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ANALYSIS OF DENGUE USING FUZZY LOGIC

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ABSTRACT

The recommender System involves in health care is important since user can detect whether user has problem or not. A user will get whole information on the go. Today user doesn't have much time and information about the dengue will be disclose to the user at later stages. The dengue is deadly disease so its information should be disclosed at earlier stage. The proposed system works toward this aspect. The set of parameters including fever, TLC, blood pressure, severe headache etc. are analysed in proposed system. The filtering mechanism is also utilised in the proposed system which is integral part of recommender system. The content based filtering will be utilised in proposed system.

Keywords- *Recommender system, health care, disease, dengue, tlc, blood pressure, headache, content based filtering.*

1. INTRODUCTION

We will split the introduction in two parts. Firstly we describe The Recommender System and later on we will consider Dengue Disease.

1.1 Recommender System

A recommender system is the one which works on the substructure of input inclined by user. This input will be harmonized with the parameters of the system. These parameters will embody certain values. If the input inclined by the user paired with those parameters then it pageant the positive result i.e it's the case of dengue. If the result is negative then the person is safe. Legion of work has been done toward the recommender system on health care.(1) The referenced paper contains the information about health care using internet. The YouTube videos in this paper provides information and cure about certain diseases are considered. This paper is effective in order to rectify and providing information about the disease to the user.(2) The collaborative filtering is used in this paper. Collaborative filtering is a technique used by some recommender systems. Collaborative filtering has two senses, a narrow one and general one. General collaborative filtering is the process of filtering for information or patterns using techniques involving collaboration among multiple agents, viewpoints, data sources, etc. Applications of collaborative filtering typically involve very large data sets. Collaborative filtering methods have been applied to many different kinds of data including: sensing and monitoring data, such as in mineral exploration, environmental sensing over large areas or multiple sensors; financial data, such as financial service institutions that integrate many financial sources; or in electronic commerce and web applications where the focus is on user data, etc. (3) Online social media is the way to transfer data from source to destination. The recommender system is using this medium for getting information about the parameters of dengue. Also the information about the disease is transferred to the infected persons also. Hence the user will get the information on the go. By using the recommender system user can easily get the information of this deadly disease and can easily recover well within time.

The general model for The Recommender System

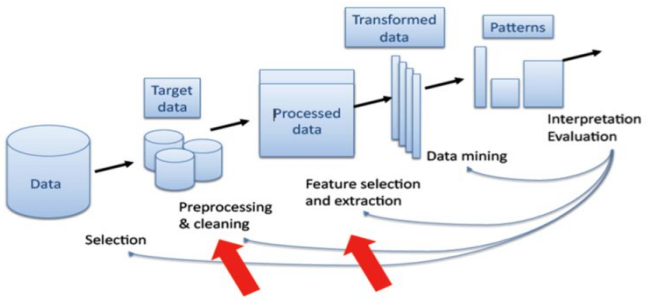

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Fig 1: Describing general recommender system.

The growth of technology spreads widely in the field of medical sciences. (4) By using GPS we can track the infectious persons and suggest cure to them. To apparatus this system an application is required. The user must enter his/her information to create id on that app. When the id will be validated he/she will enter the parameters in that app. If the parameters matched with that application then it shows the positive result. So that application we suggest the cure and nearby hospital to that person.

Fig2: Describing GPS based Recommender System

1.2 About Dengue

Dengue is bequeathed by the bite of a mosquito infected with one of the four dengue virus serotypes. It is a febrile illness that affects infants, young children and adults with symptoms appearing 3-14 days after the infective bite. Dengue is not communicated directly from person-to-person and symptoms range from mild fever, to incapacitating high fever, with severe headache, pain behind the eyes, muscle and joint pain, and rash. There is no vaccine or any specific medicine to treat dengue. People who have dengue fever should rest, drink plenty of fluids and reduce the fever using paracetamol or see a doctor etc to cure within time.

