Online Disease Prediction and Health Monitor

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Abstract: In today's world information is a crucial thing and must be saved or stored correctly for later use. When it comes to information related one's medical records or his/her medical history, this information can come handy even after couple of years where we fail to safely store medical records as they are mostly a hard copy. A digital record of the same will not wear off with time and is also easy to store, maintain and retrieve. The goal of this project is to make a web application where users can store his medical records online and have a full-time access to it. Also, one can easily share his records with his trusted doctor's simply by a unique user record view ID, with or without giving them the permission to edit those records. Having a secure and full time available record, these medical records of a user can be put to greater use by predicting disease that has a chance of affecting the user in future, based on his previous records. User can follow-up this predicted disease with his trusted doctor's and prevent them from happening to them.

IndexTerms - Data mining, Machine Learning, Neural Network, Classification, Decision tree, Dataset, Prediction
ODPHM : Online Disease Prediction and Health Monitor

I. INTRODUCTION

A. Neural Network :

The combination of big data and machine learning is a revolutionary technology that can make a great impact on any industry if used in a proper way. In the field of healthcare, it has great usage in cases like early disease detection, finding signs of early breakouts of epidemics, using clustering.

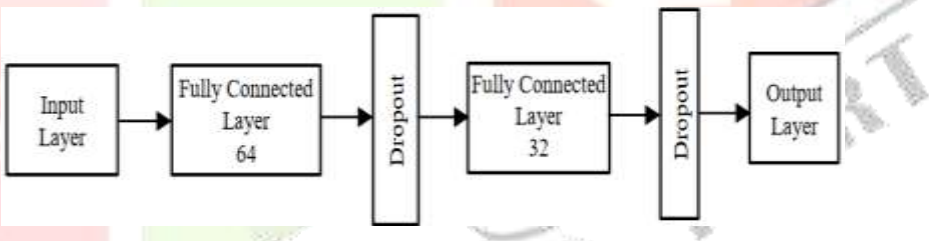

Fig.1 Flow of Neural Network

Neural networks are a set of algorithms, modelled loosely after the human brain, that are designed to recognize patterns. They interpret sensory data through a kind of machine perception, labelling or clustering raw input. The patterns they recognize are numerical, contained in vectors, into which all real-world data, be it images, sound, text or time series, must be translated. Neural networks help us cluster and classify. You can think of them as a clustering and classification layer on top of the data you store and manage. They help to group unlabelled data according to similarities among the example inputs, and they classify data when they have a labelled dataset to train on. (Neural networks can also extract features that are fed to other algorithms for clustering and classification; so you can think of deep neural networks as components of larger machine-learning applications involving algorithms for reinforcement learning, classification and regression.)

Disease involved in prediction system as following

i. Swine Flu
ii. Diabetes

B. Example :

Deep learning maps inputs to outputs. It finds correlations. It is known as a "universal approximates", because it can learn to approximate an unknown function f(x) = y between any input x and any output y, assuming they are related at all (by correlation or causation, for

example). In the process of learning, a neural network finds the right f, or the correct manner of transforming x into y, whether that be f(x) = 3x + 12 or f(x) = 9x - 0.1.

Swine flu is a respiratory disease caused by influenza viruses that infect the respiratory tract of pigs and result in a barking cough, decreased appetite, nasal secretions, and listless behavior; the virus can be transmitted to humans. Diabetes is a number of diseases that involve problems with the hormone insulin. Normally, the pancreas (an organ behind the stomach) releases insulin to help your body store and use the sugar and fat from the food you eat.

C. API :

Tensor Flow is an open source software library for numerical computation using data flow graphs. Tensor Flow is cross-platform. It runs on nearly everything: GPUs and CPUs—including mobile and embedded platforms—and even tensor processing units (TPUs), which are specialized hardware to do tensor math on.[7]

II. LITERATURE SURVEY

A Research paper given by **Mukesh Kumari, Dr Rajan Vohra, Anshul Arora** used Bayesian network with WEKA tool, and used confusion matrix for performance and Dataset collected from Pima Indian dataset [1].

A Research Paper given by **Sudajai Lowanichchai**, **Saisunee Jabjone, Tidanut Puthasimma** Assistant Professor, Informatic Program Faculty of Science and Technology Nakhon Ratchsima Rajabhat University it proposed the application Information technology of knowledge-based DSS for an analysis diabetes of elder using decision tree. The result showed that the RandomTree model has the highest accuracy in the classification is 99.60 percent when compared with the medical diagnosis that the error MAE is 0.004 and RMSE is 0.0447. The NBTree model has lowest accuracy in the classification is 70.60 percent when compared with the medical diagnosis that the error MAE is 0.3327 and RMSE is 0.454 [2].

