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Disease Prediction System in New Normal

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***Abstract*- In this disease prediction system follows normal rules. The system is designed such that to provide a facility predicting disease from given reports. Report can be in the form of image (MRI, x-Ray, mammography, etc). Or in the form of input parameters like numerical value came with the result of reports. The system will take an input from the user for specific disease the system will follow image processing techniques to process and extract result from image. The result will be provided to a user. The system will also suggest nearby specialists for detected disease.**

***Keywords*- Image Processing, Image Extraction, Deep Learning, Machine Learning.**

I. INTRODUCTION

It is estimated more than 70% of people are prone to body diseases like cancer, viral infections and many other general/major diseases. 25% of the population succumbs to death because of ignoring the early general body symptoms. It is important to identify and predict disease at the earliest stage to avoid any unwanted casualties.

Especially in this new normal, it becomes more difficult to get an appointment of a specialist.

The purpose of this system is to provide prediction for the different major diseases like cancer and some general occurring diseases.

This prediction system does the following:

- Takes symptoms from user as an input and predict the disease.
- For the major diseases like cancer it takes x-ray/ mammography as an input process it and predicts whether it is positive or negative.
- Based on the disease predicted shows the specialists contact information.

A disease prediction system in new normal. The main objective of the project is to provide a system which will provide a time saving and more safe system to predict diseases in this pandemic situation.

II. DATA FLOW AND ARCHITECTURE

This section consists of the data flow diagram and architecture of the proposed application. The Data flow diagram gives the overall conceptual idea and the architecture of the system gives the detailed steps required to build the proposed disease prediction system.

1. Data Flow Diagram:

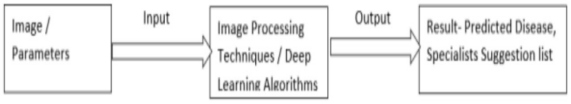

Fig 1. shows the level-0 data flow diagram showing the flow of purposed system.

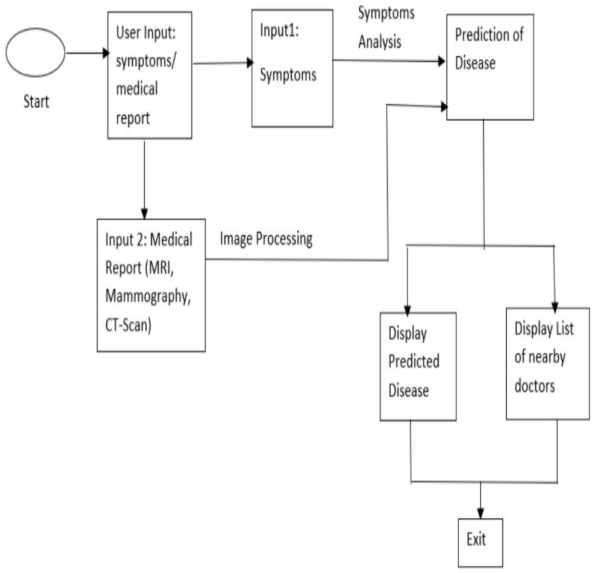

Fig 2. shows the level-1 data flow diagram depicting the exploded view of the proposed system.

2. Architecture:

Figure 3 shows the architecture of the proposed disease prediction system. It consists of three modules that are input module, processing module and an output module. The architecture helps to give a conceptual idea of the proposed disease prediction system.

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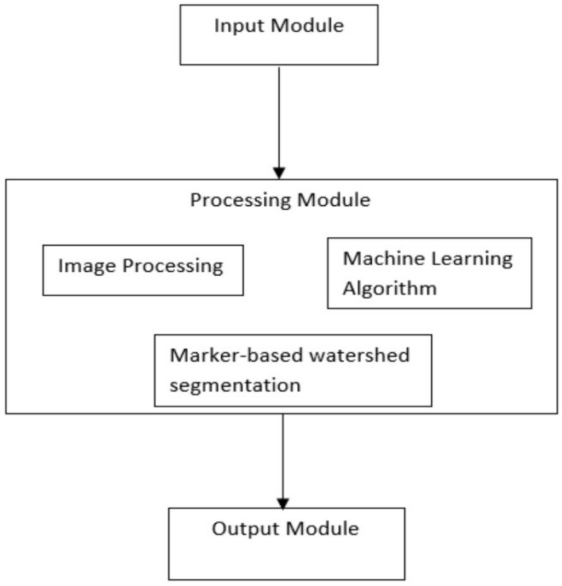

Fig 3. Archetecture.

