Malaria and Dengue Classification Using Convolutional Neural Networks: A Review

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Abstract

A health care facility is found to be rich in information, but not limited to information. This is because we do not have the tools and methods that are effective and efficient. By using the latest technology such as machine learning techniques and techniques and methods valuable information can be extracted from the health care system can greatly assist in further development. Malaria and Dengue are many malignant syndromes that can seriously damage the human body. We use Deep Learning algorithms to increase the accuracy of the Malaria and Dengue Diagnosis System. It acts as a desktop application where the user transmits different data such as text and image of blood cell markers. It retrieves hidden data from the database and in-depth learning model and compares user values with a set of trained data.

Keywords - *Machine learning, disease prediction, malaria, dengue.*

I. INTRODUCTION

Diseases are created for a variety of reasons. They can be transmitted by a variety of viruses or by some chemical reactions in our body. Among a variety of life-threatening illnesses, diseases with similar symptoms have received much attention in medical research. Diagnosis of symptoms with similar symptoms is a challenging task, which can provide automatic predictions about a patient's illness so that further treatment can be effective. The diagnosis of such diseases is usually based on the symptoms, signs and image of the patient. A major challenge facing health care organizations, such as hospitals and medical centers, is the lack of affordable resources and limited time.

[1] In health care, quality care depends on good patient evaluation and the provision of effective treatment an affordable cost. The available disease database contains numerical and cellular image information. Before installing any algorithm or any functionality in the available database we need to first check its authenticity and compliance. We first need to make data editing work on the database to make it clean and relevant.

[2] By using an algorithm, the proposed system can identify and extract hidden information from the database, i.e. patterns and disease-related relationships in the database. The Health Forecasting System is the ultimate user and online consultation project that can help reduce the total time required to reach each patient with a doctor on time. Here we propose a system that allows users to get instant guidance on their health issues with similar symptoms through an online health care system.

The program also looks at diagnosing diseases with similar symptoms.

Width:

1. Be sure to predict disease promptly.

2. Be sure to accurately predict disease.

3. It requires less staff

4. Ensures low cost

5. Easy to access

II. SCRIPTURE STUDY

Name-: Automatic Diagnosis By Active Medical Case Search Based on EvolvingGraphs. (Xiaoli Wang 1, Yuan Wang2, Chuchu Gao1, Kunhui lin1, no yadi li3), IEEE, 2018.

Definition-: A graph-based approach to creating connections between different types of multimodal data forms the basis of rich semantic data using medical dictionaries and active clinical data collected in hospitals and suggests a modeling graph to bridge the gap between different types of data, as well as several clinical and patient clinical data. is designed as a single integrated graph and develops a lazy automatic diagnostic algorithm based on graph matching search.

Limit-: The GP model is not used in graph sequence for a different type of standard algorithms that attempts to actively train the global GP model across the entire database.

Name-: Using Electronic Health and Mechanical Records to Make Medical-Related Predictions From Non-Medical Data (Stavros Pitoglou, YeannisKoumpouros and AthanasiosAnastasiou), International Conference on Technology Information Technology, and Engineering 2018 Bed

Definition-: The idea that the use of machine learning processes in this type of data can be used to address predictive / predicting problems in the Health IT domain.

Limit-: The youth of this method contains medical information (test results, diagnostics, doctor's notes etc.) is not included in the predictive database.

Name-: Monitoring Walking Patients Using Predictability Analysis With Data From Wearing, International Conference on Electrical, Technological, and Operational (ICEEOT) 2018 Conference.

Definition-: In this paper program it uses sensors, data acquisition unit, microcontroller and software.The system is able to send alarm messages regarding sensitive patient health information via text messages or email messages. Using this information a healthcare professional can provide the necessary medical advice.

Limit-: Sensors and controller, camera expensive.

Name-: Neat Data Data Mine in Health Monitoring Systems: Cultural Review and Recent Challenges, Independent Nervous Systems Center, Orebro University, SE-70182, Orebro, Sweden; 2017.

Definition-: This paper provides the latest review of the latest methods and algorithms used to analyze data from wearable sensors used for physical monitoring of vital signs in health care services. In particular, this paper describes the general functions of data mining used such as anonymous discovery, speculation and decision making when considering especially time series continuous estimates.

Limit-: The chosen digging process depends largely on the digging work to be done. According to the proposed data mining activities in section 3, the error detection function, SVM, HMM, mathematical tools and frequency analysis are widely used.

Name-: Artificial Neural Network Method for Vector-Borne Disease Separation. (PrajwalShimpi, Sanskruti Shah, Maitri Shroff, AnandGodbole), (ICEEOT) 2018.