In another Research paper presented by **Yang Guo, Guohua Bai, Yan Hu School of computing Blekinge Institute of Technology Karlskrona, Sweden**, the discovery of knowledge from medical databases is important in order to make effective medical diagnosis. The dataset used was the Pima Indian diabetes dataset. Pre-processing was used to improve the quality of data. classifier was applied to the modified dataset to construct the Naïve Bayes model. Finally, weka was used to do simulation, and the accuracy the resulting model was 72.3% [3].

In Research paper presented by **Ms. Ankita R. Borkar, Dr. Prashant R. Deshmukh author** used Naïve Bayes Technique based intelligent Prototype with an Accuracy of 63.3% [4]

III. PROPOSED SYSTEM

System design is the process of defining system architecture, modules and interfaces for the proposed system to satisfy specified requirements.

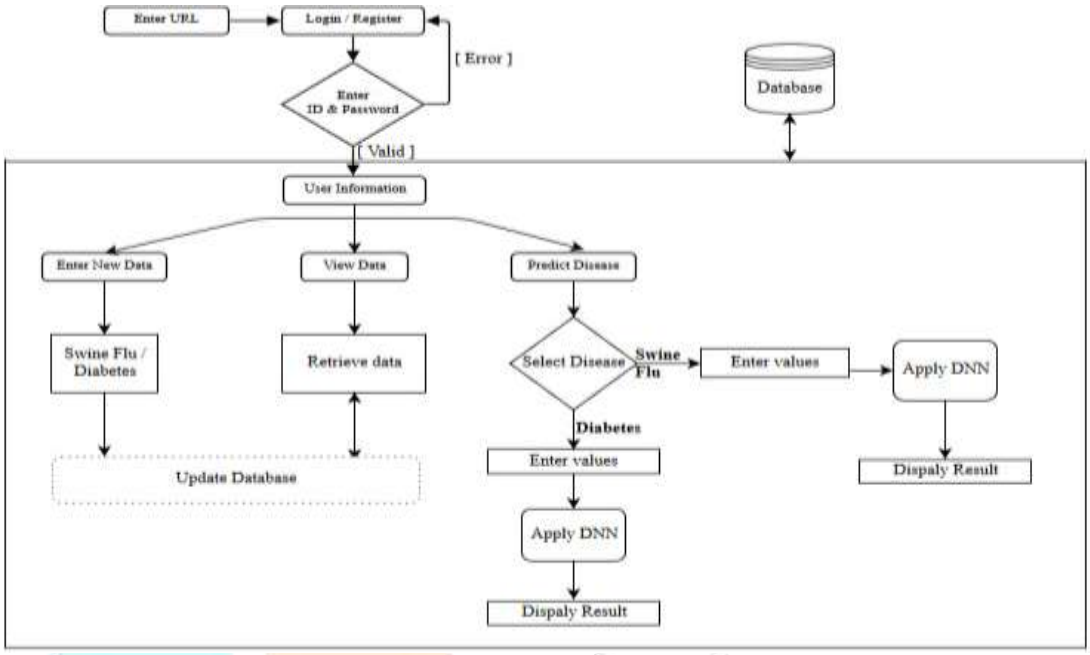

Fig.2. System Architecture of Online Disease Prediction and Health Monitor

In above system overflow, when user enters username and password then user redirected to main page then user can enter own detail and predict disease diabetes and swine flu after selecting values by using sliders and predict disease by using DNN algorithm.

A. Classification:

All classification tasks depend upon labelled datasets; that is, humans must transfer their knowledge to the dataset in order for a neural to learn the correlation between labels and data. This is known as *supervised learning*.

- Detect faces, identify people in images, recognize facial expressions (angry, joyful)
- Identify objects in images (stop signs, pedestrians, lane markers…)
- Recognize gestures in video
- Detect voices, identify speakers, transcribe speech to text, recognize sentiment in voices
- Classify text as spam (in emails), or fraudulent (in insurance claims); recognize sentiment in text (customer feedback)

Any labels that humans can generate, any outcomes you care about and which correlate to data, can be used to train a neural network.[8]

B. Clustering:

Clustering or grouping is the detection of similarities. Deep learning does not require labels to detect similarities. Learning without labels is called *unsupervised learning*. Unlabelled data is the majority of data in the world. One law of machine learning is the more data an algorithm can train on, the more accurate it will be. Therefore, unsupervised learning has the potential to produce highly accurate models.

- Search: Comparing documents, images or sounds to surface similar items.
- Anomaly detection: The flipside of detecting similarities is detecting anomalies, or unusual behaviour. In many cases, unusual behaviour correlates highly with things you want to detect and prevent, such as fraud, disease.[8]

C. Predictive Analysis: Regression

With classification, deep learning is able to establish correlations between, say, pixels in an image and the name of a person. You might call this a static prediction. Similarly, exposed to enough of the right data, deep learning is able to establish correlations between present events and future events. It can run regression between the past and the future. The future event is like the label in a sense. Deep learning does not necessarily care about time, or the fact that something has not happened yet. Given a time series, deep learning may read a string of number and predict the number most likely to occur next.

