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HEART DISEASE RISK DETECTION SYSTEM USING DEEP LEARNING

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Abstract- Heart is like a room that pumps blood to the whole body. Heart disease are the main reason for human deaths in the world. So, there is a need of predicted system for proper treatment on diseases. We are developing web application for predicting heart diseases risk. Deep learning algorithms and techniques have been applied to the given data set to do analysis of large complex data. In recent times, have been using deep learning techniques to help the healthcare industry. But RNN (Recurrent Neural Network) algorithm has never been explored in health care system related to heart which we are trying to implement in our system. Such prediction can be done manually but if we use algorithm like RNN, many errors can be avoided and helps correct prediction at large.

Keywords- *Heart diseases prediction, RNN, Neural network, Input layer, Hidden layer, Output layer.*

I INTRODUCTION

Heart is most significant asset of human body. We are building a system on "heart disease risk detection". This article presents a deep learning approach for heart related disease detection. Heart disease prevention is one of the most important task of any health care system as about 50 million people are at risk of heart problems across the world. Coronary artery disease is the most common type of heart disease. It happens when the arteries that supply blood to heart muscle become hardened and narrowed. This is due to build up of cholesterol. This build up is called as a therosclerosis.

The world health organization (WHO) streamlines in their report "non-communicable disease country profiles 2014" that chronic diseases are major cause of disability and concern worldwide. Chronic disease contribute to 60% of deaths in India.

The expansion of big data in the medical field and the rapid development of big data analytic technology are substantiating worthwhile in disease risk prediction. Although structured data for disease prediction are more convenient to utilize, unstructured data store more disease related features. Thus disease predicting with unstructured data provides accurate result in emotion aware healthcare, health monitoring a digital medical solution.

II IMPLEMENTATION

The proposed system is in web domain. We have two modules.

1. Patient module

2. Doctor module

1.Patient module: In the system patient can give its current status for example, there will be many attributes on the page like chest pain or dizziness and patient just has to check that option. As soon as the patient enters these symptoms it is made aware of the possible disease that might incur and prescriptions. Patient can contact doctor. If the inputs given by patient are acutely in danger zone then a dialogue box appears that says "you must consult a doctor."

Attributes to access risk in patient module:

wizling, chest pain, shortness of breath, hypertension, high blood pressure, chronic wet cough, diabetes, Fatigue, obesity, Abnormal awareness of heartbeat, swelling of the abdomen with fluid, low heart peels, feet swelling, ankles swelling, headache, increased fat around the middle, anxroxy.

2. Doctor module: In this system doctor is the admin The Doctor can enter the values for following attributes. He/she can update the prescription for the diseases.

The doctor enters the raw data of the patient. Then check the entered data is valid or not. In this raw data, doctor apply the LSTM and predict the risk of the heart disease using the RNN algorithm.

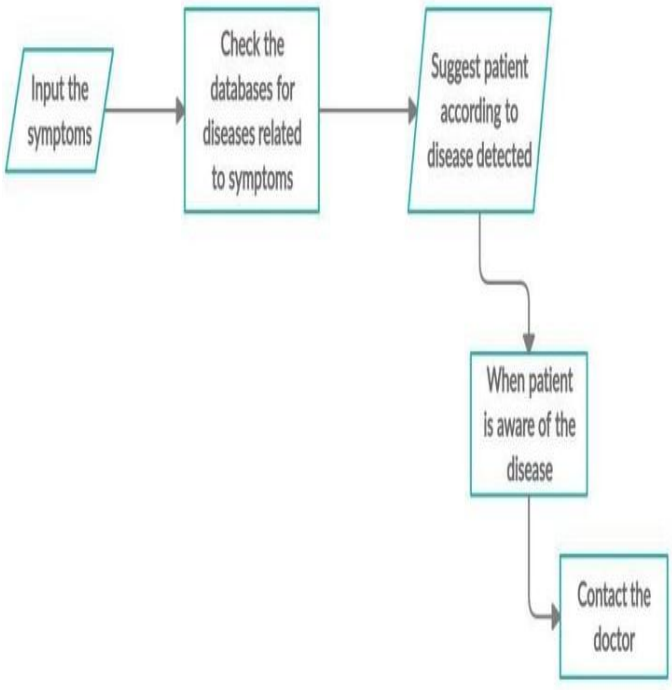
In doctor module, raw data is nothing but an input data. word embed checks if data is valid or not. In this system of heart disease risk detection we are using Long Short Term Memory.

