

Review on Classification and Prediction of Dengue and Malaria Diseases

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Abstract - Malaria and Dengue diseases are quite prevalent in India and cause a large number of deaths when they get aggravated, in turn leading to epidemics. It is quite easy to get infected by means of those diseases, that have very similar symptoms, maximum of which manifest after days. Technology, these days, can offer a assisting hand in the precise diagnosis of those illnesses. In this paper, we take up two diseases prevalent in India: malaria and dengue. The proposed method uses machine learning algorithms like Naive Bayes' and Convolutional Neural Network algorithm for training and testing. The structured database is taken as text format for symptoms and unstructured image dataset for blood cell images. The final probability of the more probable of the two diseases is given, based on the symptoms entered.

Key Words: Machine Learning, Artificial Intelligence, Classification, Disease prediction, Malaria, Dengue.

1. INTRODUCTION

Diseases are caused due to various reasons. They can be transmitted through various viruses or due to some chemical reactions in our body. Among various life-threatening diseases, diseases which have similar symptoms have gathered a great deal of attention in medical research. The diagnosis of diseases with similar symptoms is a challenging task, which can offer automated prediction about the disease of patient so that further treatment can be made effective. The diagnosis of such diseases is usually based on signs, symptoms and cell image of the patient. A major challenge faced by healthcare organizations, such as hospitals and medical centers, is the provision of quality services at affordable costs and accuracy with less time.

1. The high-quality services imply diagnosing patients properly and administering effective treatments. The available database consists of each numerical and cell photo records. Before further processing, cleaning and filtering are implemented on these records. It filters the non relevant data from database.

2. The proposed system can determine an exact hidden knowledge, i.e., patterns and relationships associated with disease from a database. The Healthcare prediction system is an end user and an online consultation project which can help in decreasing the total time period required for accessing each patient by doctors on time. Here we propose a system that allows users to get instant guidance on their health issues having similar symptoms through a predictive

health care system online. This system is also responsible for classifying diseases having similar symptoms.

1.1 Review of Literature

In paper [1] the knowledge graph-based method to build the linkage between various types of multimodal data builds a semantic-rich knowledge base using both medical dictionaries and practical clinical data collected from hospitals and proposes a graph modeling method to bridge the gap between different types of data, and the multimodal clinical data of each patient are fused and modeled as one unified profile graph and also develop a lazy learning algorithm for automatic diagnosis based on graph similarity search.

In paper [2] the hypothesis that the application of machine learning techniques on data of this nature can be used to address prediction/forecasting problems in the Health IT domain. It experiment with the prediction of the probability of early readmission at the time of a patient's discharge. It extract real HIS data and perform data processing techniques. It then applies a series of machine learning algorithms and measures the performance of the emergent models.

In paper [3] it is proposed that there are three diseases prevalent in India: malaria, dengue and chikungunya. The proposed method uses an Artificial Neural Network (ANN) based back propagation algorithm for training and testing. A number of gradient optimization techniques are used like Adaptive Moment Estimation, RMS Prop, Adagrad, Classical Momentum and Nesterov accelerated gradient.

In paper [4] the potential of nine classification techniques was evaluated of prediction of heart disease. Using scientific profiles which include a age, sex, blood pressure, chest ache kind, fasting blood sugar. It can expect like of patients getting heart disorder Based in this, clinical society takes part interest in detecting and preventing the heart ailment.

In paper [5] the system uses sensors, the data acquisition unit, microcontroller and software. This system is able to send alarm messages about the patient's critical health data by text messages or by email reports. By using this statistics the healthcare professional can provide vital clinical advising.

In paper [6] the system introduces an ensemble based on distances for a kNN (k Nearest Neighbour) method and shows results of its application to heart disease diagnosis.

In paper [7] the system examines the ethical issues of applying ML and AI in cancer care and classifies them into three major categories: bias, the societal implementation of the technology, and the effects of big data analytics on cancer patients.

In paper [8] the system provides a recent review of the latest methods and algorithms used to analyze data from wearable sensors used for physiological monitoring of vital signs in healthcare services. In precise, the paper outlines the greater common records mining duties that have been implemented which include anomaly detection, prediction and choice making whilst thinking about mainly continuous time collection measurements.

In paper [9] the technique of bronchial asthma diagnostics primarily based on evaluation of microwave band electromagnetic radiation propagation thru the patient chest is described. The suggested method allows realizing innocuous non-invasive diagnostics of respirator system diseases among patients of all ages. It also allows monitoring the patient's condition and the disease progression during the whole period of treatment.

In paper [10] the system offers a variety of alerting and risk management decision support tools, targeted at improving patients' safety and healthcare quality and disease predictions.

2. PROPOSED SYSTEM

A. Model

In this proposed system we apply the machine learning algorithms to extract the knowledge from healthcare system. Malaria and Dengue have group of condition affecting the structure and functions of body and has many root causes. We are using Deep Learning algorithms to increase the accuracy of Malaria and Dengue Disease prediction System. It is implemented as desktop application in which user submits the heterogeneous textual data like symptoms and image of blood cells. Do not use abbreviations in the title or heads unless they are unavoidable.



Fig -1: System Architecture

In this system two inputs are taken i.e. data input and image input. First input taken is data input in the form of symptoms then based on its severity mean value is calculated and compared with normal data for predicting a disease. For carrying out such process we need the Naive Bayes' algorithm. To confirm if the disease is same or not we then take images of blood cell as our input. The output from the image processing in the form of probability gives us the disease whether it is dengue or malaria. For carrying out such process we need the Convolutional Neural Network Algorithm.

B. Mathematical Model

Let 'S' be the system

Where,

- $S = \{I, O, P, Fs, Ss\}$
- Where,
- I = Set of input Set of output
- P = Set of technical processes
- Fs = Set of Failure state
- Ss = Set of Success state

1. Identify the input data I1, I2, ..., In

$I = \{(Input\ Data\ (Text, Image), Dataset\ (Dengue, Malaria))\}$

2. Identify the output applications as O1, O2, ..., On

$\{(Malaria\ Detection, Dengue\ Detection)\}$

3. Identify the Process as P

P = {(Image pre-processing, Image Processing, Grey-scale, smoothing, Edging, segmentation, feature extraction, classification, show result)}

4. Identify the Failure state as Fs

Fs = {(If data set not loaded, If not predicted, if more time required to predict)}

5. Identify the Success state as Ss

P = {(Correct prediction within time)}

3. CONCLUSIONS

In this paper we have proposed a model which involves classification and prediction of diseases with similar symptoms for dengue and malaria. In our proposed system we make use of machine learning algorithms instead of using MATLAB, these algorithms provide more accuracy and fast prediction of diseases. The proposed system is time and cost efficient which needs less manpower. Mechanism of the [5] Monitoring Mobile Patients Using Predictive Analysis By Data From Wearable Sensors, International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) 2018.

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model can be used to predict many diseases further in future.

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