- Hardware breakdowns (data centres, manufacturing, transport)
- Health breakdowns (strokes, heart attacks based on vital stats and data from wearables)
- Customer churn (predicting the likelihood that a customer will leave, based on web activity and metadata)

The better we can predict, the better we can prevent and pre-empt. As you can see, with neural networks, we are moving towards a world of fewer surprises. Not zero surprises, just marginally fewer. We are also moving toward a world of smarter agents that combine neural networks with other algorithms like reinforcement learning to attain goals.[8]

IV. NEURAL NETWORK ELEMENTS

Deep learning is the name we use for "stacked neural networks"; that is, networks composed of several layers. The layers are made of *nodes*. A node is just a place where computation happens, loosely patterned on a neuron in the human brain, which fires when it encounters sufficient stimuli. A node combines input from the data with a set of coefficients, or weights that either amplify or dampen that input, thereby assigning significance to inputs for the task the algorithm is trying to learn. (For example, which input is most helpful is classifying data without error?) These input-weight products are summed and the sum is passed through a node's so-called activation function, to determine whether and to what extent that signal progresses further through the network to affect the ultimate outcome, say, an act of classification.

STEPS :

Step 1 : Load Data.
Step 2 : Define Model.
Step 3 : Compile Model.
Step 4 : Fit Model.
Step 5 : Evaluate Model.
Step 6 : Tie It All Together.

Here is a diagram of what one node might look like.

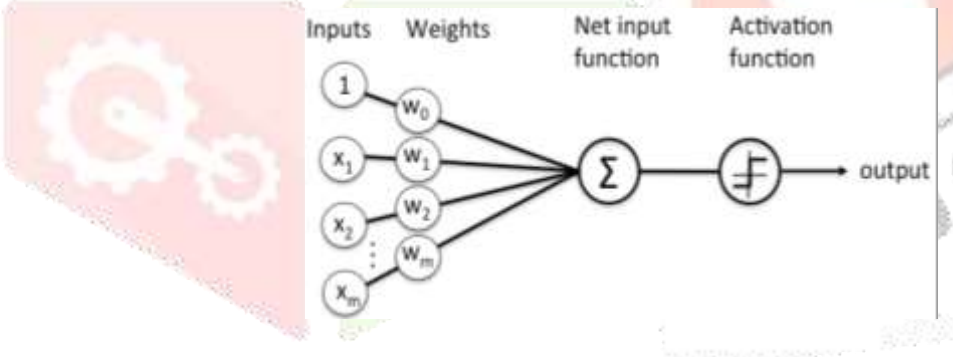

Fig.3 Layers of Neural Network

A node layer is a row of those neuronlike switches that turn on or off as the input is fed through the net. Each layer's output is simultaneously the subsequent layer's input, starting from an initial input layer receiving your data.[8]

Consider a supervised learning problem where we have access to labeled training examples (x(i),y(i))(x(i),y(i)). Neural networks give a way of defining a complex, non-linear form of hypotheses hW,b(x)hW,b(x), with parameters W,bW,b that we can fit to our data.
To describe neural networks, we will begin by describing the simplest possible neural network, one which comprises a single "neuron." We will use the following diagram to denote a single neuron:[6]

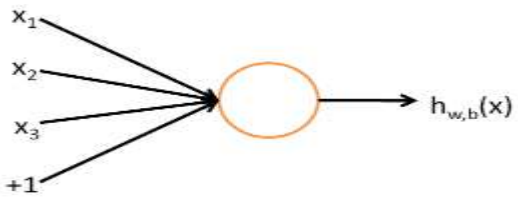

Fig.4 Single Neuron

This "neuron" is a computational unit that takes as input x1,x2,x3x1,x2,x3 (and a +1 intercept term), and output hW,b(x)=f(WTx)=f(∑3i=1Wixi+b) where f:R↦R is called the **activation function**. In these, we will choose f(·) to be the sigmoid function:

$$f(z)=\frac{1}{1+\exp(-z)} \qquad \text{(i)}$$

V. RESULT

Fig.5 Input and Output to Predict Diabetes Disease of ODPHM

Fig.6 Input and Output to Predict Swine Flu Disease of ODPHM

Fig 5 and 6 are the input fields for provided to DIABETES & SWINE FLUE DISEASE PREDICTOR, input are taken from range sliders to restrict input of incorrect data to the program. Fig 5 and 6 are the output of the inserted values for disease prediction and shows whether the person having disease or not with accuracy.

VI. CONCLUSION

In this work a new way to perform health checkup and predicting disease have been presented using the web application. The results have proved the successful completion of the required specification and computed with other algorithm for better accuracy. This application can be used on different browsers such as chrome, Mozilla etc. Multiple users can perform prediction at a time. The system can also be helpful for emergency and productive purpose.

VII. ACKNOWLEDGMENT

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