Attributes like B.P (blood pressure), age, gender, THAL etc are used by doctor to determine the risk. Patient gives inputs like the level of dizziness, chest pain which they can easily relate to. But For the final risk detection only doctor inputs are considered. When the user logs in for the second time it can view its history i.e. the symptoms he felt during the last time. If the user happens to enter the same inputs again and again then the system will display a disease related to the frequently entered symptoms. The LSTM will consider all the inputs from the bp to thal attribute and decide what the risk might be. Example: if the output generated is such {1 0 0 0 1 1 1} here number of ones are greater than number of zeroes therefore there IS a heart disease risk. Further, the risk percentage is also calculated on the basis of summation of all the attributes and taking its percentage.

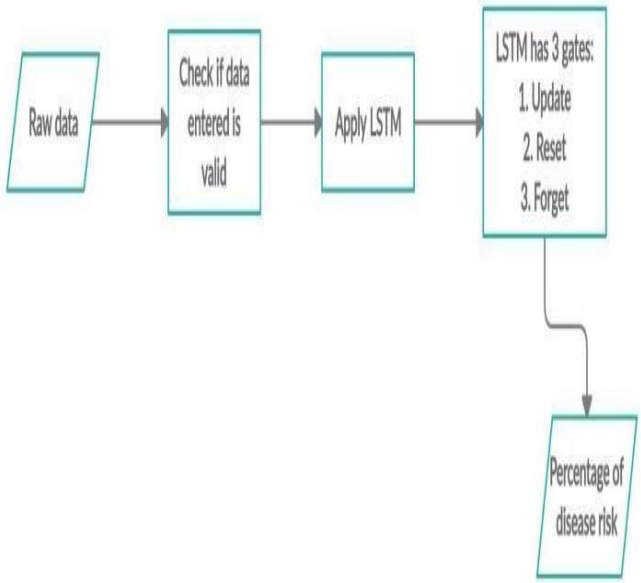
A. Attribute and Ranges in the Doctor Module

Attributes	Range
Gender	Female=0, male=1
Resting blood pressure	94-200mmHg
Thallium stress	71-202
Number of major vessels coloured by fluoroscopy	0-3
Chest pain	1-typical angina, 2-atypical angina,3-no angina,4-asymptomatic angina
Peak Exercise ST segment	Flat or downsloping-0, upsloping-1
Thallium test	Normal or fixed defect-0 reversible defect-1
Age	continuous
Exercise induced angina	1-Yes, 0-No
Pressure of heart disease	0- Absent 1 to 3-Present
Sex	0 – Female 1 - Male
Fasting Blood sugar	1 – fbs > 120 mg/dl 0 – fbs < 120 mg/dl

B Block diagram of Patient Module



C **Block diagram of Doctor Module**



III RNN ALGORITHM

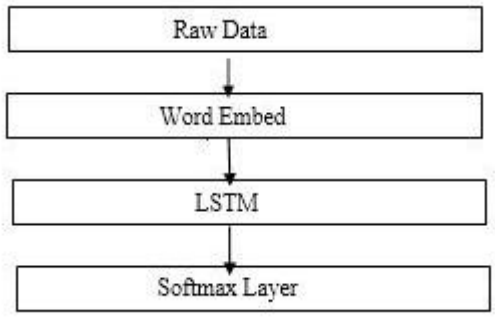
RNN (Recurrent Neural Network) is a classification of artificial neural network where the connection between the input and output of layers. It performs the task on all the inputs or hidden layers to produce the output. It is used to predict the risk of heart disease using deep learning. In this, raw data is nothing but input data, word embed check whether data is valid or not . LSTM is used to determine the risk of the heart disease. In LSTM, there are three gates- update gate, reset gate and forget. Steps in RNN algorithm:

1. In RNN, input as the raw data i.e atrributes likes age, gender, Resting blood pressure, Thallium stress, Chest pain etc.

2. Then check the entered data is valid or not.

3. Using LSTM, determine the risk of the heart disease. In LSTM has three gates update gate, reset gate and forget.

4. In softmax layer, fully connected layer classify if heart disease or not.



IV CONCLUSION

This paper has a approach to detect heart disease using deep Learning. The RNN algorithm is simple to predict the risk of heart disease. It is easy to understand the implementation.

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