Severe dengue (also known as dengue hemorrhagic fever) is delineated by fever, abdominal pain, persistent vomiting, bleeding and breathing difficulty and is a potentially lethal complication, affecting mainly children. Early clinical diagnosis and careful clinical management by trained physicians and nurses increase survival of patients. An estimated 390 million dengue infections occur worldwide each year, with about 96 million resulting in illness. (5) To identify the symptoms and laboratory features that helps in diagnosis of dengue fever in the early phase of illness helps in designing effective public health management and biological surveillance strategies. Keeping this as our main objective, we develop in this paper a new computational intelligence-based methodology that predicts the diagnosis in real time, minimizing the number of false positives and false negatives. Our methodology consists of three major components: 1) a novel missing value imputation procedure that can be applied on any dataset consisting of categorical (nominal) and/or numeric (real or integer); 2) a wrapper-based feature selection method with genetic search for extracting a subset of most influential symptoms that can diagnose the illness; and 3) an alternating decision tree method that employs boosting for generating highly accurate decision rules. The predictive models developed using our methodology are found to be more accurate than the state-of-the-art methodologies used in the diagnosis of the DF.(6) By depicting an expert system framework the clinical procedures can be observed for diagnosis and determination of the dengue fever (DF) and dengue haemorrhagic fever (DHF). An early diagnosis of DF is very essential for a better diagnosis. The DF and DHF clinical symptoms were studied from an expert system perspective, and represented in a tree-like structure amenable to expert system applications. It is envisaged that such type of automated expert system rule-chaining technology will aid medical personnel to carry out DF and DHF diagnostic procedures accurately, faster and efficient.(6) A single frequency bioelectrical impedance analysis (BIA) is an inexpensive, quick and painless means of estimating body composition. In this paper, BIA parameters engaged for predicting haemoglobin (Hb) in dengue patients. The BIA technique passes a low-amplitude electrical current, in the range of 500 μA to 800 μA, at a single frequency of 50 kHz. BIA data was sampled from 210 (comprises of 119 males and 91 females) serologically confirmed dengue fever (DF) and dengue hemorrhagic fever (DHF) patients, hospitalized at the Hospital University Kebangsaan Malaysia (HUKM). After applying multiple regression analysis, it was found out that reactance, sex, weight and vomiting were found to be significant independent determinants of predicting Hb. (7) The paper aims to develop the predictive models for dengue outbreak

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detection using Multiple Rule Based Classifiers. The rule based classifiers used are the Decision Tree, Rough Set Classifier, Naive Bayes, and Associative Classifier. Dengue fever (DF) and dengue hemorrhagic fever (DHF) have been continuously becoming a public health related issues in Malaysia and growing pandemic as reported by World Health Organization (WHO). It is important for the government to able to make early detection for dengue outburst. Thus, to improve early detection of the dengue outburst and making such strategic planning and decision, being able to predict or forecast the possible dengue outburst in an area is critically important. The purpose of the classification modelling is to build a predictive model for predicting the dengue outburst. Since to date there is no research uses this data for predictive modelling, several classifiers are investigated to study the performance of various rule based classifiers individually and the combination of the classifiers. The experimental results show that the multiple classifiers are able to produce better accuracy (up to 70%) with more quality rules as compared to the single classifier.(8) This paper describes the development of an inexpensive, but robust and easy-to-use point-of-care diagnostic device that can be used for the detection of dengue fever at the molecular level (i.e., the detection of dengue virus via using a piece of paper). To date, the clinical diagnosis of dengue fever mainly relies on ELISA-based examinations for a specific antigen. However, the protein-based diagnostics is at the relatively late stage, and it is needed to develop a simple and low-cost diagnostic device for the detection of dengue fever at the early stage after the infection. A procedure for monitoring dengue virus serotype 2 RNA (in the buffer system), including: i) amplifying the nucleic acids via RT-LAMP (reverse transcription loop-mediated isothermal amplification), and ii) examining the amplified products via a colorimetric assay in paper. We have demonstrated the ability to intensify dengue virus via RT-LAMP with the virus concentration of 60 PFU/mL; the current results indicated that this paper-based diagnostic device was capable of detecting the RT-LAMP products in the buffer system with the concentration of 300 ng/mL.

