Improved Approach for Disease Detection and It's Prescription

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Abstract: There is single doctor per 1,700 citizens in India. The World Health Organization stipulates a minimum ratio of 1:1,000. The Union Health Ministry figures claim that there are about 6-6.5 lakh doctors available, India would need about four lakh more by 2020. So to overcome this problem we proposed a system that will fulfill the requirement. Doctors use symptoms and signs as clues that can help determine or pinpoint the most likely disease. The symptoms changes from patient to patient and it become hard to distinguish from other diseases. If we use singular method to detect any disease we can't pin point the exact disease which patient have. To pinpoint the exact disease we have to consider different aspect of Symptoms and signs. So we need a system that uses multiple techniques to pinpoint exact symptoms and sign. According to the predicted symptoms it will narrow down the disease and provide proper medication on that disease.

Keywords: Image processing, ARM7, tongue segmentation, Disease detection, Artificial neural network.

I. INTRODUCTION

In recent decade population increased exponentially. If the population growth is one of the problems then providing medical facility to such huge population becomes another problem. In India according to official data, around 7,000 patients visit the outpatient department everyday from various states and the number of serious cases has to be added. In year 2008-09, multiple new cancer patients coming from Uttar Pradesh and Bihar stood at 2,403 and 1,072 which has now gone up to 2,666 and 1,243, respectively [1]. Treating such huge amount of patients everyday is not a simple task for medical professionals and it becomes impossible to treat all the patients. As the title of the project implies detection of diseases and prescription to the symptoms of the patients, the system therefore fulfills the deficiency of doctors [4]. The system includes ANN which is very important parameter here to make various decisions according to the symptoms of patients and provide needful prescriptions according to the patient's age, gender. This detection and prescription is done from experienced doctor's database. The goal of this project is to detect the diseases and prescribe the appropriate medicine of respective diseases. In this topic the information about the diseases and its symptoms is collected from the experienced doctors and this database is stored in the ANN [10]. The stimulus response of patient such as body temperature, tongue features, heart rate etc. is been given as a input to the system. According to the input stimuli of patient the ANN processes the input data from the medical database and gives the desired output. Here patient needs to fulfill the required fields asked by the system initially along with the body stimulus and thus the desired solution is given by the system eventually [5].

II. LITERATURE SURVEY

There is single doctor per 1,700 citizens in India; the World Health Organization tells a minimum ratio of 1:1,000. The Union Health Ministry figures claim that there are about six to seven lakh doctors available, India will be needing about four lakh more by 2020—50,000 for PHCs; 0.8 lakh for community health centers ; 1.1 lakh for 5,642 sub-centers and another half lakh for medical college hospitals. If shortage of medical professional is one problem, their unwillingness to work in the rural area is another, creating artificial lack in the area and high absorption in another, admit Union health ministry officials. In rural areas and tribal areas of the state, there is lack of doctors and specialist professionals besides an acute shortage of well-trained medical staff, as well as nurses. In 1,709 PHCs and 186 CHCs in Andhra pradesh, there was 140 band 322 vacancies respectively [3]. The government admits the grim images in the rural areas, regardless of the success of the National rural health mission (NRHM). Shortage of human resources is a upsetting feature of India's healthcare services. Even the Planning Commission has accepted that availability of health care services is quantitatively inadequate.

According to Union health ministry data, the current doctor to population ratio is 0.5: 1,000 and the target by 2025 is 0.8: 1,000. In the current scenario of doctor to population ratio, the quantity of doctors required in the rural areas was large and target of one doctor for 1,000 populations cannot be achieved before 2020. After detailed inputs from various working groups, the MCI came to a consensus that the targeted doctor-population ratio of 1 per 1000 would be achievable by the year 2031. According to the 12th Plan document, 6, 91,633 physicians were available during the 11th Plan and expected availability for the 12th Plan by 2017 is 8, 48,616 at one year capacity of 42,570 doctors.

To overcome this problem we suggested a system that uses different disease detection technique and also prescribes medication on that disease. B. Sarita (2013) [2] presented God's algorithm for tongue feature extraction for detecting disease related with different portions of body. The

advantage of using this system is we can pinpoint exact disease related to specific part of the body.

III.FLOW OF SYSTEM

There are three major flows through which system has to undergo, those are explained as follows:

A. Acquiring the symptoms of patient
Tables In this step system will ask some questions such as do you have an headache? etc. which will help ANN to sort out the disease. Patient have to select yes or no option, this option will be a binary number which will be stored in ANN and processed after all questions are asked.

B. Tongue feature extraction
Tongue images are the basic features for diagnosis various diseases. For the simplicity of the diagnosis, the tongue images should be processed clearly and appropriately. tongue image processing is quite a hard task due to the tongues fussy features like, its irregular shape, interference with the lip etc. So it's not easy to get an effective diagnosis of diseases without an efficient tongue image processing methods. The major features that are used for diagnosing the tongue include color, shape, pimples, cracks and texture of the tongue[8]. We have to consider two tongue images with different characteristics. Normal healthy tongue image and abnormal tongue image. The symptoms of any of the body problem such as lungs associated problems, kidney related problems, etc. will be considered as abnormalities in any of the features. So, most of the diseases can be detected simply by the examination of the tongue [6]. For thorough analysis of the tongue, we use the tongue images, with the help of the clear tongue images a meticulous diagnosis of tongue can be possible. The flowchart of tongue feature extraction process is shown above:

Step 1: Capturing the tongue image from the patient.
Step 2: Processing the acquired data.
Step 3: Feature extraction from the image.
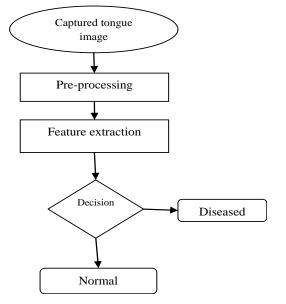Step 4: It take decision either patient is diseased or normal.

