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

Judul Karya Ilmiah	:	Early Warning System of Landslide Disaster using Generalized Neural Network Algorithm		
Jumlah Penulis	:	3 orang		
Status Pengusul	:	Penulis Utama		
Identitas Prosiding	:	a. Judul Prosiding	:	**2019 6th International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE)**
		b. ISBN/ISSN	:	978-1-7281-2689-0, Hal : 71 - 74
		c. Thn Terbit, Tempat Pelaks.	:	Semarang, 26-27 September 2019
		d. Penerbit/Organiser	:	IEEE Xplore digital library
		e. Alamat Repository/Web	:	https://ieeexplore.ieee.org/document/8904432
		Alamat Artikel	:	
		f. Terindeks di (jika ada)	:	IEEE Xplore

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b. Ruang lingkup dan kedalaman pembahasan (30%)	7,00	7,00	7,00
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	7,50	7,00	7,25
d. Kelengkapan unsur dan kualitas terbitan/prosiding(30%)	7,00	7,50	7,25
Total = (100%)	**24,00**	**24,00**	**24,00**

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Catatan Penilaian Paper oleh Reviewer :

1. **Kesesuaian dan kelengkapan unsur isi paper:** Makalah telah ditulis sesuai dengan petunjuk pada IEEE conference. Unsur-unsur makalah tersebut berisi abstract, introduction, teori tentang AI, deteksi EWS, results and analysis, dan conclusion, serta references.

2. **Ruang lingkup dan kedalaman pembahasan:** Ruang lingkup makalah difokuskan pada penggunaan GNN node untuk early warning system. Analisis hasil menyajikan pembandingan GRNN dengan metoda lain (feed forward back propagation)

3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:** Referensi makalah berasal dari paper jurnal maupun international conference yang mutahir. Terdapat 11 dari 14 referensi dari 10 tahun terakhir.

4. **Kelengkapan unsur dan kualitas terbitan:** Makalah telah memenuhi unsur kelengkapan sesuai standar dan terbit pada proceeding international IEEE conference, dan sudah terindeks di IEEExplore

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Total = (100%)	**25,00**		**24,00**

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a) **Kesesuaian dan kelengkapan unsur isi paper:** Makalah telah mempunyai kelengkapan unsur sebagai makalah ilmiah. Unsur makalah lengkap berupa pendahuluan, teori metode yang digunakan, pembahasan parameter deteksi pada early warning system, hasil dan diskusi, kesimpulan, dan dilengkapi dengan daftar pustaka

b) **Ruang lingkup dan kedalaman pembahasan:** Ruang lingkup pembahasan cukup mendalam, dilengkapi dengan data hasil simulasi terkait dari algoritma yang digunakan.

c) **Kecukupan dan kemutakhiran data/informasi dan metodologi:** Metodologi sudah biasa dipakai namun sebagian besar referensi data cukup baru. Terdapat 2 dari 14 referensi yang digunakan berusia lebih dari 10 tahun

d) **Kelengkapan unsur dan kualitas terbitan:** Unsur pembahasan lengkap, kualitas terbitan cukup, telah dipresentasikan pada konferensi internasional yang terindeks IEEE Xplore

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Early warning system of landslide disaster using generalized neural network algorithm (Conference Paper)

Sofwan, A. ✉, Sumardi ✉, Azka, T.H. ✉

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Diponegoro University, Department of Electrical Engineering, Semarang, Indonesia

Abstract

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Landslides are frequently happened Indonesia, as many as 274 districts/cities are prone to landslides. There are many parameters that affect the landslide occurrence such as rainfall, land slope, soil moisture, and vibration. It is needed to provide a system that not only able to process data parameters to provide early warning of landslide disaster, but also increase the readiness of the population to minimize losses caused by this disaster. Generalized Regression Neural Network method is used to identify the effect of each parameter on the occurrence of landslide disaster. Tests conducted on field conditions and simulations on safe, alert, and danger condition to know the calculation result of artificial neural network. The simulation results are compared with the artificial neural network feed forward back propagation and manual calculations to demonstrate the effectiveness of the proposed method. The validation test on field condition using simulation shows average error of Generalized Regression method and Feed Forward Backpropagation method are 0.00115 and 0.08702, respectively. Furthermore, the Mean Square Error performance of the former method is better than that of the latter with values of 2.9157e-06 and 0.0112, severally. © 2019 IEEE.