2. PROPOSED SYSTEM

The proposed system considers the parameters in order to assay information presented by users. The disease parameters are scrutinized against the predefined parameters range. The range specified by the user consists of Fever, TLC, BP, Headache etc. The rules of fuzzy are used in order to build model to detect disease. The parameters will be listed and values will be compared. The proposed system is extremely useful in rural area where pathological labs are limited. The methodology used is as shown below

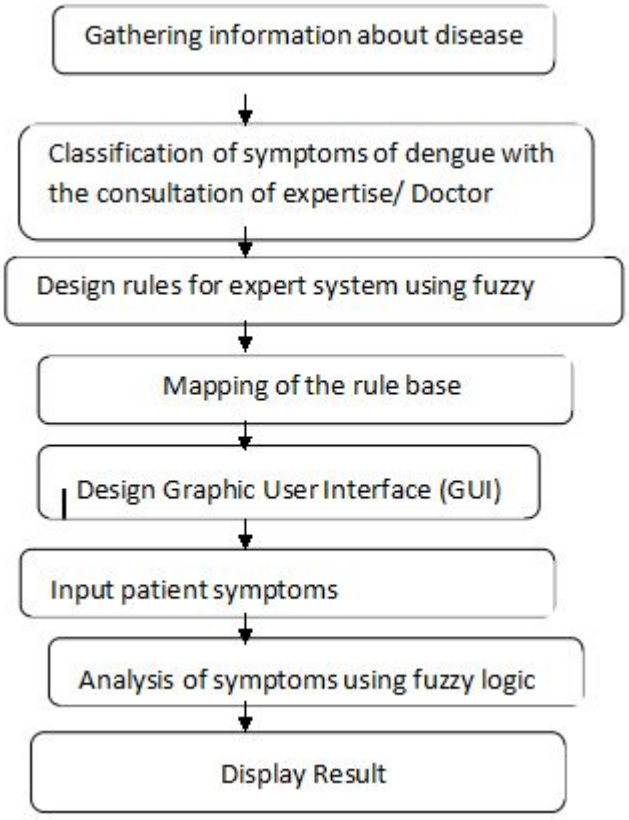

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Fig 3: Showing Methodology followed to detect the Dengue

The various rules associated with the fuzzy system verify the parametric values. The parameters which are considered are described as follows