The three modules proposed in the architecture are Input Module, Processing Module and Output Module. The following is the description of each module.

3. Input Module:
These module takes-
3.1 Patient Data like Name and Address.
3.2 For Disease:

- Symptoms or other parameter values from report.
- Medical Report Image like for breast cancer-mammography, for brain tumor-CT–scan, Pneumonia-chest x-ray, skin cancer-mole images.

User can choose any disease from mentioned diseases to predict specific disease based on image report or other medical report.

4. Processing Module:
This module is a combination of different modules like Image Processing, Machine Learning Algorithm and Marker-based Watershed Segmentation. Image processing module performs different image processing techniques like reshaping, convert to grey-scale image etc. It also takes different types of image format and converts to suitable format. If the image is not in image format types (jpg, jpeg, png, tiff) it will reject image and throw an exception. The browse window will allow choosing an image report. Machine Learning Algorithms- The different algorithms like Decision Tree, Random Forest and Naïve - Bayes Algorithms are used to predict disease from symptoms and from other extracted parameter details entered by user.

This module will take symptoms or parameter values processed it through training and testing dataset processed by this machine learning algorithms and shows the predicted disease and its percentage. Marker based Watershed is used for image segmentation: when user selects image report to detect cancer this technique is used to view tumor/cancer region.

5. Output Module:
In this module, the disease predicted with prediction percentage will be displayed and the nearby specialist doctors list for detected disease will be displayed.

III. PROCESS FLOW

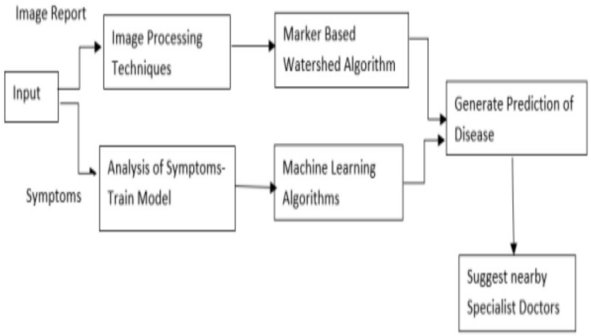

Fig 4. Process flow diagram.

1. Image Based Report Disease Prediction:
This module will take an image as an input; image must be report of MRI/CT-Scan/ Mammography/ X-Ray based on disease selected. The image will be processed through image processing techniques.

The Marker-Based Watershed Algorithm will show the affected area or tumor/cancer region. The trained model will process the image and will predict if the specified disease is present or not. Based on predicted value it will display the result and user will also be able to get specialist doctors list.

2. Symptoms/ parameter value Based Disease Prediction:
In this module the user can select the symptoms from given list- for symptoms-based disease prediction or can enter parameter values which are from extracted diagnosis medical report. The entered symptoms/values will be analysed accordingly. Based on machine algorithm the trained model will process the input and will generate predicted value. Based on predicted value it will display the result and user will also be able to get specialist doctors list.

IV.CONCLUSION

The proposed system enables user to predict diseases and get nearby specialist doctors' information. This proposed system will give the reliable solution to predict diseases.

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This system can predict cancer and also some general diseases.

Hence, our proposed system will give the solution to predict multiple diseases. It seems that for detecting major diseases like cancer image processing techniques can give 95% correct result than the naked human eye. This system will suggest the list of doctors with whom user can consult. Early detection of disease is possible hence the risk can be reduced. This proposed system will be very useful and feasible.

V. FUTURE WORK

We will extend the proposed system such that there can be client-server or cloud based model which will help to keep updating the system for adding new diseases and update specialist doctors and there will be no need for user to install the system on their machine it will be available for everyone.

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