Author keywords

Feed Forward Backpropagation | Generalized Regression | Landslide | Neural Network

Indexed keywords

Engineering controlled terms: Backpropagation algorithms | Disasters | Landslides | Mean square error | Neural networks | Population statistics | Regression analysis | Soil moisture

Engineering uncontrolled terms: Calculation results | Early Warning System | Feedforward backpropagation | Field conditions | Generalized neural network | Generalized regression | Generalized regression neural networks | Mean-square-error performance

Engineering main heading: Feedforward neural networks

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Eko Yuniarno	Institut Teknologi Sepuluh November	Indonesia
Arbai Yusuf	Universitas Indonesia	Indonesia
Rudy Yuwono	University of Brawijaya	Indonesia

Program Schedule of 6th ICITACEE 2019
(Venue: Grand Candi Hotel Semarang, Amarta 2 and Amarta 3)

Thursday, 26th September 2019

No	Time	Event
1	07.30 - 08.00	Registration (Include : Indonesia Raya Song)
2	08.00 - 08.10	Welcoming Speech by General Chair of ICITACEE 2019 By Dr. Adian Fatchur Rochim (Amarta 3)
3	08.10 – 08.20	Welcoming Speech by IEEE Indonesia Section By Vice Chair of IEEE Indonesia Section Dr Kurnianingsih (Amarta 3)
4	08.20 - 08.40	Welcoming Speech and Opening by Dean of Engineering Faculty, Diponegoro University By Prof. M. Agung Wibowo (Amarta 3)
5	08.40 - 08.50	Photo session (Amarta 3)
6	08.50 – 09.00	Saman Dance
7	09.00 -09.15	IEEE at glance by Vice Chair of IEEE Indonesia Section By Dr. Kurnianingsih (Amarta 3)
8	09.15 - 09.30	Coffee Break
9	09.30 - 10.00	Invited Speaker 1 : “Cyber-Electronic Warfare: Role and Challenges in IR 4.0” By Prof. Kamaruddin Abdul Ghani Moderator : Dr. Trias Andromeda (Amarta 3)
10	10.00 - 10.30	Ivited Speaker 2 : “Lightning Modeling, Protection and EMC Issues” By Prof Zulkurnain Abdul-Malek Moderator : Dr. M. Facta (Amarta 3)
11	10.30 - 11.00	Invited Speaker 3 : “Backward Compatible Low PAPR Preamble for Very High Throughput WLAN IEEE802.11ac” By Dr Wahyul Amien Syafei Moderator : Dr Agung Budi P. (Amarta 3)
12	11.00 - 12.00	Parallel Session 1
13	12.00 - 13.00	Lunch Break
14	13.00 - 14.20	Parallel Session 2
15	14.20 - 14.30	Coffee Break
16	14.30 - 16.00	Parallel Session 3

IEEE INDONESIA SECTION

17	16.00 - 18.30	Break
18	18.30 - 20.00	Gala Dinner

Friday, 27th September 2019
08.00 – Finish : City Tour

Parallel Session
(Room: Amarta 2)