1) IF (FEVER IS LOW) AND (JP IS LOW) AND (MP IS LOW) AND (PBE IS LOW) AND (SKINRASH IS NORMAL) AND (LOA IS NORMAL) AND (HDCH IS LOW) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS NOT DENGUE) (1)
2) IF (FEVER IS LOW) AND (JP IS LOW) AND (MP IS LOW) AND (PBE IS LOW) AND (SKINRASH IS NORMAL) AND (LOA IS NORMAL) AND (HDCH IS LOW) AND (TLC IS LOW) THEN (DENGUELEVEL IS NOT DENGUE) (1)
3) IF (FEVER IS MEDIUM) AND (JP IS MODERATE) AND (MP IS MEDIUM) AND (PBE IS MEDIUM) AND (SKINRASH IS MODERATE) AND (LOA IS LEVEL2) AND (HDCH IS MEDIAM) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS MAY BE DENGUE) (1)
4) IF (FEVER IS HIGH) AND (JP IS MODERATE) AND (MP IS HIGH) AND (PBE IS MEDIUM) AND (SKINRASH IS NORMAL) AND (LOA IS LEVEL2) AND (HDCH IS MEDIAM) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS SURE DENGUE) (1)
5) IF (FEVER IS HIGH) AND (JP IS LOW) AND (MP IS MEDIUM) AND (PBE IS MEDIUM) AND (SKINRASH IS NORMAL) AND (LOA IS LEVEL2) AND (HDCH IS MEDIAM) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS MAY BE DENGUE) (1)
6) IF (FEVER IS HIGH) AND (JP IS SEVERE) AND (MP IS HIGH) AND (PBE IS HIGH) AND (SKINRASH IS DANGEROUS) AND (LOA IS LEVEL3) AND (HDCH IS HIGH) AND (TLC IS LOW) THEN (DENGUELEVEL IS SURE DENGUE) (1)
7) IF (FEVER IS HIGH) AND (JP IS SEVERE) AND (MP IS HIGH) AND (PBE IS HIGH) AND (SKINRASH IS DANGEROUS) AND (LOA IS LEVEL3) AND (HDCH IS HIGH) AND (TLC IS HIGH) THEN (DENGUELEVEL IS NOT DENGUE) (1)
8) IF (FEVER IS HIGH) AND (JP IS SEVERE) AND (MP IS HIGH) AND (PBE IS HIGH) AND (SKINRASH IS DANGEROUS) AND (LOA IS LEVEL3) AND (HDCH IS HIGH) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS MAY BE DENGUE) (1)
9) IF (FEVER IS HIGH) AND (JP IS SEVERE) AND (MP IS HIGH) AND (PBE IS HIGH) AND (SKINRASH IS DANGEROUS) AND (LOA IS LEVEL2) AND (HDCH IS HIGH) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS MAY BE DENGUE) (1)
10) IF (FEVER IS HIGH) AND (JP IS SEVERE) AND (MP IS HIGH) AND (PBE IS HIGH) AND (SKINRASH IS MODERATE) AND (LOA IS LEVEL2) AND (HDCH IS HIGH) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS NOT DENGUE) (1)
11) IF (FEVER IS MEDIUM) AND (JP IS MODERATE) AND (MP IS MEDIUM) AND (PBE IS MEDIUM) AND (SKINRASH IS NORMAL) AND (LOA IS LEVEL2) AND (HDCH IS HIGH) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS NOT DENGUE) (1)
12) IF (FEVER IS HIGH) AND (JP IS LOW) AND (MP IS LOW) AND (PBE IS LOW) AND (SKINRASH IS NORMAL) AND (LOA IS NORMAL) AND (HDCH IS HIGH) AND (TLC IS MEDIUM) THEN (DENGUELEVEL IS NOT DENGUE) (1)
13) IF (FEVER IS HIGH) AND (JP IS LOW) AND (MP IS LOW) AND (PBE IS LOW) AND (SKINRASH IS NORMAL) AND (LOA IS NORMAL) AND (HDCH IS HIGH) AND (TLC IS LOW) THEN (DENGUELEVEL IS MAY BE DENGUE) (1)
14) IF (FEVER IS HIGH) AND (JP IS LOW) AND (MP IS LOW) AND (PBE IS LOW) AND (SKINRASH IS NORMAL) AND (LOA IS LEVEL3) AND (HDCH IS HIGH) AND (TLC IS LOW) THEN (DENGUELEVEL IS SURE DENGUE) (1)

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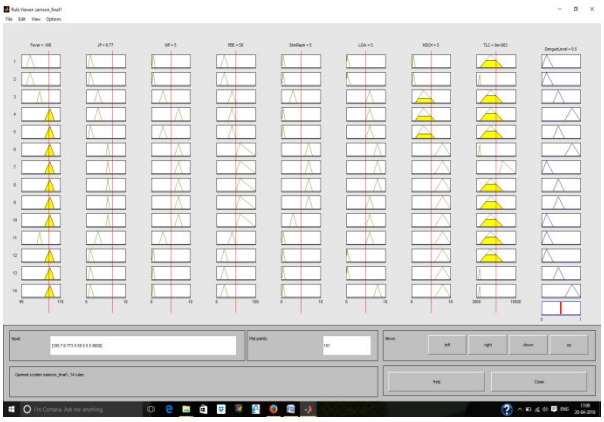

Fig 4: This screen will be describing the values of parameter fever=106, joint pain=6.77, muscles pain=5, pain behind eyes=50, skin rashes=5, low on appetite=5, HDCH=5, TLC=9e+003 then dengue level=0.5. It shows medium symptoms of dengue.