Definition-: The three most common diseases in India: malaria, dengue and chikungunya. The proposed method uses the Artificial Neural Network (ANN) based backpropagation algorithm for training and testing. Many gradient optimization techniques such as Adaptive Moment Estimation, RMS Prop, Adagrad, Classical Momentum and Nesterov accelerate gradient are used.

Limit-: With the exception of the 3 diseases that may have been considered in this paper, various diseases, i.e., with the exception of vector-borne diseases are not found.

Name-: Cardiovascular analysis research using classification techniques. (C. Sowmiya; P.Sumitra), International Conference on Wise Management Systems, Energy Efficiency and Symbol Processing, 2017

Definition-: In this paper the strengths of the nine types of heart disease tests have been tested. Using medical profiles such as age, gender, blood pressure, type of chest pain, and fasting blood sugar. It can predict as patients with heart disease Accordingly, the medical community plays a role in the diagnosis and prevention of heart disease.

Limit-: Can only try a priori algorithm. Disease classification is inaccurate.

Name-: Compilation based on the degree of kNN method of diagnosis of heart disease. (Alberto Palacios Pawlovsky), IEEE, 2018

Description-: This paper introduces the ensemble based on the distance of the kNN (k Nearest Neighbor) method and shows the results of its application for a heart test.

Limit-: Combination provides approximately 85% accuracy in any configuration and versions tested with UCI Cleveland cardiac data set.

Name-: Health Care Guessing Statistics Using Machine Learning Tools and Procedures.(B. Nithya, Dr. V Ilango), ICICCS, 2017

Definition-: Provides tools to support a variety of risk management decisions, aimed at improving quality safety and quality health care and disease prevention

Limit-: Large amounts of heterogeneous, distributed, varied, highly dynamic data sets and an increasingly large number of informal and non-targeted data regarding different types of cancer

Name-: Non-invasive method of diagnosing bronchopulmonary diseases in patients of all ages based on microwave technology. (Ivan V. Semernik, Alexander V. Dem'yanenko, Olga E. Semernik, Alexander A. Lebedenko), IEEE, 2017

Definition-: This paper describes a method of diagnosing asthma based on microwave band electromagnetic radiation propagation in a patient's chest. The proposed approach allows for the recognition of non-invasive diagnoses that do not cause respiratory infections among patients of all ages. It also allows to monitor the patient's condition and the progression of the disease throughout the course of treatment.

Limit-: Disadvantages of the proposed method is the lack of need to do the patient's breathing, lack of influence on the patient etc.

Name-: Behavioral Challenges of Using Machine Learning and Artificial Intelligence in Cancer Care. (Rima Hajjo), IEEE, 2018

Definition-: This document examines the ethical issues of using ML and AI in cancer care and divides it into three main categories: bias, social technological initiation, and the effects of large data statistics on cancer patients.

Limit-: Algorithms trained in data sets with these features are adopted in health care; they have the potential to increase health disparities.

III. PROPOSED METHODOLOGY

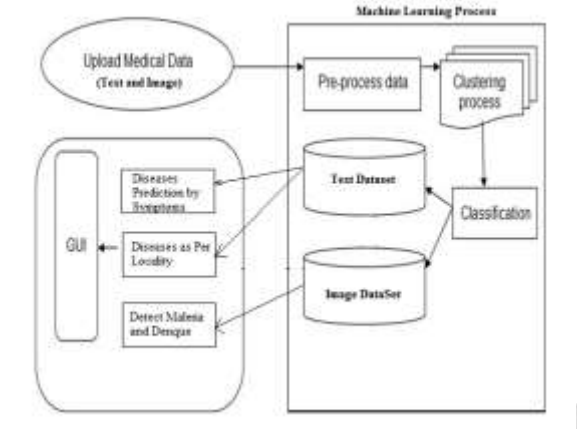

Figure 1. System structure

People suffer from many infectious diseases such as Dengue, Malaria. This information is collected at various hospitals and data analysis is done and predicting other diseases can be done. This program provides local location predictions.

Description:

Category 1:

In this system we detect malaria and dengue fever based on cellular databases and use them to process images using a machine learning process.

Category 2:

We then collect patient data from all hospitals in a particular area to determine which disease will spread the most depending on the combination of the algorithm.

Category 3:

Here provide a diagnosis module based on symptoms.