Session 1 Moderator : Mr. M. Facta				
No	**Track**	**Time**	**First Author**	**Tittle**
1	Power Systems	11.00-11.10	Alif Luqman	Performance Improvement of Scalar Feedback Control for Induction Motors by Using Third Harmony Injection SPWM
2	Power Systems	11.10-11.20	Muhammad Kuncoro	Dynamic Power Injection for Solar PV Constant Power Generation
3	Power Systems	11.20-11.30	Anggakara Syagata	Fast-Charging LTO 18650 Batteries Using a DC PS-3005D Power Supply
4	Power Systems	11.30-11.40	Mochammad Facta	Power Consumption Analysis in Resonant Converter
5	Power Systems	11.40-11.50	Abdul Syakur	Design of Temperature and Humidity Control Devices in the Leakage Current Test Chamber of 20kV Insulator
6	Power Systems	11.50-12.00	Fikri Shalahudin	Design of Monitoring Remote Terminal Unit(RTU) Panel Supply Based on IOT Case Study at PLN
Session 2 Moderator : Mr. Agung B.P.				
No	**Track**	**Time**	**First Author**	**Tittle**
1	Telecommunications and Vehicular Technologies	13.00-13.10	Soraya Mustika	Uplink Boost Eliminate User in Massive MIMO System Using Reinsch Algorithm
2	Telecommunications and Vehicular Technologies	13.10-13.20	Kartiko Nugroho	Accuracy Comparison of Radio Direction Finder with 6 and 4 of Log Periodic Dipole Array Antennas
3	Telecommunications and Vehicular Technologies	13.20-13.30	Samrat Patel	UAV and IoT Based Micro UGV Platform Applications for Forest Monitoring and Climate Change
4	Telecommunications and Vehicular Technologies	13.30-13.40	Yuli Christyono	Design and Construction of Helical Antenna in GSM 900
5	Telecommunications and Vehicular Technologies	13.40-13.50	Subuh Pramono	Bandwidth Enhancement Using Stacked Patch MIMO Antenna with Low Mutual Coupling for 3.5 GHz
6	Telecommunications and Vehicular Technologies	13.50-14.00	Elfira Nureza Ardina	The Track Characteristics and the Propagation Model in Train Traffic for Automatic Traffic Door System
7	Telecommunications and Vehicular Technologies	14.00-14.10	Misbahuddin Misbahuddin	Multi-hop Uplink for Low Power Wide Area Networks Using LoRa Technology
8	Telecommunications and Vehicular Technologies	14.10-14.20	Arif Nursyahid	Automatic Sprinkler System for Water Efficiency Based on LoRa Network
Session 3 Moderator : Mr. Iwan S.				
No	**Track**	**Time**	**First Author**	**Tittle**
1	Control and Circuits	14.30-14.40	Rifky Ismail	Design of Fabric-Based Soft Robotic Glove for Hand Function Assistence

2	Control and Circuits	14.40-14-50	Betantya Nugroho	Spark Gap System of Electrical Discharge Machining (EDM)
3	Control and Circuits	14.50-15.00	Aghus Sofwan	Development of Omni-Wheeled Mobile Robot Based-on Invers Kinematic and Odometry
4	Control and Circuits	15.00-15.10	Mochammad Ariyanto	Three-Fingered Soft Robotic Gripper Based on Pneumatic Network Actuator
5	Control and Circuits	15.10-15.20	Siti Yusuf	MFCC Feature Extraction and KNN Classification in ECG Signal
6	Control and Circuits	15.20-15.30	Syahril Ardi	Design Semi-Automatic Control System Using PLC for Stalling Materials in the Forming Machine
7	Control and Circuits	15.30-15.40	Enda Sinuraya	Designing a Fuzzy Controller of Crude Oil Dilution in Palm Oil Mills
8	Control and Circuits	15.40-15.50	Sumardi	Inertial Navigation System of Quadrotor Based on 10-DOF IMU and GPS Sensors
9	Control and Circuits	15.50-16.00	Aris Triwiyatno	Design of Data Acquisition System for Position and Attitude Quadcopter

Spark Gap System of Electrical Discharge Machining (EDM)

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***Abstract* - EDM is a process of machining electrically conductive materials by precisely controlled electrical discharge through a small clearance gap that occur between an electrode and a workpiece in the presence of a dielectric fluid. Through EDM process, the material of workpiece are melted and gap distance will increase. In order to maintain a stable spark, the gap must be controlled. This paper presents control spark gap system of EDM using PID controller with voltage and position feedbacks. The results show Time Rise (Tr) of PID control with voltage feedback has a value about 75 seconds and Time Rise (Tr) of PID control with voltage and position feedbacks has a value about 18.6 seconds. The average error of gap distance in PID control with voltage feedback is 55.56 and the average error of gap distance in PID control with voltage and position feedbacks is 48.53. Addition of the position feedback is used to increase the rise time and stabilize distance the electrode and the workpiece.**

Keywords –Electrical Discharge Machining, PID Control; Position Feedbacks

I. Introduction

EDM is a process of machining electrically conductive materials by precisely controlled electrical discharge (sparks) through a small clearance gap (approximately 10 to 50 μs) that occur between an electrode and a workpiece in the presence of a dielectric fluid [1-4]. EDM system consists of power generator, workpiece positioning system and flushing system[1-3].

Through EDM process, the material is melted and gap distance decreases. In order to maintain a stable spark, the gap must be controlled[5,6]. The gap distance is adjusted by DC motor linear system and controlled by a digital control system. This control system uses voltage sensor to sense the voltage and encoder sensor to sense the distance. The information from the sensor is related to voltage gap and waveform of the pulse.