Fig.1. Flowchart of tongue feature extraction

C. Artificial neural network
After getting all the required information from the system, it will pass this information to ANN [9]. In ANN the information about disease and its prescription is stored, which is collected from the experienced medical professional. ANN will pin point the disease and displays the prescription for that particular disease [7].

IV.SYSTEM DESCRIPTION

Basically in this system, the inputs like temperature of patient, tongue features, pulse rate are taken from the patient. These inputs are processed and given to the ANN. In ANN the database collected from the doctor about all diseases are stored.
Along with the diseases information prescription on those diseases is also maintained and this database is stored in the ANN. According to the input symptoms ANN finds the correct disease which has similar symptoms, and then it prescribe the correct medicines for that disease.
Various algorithms are used in systems. For tongue feature extraction GOD's algorithm is used. Various components of the systems are described below.
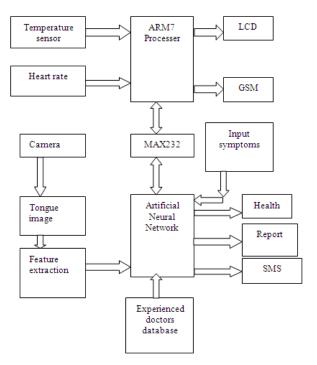

Fig.2. Block Diagram of System

A. LM35
It is a temperature sensor which is interfaced to ARM7 Processor for detecting the body temperature of patient.

B. Heart Rate Sensor
It is a sensor to measure the heart rate of the patient, by putting the finger on it. Basically it is a comparator whenever the changes happen due to heart bit it count that.
C. Camera
Camera is used to analyse the tongue features by taking the tongue images and pre-processing them by particular MATLAB programming. Here several images are classified and analysed and given further to ANN for analysis.

D. ARM7

Here ARM processer is used for interfacing the different component like temperature sensor LM35, heart bit sensor etc. It also provides ease for processing the data.

V. SYSTEM FLOWCHART

Various steps involved in system are explained below:

Step 1: In the first step some questions are asked by the system to which patient had to answer.

Step 2: In this step input stimuli of the patient is taken such as temperature of the patient, heart rate etc. and all this information is given to ANN.

Step 3: The data from the patient and from tongue feature extraction is given to ANN to find out the disease.

Step 4: ANN compare the database if disease is detected then it prescribe the medication for that disease, if disease is not detected then it stops

Step 5: SMS is sent to the doctor about symptoms of the patients, detected disease and prescribed medication to check whether it is correct or not.

Step 6: History of all diagnosed patient is stored.

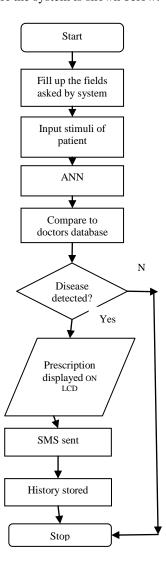The flowchart of the system is shown below:

Fig 1 Flowchart of system

VI.CONCLUSION

In this paper, we propose a distinct computerized system which helps to improve disease detection of patients in the Hospitals. With the help of this system it becomes very easy to provide the preliminary aid to patients in the emergency medical cases. If there is a huge rush of patients in the Hospital for digenesis the system can reduce the rush of patients. Generally this condition occurs when there is any natural calamity, terror attacks etc. Also the scarcity of doctors is fulfilled in rural and urban areas.

This will undoubtedly boost modernization process after traditional preliminary checking and diagnosis of patients, more importantly shorten the gap between diagnosis and clinical application

REFERENCES

[1] Sonu R.K.Sharma"Disease Detection Using Analysis of Voice Parameters", TECHNIA – International Journal of Computing Science and Communication Technologies, VOL.4 NO. 2, January 2012 (ISSN 09743375).
[2] B.Sarita, B.Cannan "Disease Analysis Using Tounge Image"IJERT, VOL.2, issue 4, April 2013.
[3] Yu-Cheng Hsu, Ying-Ching Chen, Lun-chien , John Y. Chiang,"Automatic Tongue Feature Extraction", Department of Computer Science Engineering,Taiwan.
[4] U Anand Kumar "India has just one doctor for every 1,700 people", Newindian Express, Published: 22nd September 2013 12:00 AM, Last Updated: 22nd September 2013 09:33 AM.
[5] Bar-Yam, Y. (1997). Dynamics of Complex Systems. Addison-Wesley.
[6] Kauffman, S. (1993) Origins of Order, Oxford University Press.
[7] McCulloch, W. and W. Pitts (1943). A Logical Calculus of the Ideas Immanent in Nervous Activity.
[8] Bulletin of Mathematical Biophysics, Vol. 5, pp. 115-133.
[9] Rojas, R. (1996). Neural Networks: A Systematic Introduction. Springer, Berlin.
[10] Rumelhart, D. and J. McClelland (1986). Parallel Distributed Processing. MIT Press, Cambridge,Mass.
[11] Young, D. Formal Computational Skills Course Notes.
[12] http://www.cogs.susx.ac.uk/users/davidy/fcs
[13] http://diwww.epfl.ch/mantra/tutorial/english/
[14] http://www.gc.ssr.upm.es/inves/neural/ann1/anntutorial.html
[15] http://www.doc.ic.ac.uk/~nd/surprise_96/journal/vol4/cs11/report.html