21600000,00	6,055
	14	16817940,25	16530000,00	1,742
	15	12870738,75	12876000,00	0,041
	16	19291737,33	19250000,00	0,217
	17	22306003,20	21774000,00	2,903
	18	11190731,50	12906400,00	13,293
Min		66800,00	68804,00	0.041
Max		24012854,83	23843000,00	13.293
Mean		15609926,18	15599067,00	4,392
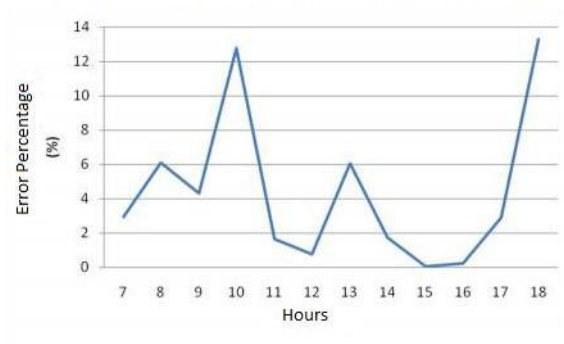
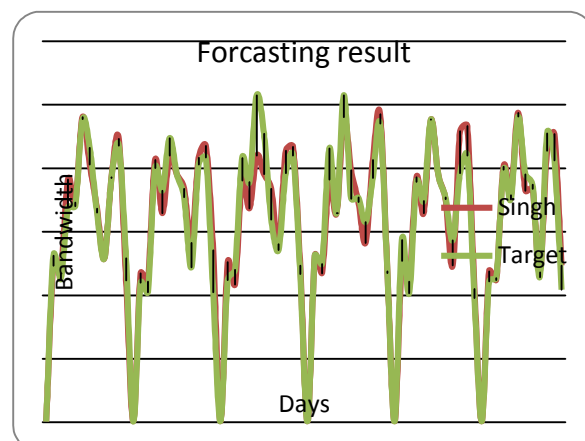Fig 3. Graphics *Error* at learning hour condition (19/12/2011)

Fig 4. Graph of Forecasting Results in Course Condition

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CERTIFICATE

2015 INTERNATIONAL CONFERENCE ON
ELECTRICAL ENGINEERING, COMPUTER SCIENCE AND INFORMATICS

August 19-21, 2015
Palembang, Indonesia

Presented to

Aryanti

In recognition and appreciation of the contribution as

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Rector – Sriwijaya University

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