Andromeda, T [7] explained the control of electrode gap in EDM with encoder to monitor the electrode position. The system limits the position of the electrode, so that it is within the distance control of the workpiece. The additional position sensor increases the Material Removal Rate (MRR). Jawaad, S. A. A [8] discussed the control of servo system with digital PID controller and close loop to control the speed and position of DC Motor using ARM mbed microcontroller.

This paper presents a gap control of Electrical Discharge Machining servomechanism system using RC-Generator as a power generator. A PID control with voltage and position feedbacks is used to control the gap.

II. Spark Gap System Model and Simulation

The spark gap system is accomplished by the servo mechanism system. The PID control uses a two types loop feedback consisting of a voltage gap loop and position loop as shown in block diagram of figure 1.

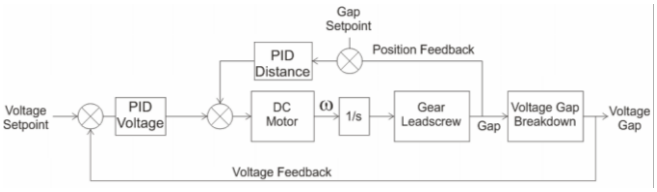

Fig 1. Block diagram of PID controller for spark gap

The DC motor consists of electrical equivalent components: resistive (R), inductive (L), supply voltage (v) and motor voltage (e), mechanical equivalent components: torque (T), inertia (J) and friction constant (K_f). The parameters for the model DC motor are obtained from manufacturer's datasheet are listed in table 1.

Table 1. Parameters of DC Motor

Parameter	Symbol	Value
Armature Resistance	R	6.8 Ω
Armature Inductance	L	4.2 mH
Back EMF constant	K_e	0.01434 V.s/rad
Torque constant	K_t	0.01434 N.m/A
Friction coefficient	K_f	1.08×10^{-5} N.m.s/rad
Inertia of Rotor	J	2.1×10^{-6} Kg.m^2
Gear (G)	N_{gm}/N_{gl}	1/300
Leadscrew (L)	d_{ls}	8×10^{-3} m

Parallel Session
(Room: Amarta 3)

Session 1 Moderator : Mr. Aghus S.				
No	**Track**	**Time**	**First Author**	**Tittle**
1	Telecommunications and Vehicular Technologies	11.00-11.10	Wahyul Syafei	Centralized Dynamic Host Configuration Protocol and Relay Agent for Smart Wireless Router
2	Green Applications and Interdisciplinary Topic	11.10-11.20	Ratna Aminah	Diabetes Prediction System Based on Iridology Using Machine Learning
3	Green Applications and Interdisciplinary Topic	11.20-11.30	Risti Putri	Analysis of the Effect of the Wax Coating on Firmness Prediction Model in Malang Apples Based on Visible and Near-Infrared (VNIR) Imaging
4	Green Applications and Interdisciplinary Topic	11.30-11.40	Erick Fernando	Development Conceptual Model Smartphone Adoption for Use Mobile Banking
Session 2 Moderator : Mr R. Rizal Isnanto				
No	**Track**	**Time**	**First Author**	**Tittle**
1	Information and Computer Technologies	13.00-13.10	Nurdin Nurdin	Understanding Digital Skill Use from the Technology Continuance Theory (TCT)
2	Information and Computer Technologies	13.10-13.20	Surjandy Surjandy	Analysis Social Media Application Message Trust Factor a Case Study University Student in Indonesia
3	Information and Computer Technologies	13.20-13.30	Aghus Sofwan	Early Warning System of Landslide Disaster Using Generalized Neural Network Algorithm
4	Information and Computer Technologies	13.30-13.40	Agung Prasetijo	Intelligent Multiple-Vehicular-Attributes (iMVA) Broadcast Protocol for VANETs
5	Information and Computer Technologies	13.40-13.50	Surjandy Surjandy	Data Privacy Factor of Female Passenger's Data in Indonesia Online Transportation System
6	Information and Computer Technologies	13.50-14.00	Erick Fernando	Success Factor of the Implementation Blockchain Technology in Pharmaceutical Industry: A Literature Review
7	Information and Computer Technologies	14.00-14.10	Faizal Prabowo	Hierarchical Multi-label Classification to Identify Hate Speech and Abusive Language on Indonesian Twitter
Session 3 Moderator : Mrs. Oky DN				
No	**Track**	**Time**	**First Author**	**Tittle**
1	Information and Computer Technologies	14.30-14.40	Dina Murad	Towards Smart LMS to Improve Learning Outcomes Students Using LenoBot with Natural Language Processing
2	Information and Computer Technologies	14.40-14-50	Salam Hamdan	Using Minimum Distance to Classify Uttered Arabic Words into Subject - Object Name
3	Information and Computer Technologies	14.50-15.00	Andika Hairuman	MEC Deployment with Distributed Cloud in 4G Network for 5G Success
4	Information and Computer Technologies	15.00-15.10	Iwan Binanto	LC-MS Analysis: Mini Review Frequently Used Open Source Softwares
5	Information and Computer Technologies	15.10-15.20	I Gede Putra Kusuma Negara	Geometric Verification Method of Best Score Increasing Subsequence for Object Instance Recognition

