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Result on the Application for Multiple Disease Prediction from Symptoms and Images by using Fuzzy Logic

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Abstract - *Text mining use in different fields such as medical, pharmacy and agriculture etc. In medical field, healthcare system use a medical text which have been increasingly modeling. PHI means Personal Health Information and System works on the PHI of the user. Healthcare system agree to give user access to range of health information and medical knowledge. Advantages of the system is all the information related to disease, precautions and healthcare are store at one place. Experienced Doctor classify disease base on the different diagnosis method. This is done using by using their experience and knowledge, it is confirmed by performing various tests. So we are trying to build this process to make this rather tough task a lot easier.*

Disease detected by two ways first from symptoms and second from images. Medical Imaging has an important role in healthcare processes, supporting not only diagnosis, but also treatment. This system will give the list of disease that the patient has maximum probability of suffering from. This, in turn, will help to recommended specific tests corresponding to disease in the list, thus reducing the number of non-consequential tests and thus resulting in saving time and money for both the doctor and the patient.

Key Words: Data Mining, Fuzzy Logic, Disease Prediction.

1. INTRODUCTION

Data mining is process of extracting hidden knowledge from large volume of raw data. Data mining is used to discover knowledge out of data.

Data mining is used in the field of medicine to predict disease such as breast cancer, heart disease and various disease. Experienced Doctor classify disease base on the different diagnosis method. This is done using by using their experience and knowledge, it is confirmed by performing various tests. Especially in some places, the problem of lack of trained and experienced doctors leads to intensification of this problem. So we are trying to build this process to make this rather tough task a lot easier.

Disease detected by two ways first from symptoms and second from images. Medical Imaging has an important role in healthcare processes, supporting not only diagnosis, but also treatment.

This will be done through fuzzy logic. By using clustering algorithm.

As per discussion, code project result analysis with parameter.

- Time for disease prediction.
- Accuracy for database clustering.
- Accuracy for Fuzzy Rules.
- Number of expertise use for database generation.
- Number of record patterns in database.
- Accuracy for medicine prescription.

2. LITERATURE SURVEY

2.1. Review

Medical diagnosis process is the interpreted as a decision making process, throughout patient's symptoms, various test's results and expertise (doctors) experience. At the University of Calabria in Italy, the medical decision process is on computerized.

Shucheng Yu, Cong Wang, Kui Ren, Wenjing Lou in their paper "Attribute based data sharing with attribute revocation" [11] addressed an important role of attribute revocation for attribute based system. They consider application which is semi-trustable proxy servers are available and proposed a scheme supporting attribute revocation.

Healthcare system provides health condition monitoring by using text mining and feature of image extraction. From paper of Jun Zhou [13] gives PPDM privacy-preserving dynamic medical text mining and image feature extraction scheme. Here author shows about the security and privacy issues of the user's Personal Heath Information (PHI).

They provides security and privacy preserving outsourcing medical text mining and image extraction. By using one way trapdoor function.

Jenn-Lung Su, Guo-Zhen Wu [9] shows the concept of database which is use in medical information system for processing large volume of data. Author use various algorithm like decision tree, bayesian network, supporting vector machine.

Hubert Kordylewski [6], Damiel Graupe [7] in 2001 represent the application of large memory storage and retrieval (LAMSTAR) neural network. LAMSTAR useful for application to problems having large memory storage.. LAMSTAR is a self-organized map (SOM) link among with neurons.

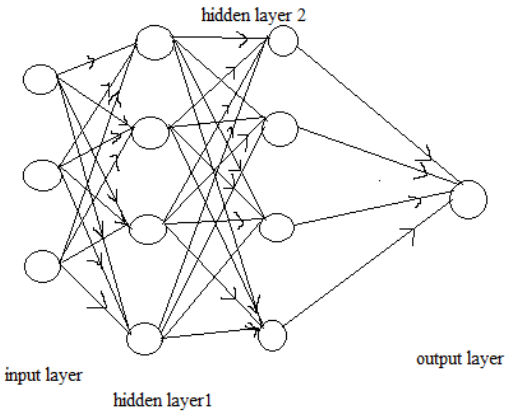

Figure 2.1: Neural network

2.2 Motivation

On search engine available vast amount of medical knowledge available on the Internet. The problem is that common person need to know what you are looking for. It they don't, it will not help very much. Diagnosis system solves this problem by enabling to search medical knowledge with a pattern of symptoms. Using the system gives common person or patients access to the most up to date and accurate information available. Just feed in your symptoms and it will provide patient with a list of the most likely disease that could be the cause of those symptoms. All disease linked to medical knowledge. This process is not to mean replace your doctor. It help become more informed and more productive discussion with doctor about your diagnosis.