Algorithm:

CNN is the basic algorithm used for the following project,

1. Organize the database under labeled folders with blood sample images as CNN is monitored by algorithm

2. Read the database and sort the data into a single file like pickle or numpy.

3. Learn the characteristics of all the images and the label (here the name of the database folder) using the following functions,

a. Conv2D

b. Maxpool2D

c. Relu activation for layers

d. Sigmoid activation for dense layer

e. Binary Crossentropy for calculating losses

4. Save it to the model file

5. Get the installation image

6. Learn the features of the input image

7. Compare the features of the saved features

8. Show the label as a prediction of similar features.

Convolutional neural network (CNN, or ConvNet) is one of the most important algorithm and process for in-depth learning and is widely used to analyze image data. CNN uses a variety of multilayer perceptrons designed to require minimal processing. They are also known as shift invariants or space invariant network networks (SIANN), based on their composition of shared weights and signs of translation flexibility. Transformation networks are promoted by biological processes in that the pattern of communication between neurons is similar to that of the visual cortex of animals. Cortical neurons individually respond to stimulation only in the restricted region of the visual field known as the receptor field. The receiving fields of different neurons are scattered in such a way that they cover the entire field of view. CNN uses a much smaller processing compared to other image class algorithms. This means that the network reads filters in traditional manual algorithms. This independence from previous knowledge and human efforts in the construction of the feature is of great benefit. They have applications for image and video recognition, complimentary programs, image classification, medical image analysis, and natural language processing. CNN contains input and output layer, as well as many hidden layers. CNN's hidden layers usually consist of convolutional layers, composite layers, fully connected layers and standard layers.

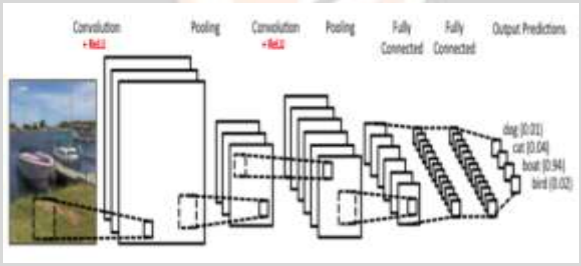

Figure 2. Simple ConvNet

Convolutional Neural Network in Fig. It is similar to the original LeNet architecture and divides the installation image into four categories: dog, cat, boat or bird. There are four key functions in ConvNet displayed on figs. above:

1. Conversion

2. Non Linearity (ReLU)

3. Pooling or Sub Sampling

4. Separation (Fully Connected Layer)

Image is a pixel value matrix. In fact, an entire image can be represented as a pixel Channel value matrix by a common term used to refer to an object in an image. An image from a standard digital camera will have three channels - red, green and blue - you can imagine those two 2d-matrices grouped over each other (one in each color), each with pixel values in range 0 to 255.

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

- Identify the input data I1, I2, , In

I = {(Input Data (Text, Image), Database (Dengue, Malaria))}

• Find output programs such as O1, O2 ,, On

{(Diagnosis of Malaria, Diagnosis of Dengue)}

• Identify Process as P

P = {(Preview Image, Image Processing, Gray Scale, Smooth, Editing, segmentation, feature removal, segmentation, display effect)}

• Recognizing the Failure Status as Fs

Fs = {(If data is set unloaded, If unpredictable, if more time is required to predict}

• Identify the Success Status as Ss

P = {(Correct prediction)}

IV. RESULTS AND DISCUSSION

In the proposed program, we will use the CNN-monitored method used to predict results from images and text databases used for signal classification. CNN provides more accuracy than other algorithms. And text-to-speech editing and token classification work by recommending CNN for accurate results.

The comparative results of the existing and proposed system are as follows,

Parameters	**Existing System**	**Proposed System**
Image Dataset	Somewhat	Yes
Text Dataset	Somewhat	Yes
Symptoms Classification	Many Diseases	Focused on Dengue and Maleria
CNN	Somewhat	Yes
Execution	Mostly Heavy with Matlab	Lightweight with Python, OpenCV and Tensorflow
Time	More	Less

Table 1 : comparative result

With reference to Table 1 it is clear that we are overcoming various problems in the existing system and our approach works well.

V. CONCLUSION

A strong and novel approach to the use of study equipment to diagnose malaria and dengue has been used in this paper. By using this method we obtain less than 60 seconds to provide a diagnosis compared to other clinical laboratories. An algorithm to predict the location of a specific location of a specific disease by looking at the location from the database to calculate the results.The results should be similar to Python output, as well as maintaining an acceptable processing speed and duration. The study will focus on the benefits that can bring about a successful diagnosis of malaria, dengue and supportive treatment.

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