6	Information and Computer Technologies	15.20-15.30	Kurniawan Martono	Augmented Reality Technology as One of the Media in Therapy for Children with Special Needs
7	Information and Computer Technologies	15.30-15.40	Rievanda Putri	Implementation of Neural Network Classification for Diabetes Mellitus Prediction System Through Iridology Image

Intelligent Multiple-Vehicular-Attributes (iMVA) Broadcast Protocol for VANETs

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***Abstract*— Any vehicular network attributes in VANETs (e.g., sender-receiver distance, number of similar messages heard) can be used to determine candidate rebroadcast vehicles. The use of only limited number of attributes, however, may rule out potential broadcast candidates. For example, a counter-based scheme broadcast will never take specific rebroadcast nodes into consideration even though they have great sender-receiver distance. Hence, this research employs multiple vehicular attributes to tackle such an issue. The use of naïve-Bayes probability in our protocol combines the individual strengths of the incorporated vehicular attributes to obtain a broadcast decision. The results suggest that the proposed method is intelligent to the variation of network density and its performance outperformed both the distance-based scheme and the Efficient Counter-based Scheme (ECS) broadcast scheme at any network densities. Our algorithm contributes to the increase of 1.8% average reachability, 30.3% saving on rebroadcast tries, 5% drops on delivery cost and shortens the total delay time by about 19.6% over the ECS scheme. The analytical model justifies the simulated reachability and saved-rebroadcast results, showing similar trends over network density experimented.**

Keywords—Broadcast-storm, naïve-Bayes, VANET attributes, network density, back-off

I. Introduction

Simple broadcast in a dense network may result in a massive message redundancy, contention and collision, the so-called broadcast storm problem [1, 2, 3, 4]. Initial schemes for alleviating broadcast storm problem are either by redundant broadcast reduction or timing differentiation. Probabilistic schemes use probability to inhibit some hosts from rebroadcast; therefore, the number of redundant messages transmitted is reduced. A counter-based scheme reduces message redundancy by listening for duplicates that arrive during back-off time. If similar messages are received multiple times reaching a threshold before the expiry of the timer, the message will be dropped. Distance-based scheme uses distance between the sending and receiving vehicles to make rebroadcast decision based on a set threshold as the greater the distance, the larger the additional coverage can be obtained. Location-based scheme provides more precise information on a vehicle's contribution to the new coverage. If the additional coverage exceeds the set threshold, the vehicle will immediately rebroadcast the message after the count-down timer reaches zero. In cluster-based system, reduction of duplicates is by assigning few vehicles as cluster-heads and gateway vehicles while letting the other vehicles as members that are not responsible for message rebroadcast. Details on such schemes can be found in [2, 4].

Our approach to the broadcast-storm problem is to employ a more comprehensive set of VANET's vehicular attributes to make rebroadcast decision. Whilst, to the best of our knowledge, the available solutions to the broadcast-storm problem employ only a limited number of attributes, e.g., the distance-based and the counter-based broadcast. The reason behind our proposed method was that selectively picking the rebroadcast vehicles will give a better performance than merely picking them blindly. For example, the distance-based broadcast offers better overall performance compared to the probabilistic-based broadcast. In addition, the inclusion of various vehicular attributes of VANETs means a better and more selective mechanism for choosing more accurate rebroadcast vehicles. As an advantage of our protocol, the attributes employed in this study require only one-hop information. No two-hop or global knowledge are employed.