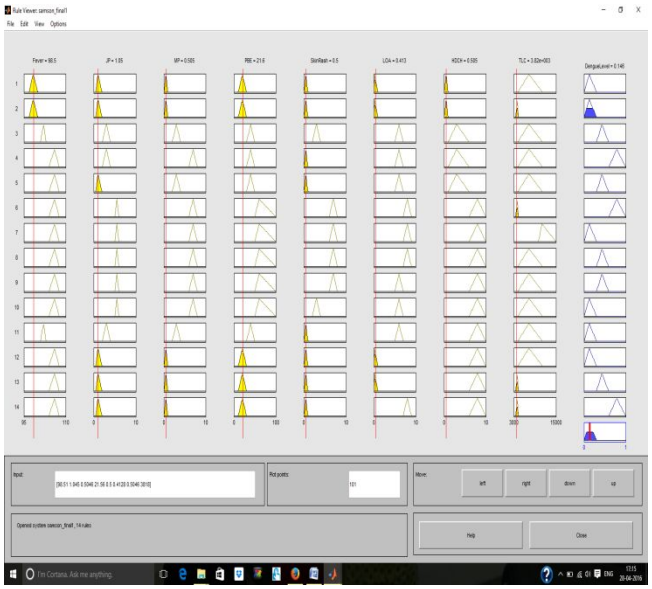

Fig 5: This screen will be describing the values of parameter fever=98.5, joint pain=1.05, muscles pain=0.505, pain behind eyes=21.6, skin rashes=0.5, low on appetite=0.413, HDCH=0.505, TLC=3.82ee+003 then dengue level=0.146. It shows no dengue.

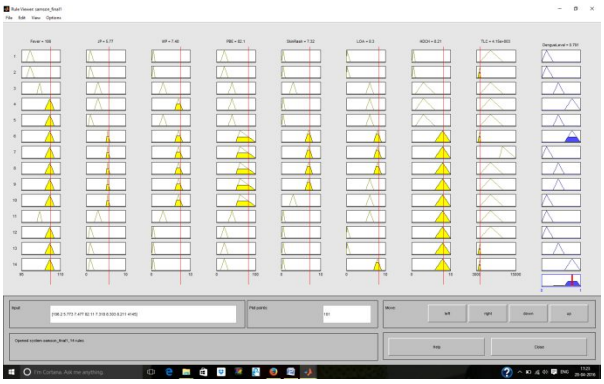

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Fig 6: This screen will be describing the values of parameter fever=106, joint pain=5.77, muscles pain=7.48, pain behind eyes=82.1, skin rashes=7.32, low on appetite=8.3, HDCH=8.21, TLC=4.15e+003 then dengue level=0.791. It shows high symptoms of dengue.

3. CONCLUSION & FUTURE

In the proposed paper analysis of dengue is considered. It is a deadly disease and precautions and cure is prerequisites. The proposed paper automatically detects the disease through the parameters inputted by user. This technique is useful in the area of health care. Because of shortage of time people have no time to go for regular checkups and they avoid the symptoms of the diseases from they are suffered. In our proposed paper we are designing a recommender system which shows about the dengue by matching out the parameters provided by the user. If the input given by the user matched with the parameters of the system then on single go we can easily detect the dengue. In future we can also detect other diseases by using our recommender system because of lack of time the people have.

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