Discussion on this research will be as follows. Section 2 discusses the broadcast-storm problem mitigation from literature. Section 3 presents the selected attributes and performance measures of VANETs and section 4 discusses our intelligent multiple-vehicular-attributes (iMVA) broadcast scheme. Following this, results and discussions and conclusion can be seen in Section 5 and 6.

II. Literature Review

As vehicle's radio coverage is limited, routing is deemed fundamental for messages delivered to other vehicles beyond the radio coverage. Broadcasting is a common operation for delivering messages over networks. It is also useful for route finding as the underlying mechanism for unicast and multicast routing protocols. When dealing with broadcasting messages, the broadcast-storm problem is most likely to arise when a simple-flooding scheme is used. Available solutions to such a problem available in literature usually employ one or more (local or global) attributes/entities that selection on rebroadcast vehicles or cancellation on an assigned rebroadcast can be relied with. This incurs less accurate selection of broadcast candidates, hence the performance offered might not optimal.

Literature [1, 2, 3, 4] provides legacy single-attribute broadcast schemes (e.g. distance-based, location-based, and counter-based) that demonstrate the sender-to-receiver distance or number of message copies can be used to select the broadcast candidates. The use of speed differential between the sender and the receiver is also proposed. In [5], the speed is considered as a representation of vehicle density. Lower speed implies higher vehicle density. Literature [6] combined the use of the counter-based and the probabilistic schemes. The number of message copies heard during the waiting period is used to determine the vehicle's broadcast probability. In [7], local node density is used in DECA protocol to select broadcast candidates. Vehicles will be selected to broadcast a message if they have the highest number of neighbors. Upon a message has been received, every node checks if it is the selected rebroadcast node. If so, it broadcasts the message, otherwise it stores the message for future needs.

Multiple-attributes based broadcast protocols are also available: Literature [8] uses neighbor density and the

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Using Minimum Distance to Classify Uttered Arabic Words into Subject - Object Name

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***Abstract*— due to the improvement in technology, smart devices and smart applications are included in most of human life aspects, and in order to make the interconnection between human and these applications and devices simpler, making these devices and applications understand the spoken language is essential. Speech recognition is the field that is meant to analyze and understand the spoken language. In this paper a new model is proposed to classify the Arabic words into two classes: subject name class or object name class. The Mel Frequency Cepstral Coefficient transformation is used to extract the features from the uttered words, and finally a MAHALANOBIS DISTANCE is used to classify the words using MATLAB tool. The data set that is used contained of 100 Arabic words 50 are subject names and 50 are object names. The results show that the accuracy of detecting subject and object name is 96%. (Abstract)**

Keywords*— *Arabic speech recognition, pattern recognition, signal processing

I. INTRODUCTION

Pattern recognition is an attracting research area [1], examples of pattern recognition applications are: speech recognition and face recognition [2]. For the time being, a massive improvement on technology is leading to great demand on making digital applications understand the natural spoken language. Multi stages should be done to achieve this; following are the steps that should be done [3], the speech signal must be converted from analogue form to digital form then it must be preprocessed because it is infeasible to work with a speech signal inasmuch the size of speech signal is very large [4], in order to be ready for features extraction step from the spoken language. After extracting features, preprocessed words will be entered into the machine learning model to be learned. Afterwards, the model will be trained according to these uttered words. The trained model will be tested using the test dataset. Thus, the speech Recognition is the process of converting the signal of the speech into a sequence of words, using an algorithm implemented in the computer.

Most of Arabic language is constructed according to predefined patterns. The most used and useful patterns in Arabic language are those related to subject name (اسم الفاعل) as (ضارب). Sense (اسم الفاعل) carries information about the action and who made the action like (آكل,ضارب). And object name(اسم المفعول) carries the information about on whom the action is done on. This makes the identification of the word build according to this pattern important in many applications. In this paper a new model is proposed to recognize the spoken words belonging to these categories.

Speech recognition systems can be separated into several different classes by describing what types of utterances they have the ability to recognize. These classes are classified as the following:

- Isolated Words: in this type of speech recognition the training data set and tested data set are separated words, in which the speaker will uttered the sample word then pause [5].
- Connected Words: it is as the same as the isolated words but it is a Connected word systems (or more correctly 'connected utterances') are similar to isolated words, but allows separate utterances to be 'run-together' with a minimal pause between them [6].
- Continuous Speech: in this type of the recognition the speakers speak naturally and the computer will recognize the words, this type of the recognition is considered the hardest one in order that the computer must determine the boundaries of the words [7].

Most of subject names are constructed from specific patterns which is Fa'el (فاعل) and most of object name are constructed from specific pattern which is Mafoal (مفعول). In this paper a new model is proposed to classify the uttered words into subject name (اسم فاعل) and object name (اسم مفعول), in which the subject name will be in a specific pattern which is (فاعل) and object name will be also on a specific pattern which is (مفعول). The uttered words are preprocessed using the Mel Frequency Cepstral Coefficient MFCC transformation then a function called Mahalanobis distance [8, 9] which computes the difference between the samples to find the class that the sample belong to.

This paper is organized as follows, section 2 will describe the techniques that have been proposed so far, section 3 describes the dataset used in this paper, section 4 describes the proposed technique, section 5 evaluate the performance, and finally section 6 conclude the paper.

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Implementation of Neural Network Classification for Diabetes Mellitus Prediction System through Iridology Image

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***Abstract*—One alternative and a non-invasive method named iridology, has been developed to find more effective way of detecting diabetes mellitus. Iridology is the method of mapping the human organs, and it has corresponded in iris' zone. It can be used to detect damaged tissues, particularly in the pancreas where it holds the primary role of producing insulin. This study focuses on developing a non-invasive diabetes mellitus prediction system through an iris image using an image processing algorithm and neural network model. The processing starts with image enhancement using FFT filter and grayscaling, iris localization using Circular Hough Transform (CHT), and normalization using rubber sheet normalization. Segmentation on pancreas in iris image then resulted as followed, one ROI of right-eye image and two ROIs of left-eye image. The image database is collected with maximum of three images taken from 15 healthy subjects and 11 diabetes subjects, resulted in 201 data images. Feature extraction method that has been used is the Gabor filter, using the texture feature of the segmented iris image. The evaluation method we use for the system is the confusion matrix to obtain its accuracy and other parameters. Classification model of Feed-Forward Neural Network (FNN) is implemented to classify between diabetes and healthy subjects with the best results of accuracy number 95.74% and 92.57% for training and testing data respectively. The result shows that this system can be proposed as a complementary tool for therapeutic methods for diabetes prediction.**

Keywords—diabetes mellitus; Gabor filter; image processing; iris image; neural network

I. INTRODUCTION

Diabetes is one of the causes of the death-related case in the world. To detect if someone has Diabetes by measuring the blood glucose level, it can be done through other body fluid such as urine, sweat, saliva, and ocular system fluid [1]. Measuring the blood glucose using biosensor strip on a small amount of blood drawn is the most used method, which is an invasive way to do. In this study, we implement one of an alternative and non-invasive method to more effectively detect diabetes, which is called an iridology method. It is a method to detect and predict the condition of one's organ that is represented and mapped respectively on the human iris, by looking at its characteristics such as dark spot, structure, and color of the iris [2]. The method has been recognized as one of an alternative method that increased in usage number as a complementary medical method to predict several diseases in the human body [3]. We focused on the iridology zone of the pancreas, which is an organ that has the primary function of producing insulin hormone and controlling the blood glucose affecting diabetes.

In medical application, the development of machine learning has helped a lot in predicting and analyzing the symptoms along with image processing implementation to predict and detect a disease [4]. Algorithms that have been used to detect diseases through iris image include Fast Fourier Transform filtering, Circular Hough Transform (CHT), rubber sheet normalization, and feature extraction such Gabor filter, Discrete Wavelet Transform (DWT), or Gray Level Co-Occurance Matrix (GLCM). The method we use, Gabor filter, is a method that can analyze an image using its frequency domain with a sinusoidal plane wave modulated of Gaussian function [5].

Several topologies and training functions of Neural Network (NN) model are used and compared to establish a better system using the extracted features, as it has been applied in previous research of detecting particular disease through medical images [6]. The NN model is implemented using MATLAB to build a prediction model which based on the reference data of diabetes and healthy subjects.

II. SYSTEM DESIGN AND IMPLEMENTATION

A. Data Preparation

The iris image dataset is obtained from diabetes and healthy subjects. The healthy subject here means that they have never been diagnosed with diabetes disease. The age range of subjects is from 20 to 60 years old, and the ratio for diabetes and the healthy subject is 11:15 people. We acquire the images from each subject with a maximum number of three shots, each left, and right eye. Eye images then are selected to get the best ones, which are not blurred, and the iris captured utterly, that will be processed further.

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