2.3 Problem Definition

Predictive models generated with by applying predictive mining methods and techniques on historical medical data. They were constructed in three modes such as a single mode, hybrid mode and ensemble-based mode. Hybrid mode aim to improve the performance of techniques and overcome the weakness of single base mode. Ensemble-base mode aim to increase accuracy. Generally effective predictive models are faced by several problems that the lack of input data, drawbacks of methods with belong to combination.

2.4 Objectives

- To diagnose disease
- To assist medical student which are working in pathological labs.
- To health nursing students.
- To health doctors for disease associated.

2.5 Parameter

Below given parameters from the project analysis.

- To reduce time for disease prediction.
- Accuracy for Fuzzy rules and database clustering.
- Number of records patterns in database and expertise use for database generation.

3. SYSTEM DEVELOPMENT

3.1 Related work

In literature survey, discussed existing medical diagnosis process. Successful authors show their result with accuracy but they only try to diagnose disease by single way means only by image extraction or only by text mining.

In system development we will diagnose multiple disease by both way like from symptoms and image extraction. We will done using k-mean clustering algorithm technique.

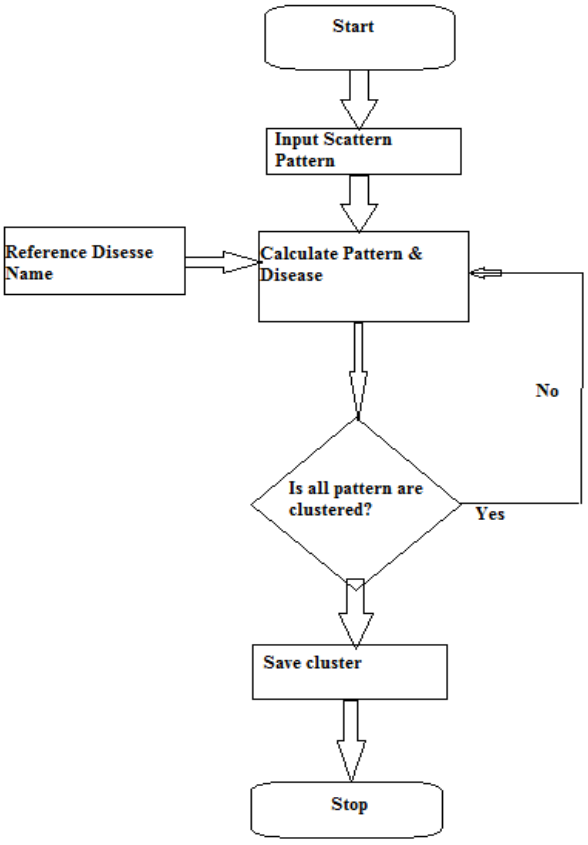

Figure 3.2: DFD Clustering

- It shows how to work load clustered database by using clustering.
- Clustering algorithm is used to cluster disease patterns where all patterns are gathered around its reference disease name.
- Calculate distance of pattern and disease with the help of reference disease name.
- If all patterns are clustered then save otherwise it again calculate distance of patterns and disease.

3.2 Proposed methodology

The systems contain two phases

- ❖ Training phase
- ❖ Testing phase

3.2.1 Training phase

Training phase is a phase where we create a database by applying fuzzy rules on various disease taken by doctors. The proposed methodology contain 50 to 100 symptoms of various disease.

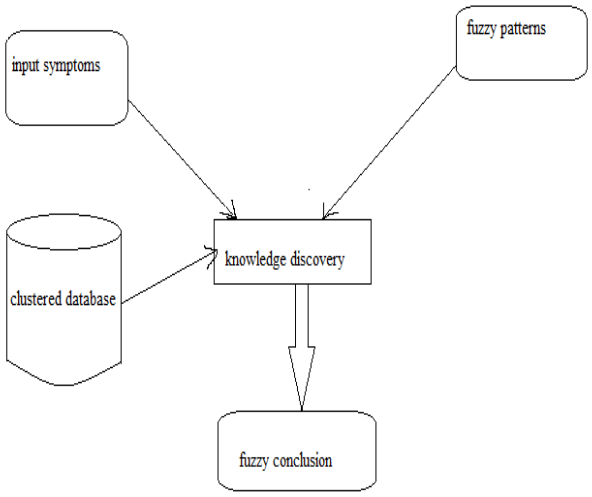

Figure 3.1: Proposed System Architecture.

For expertise to save database first up all take image it enhance. After enhance that image shows infected area which damage by disease. Expertise give disease name to save database. Below figure 3.2 data flow diagram shows how to save database disease name.

Also save symptoms of disease from their experience knowledge. By this common person easy to predict disease from symptoms.

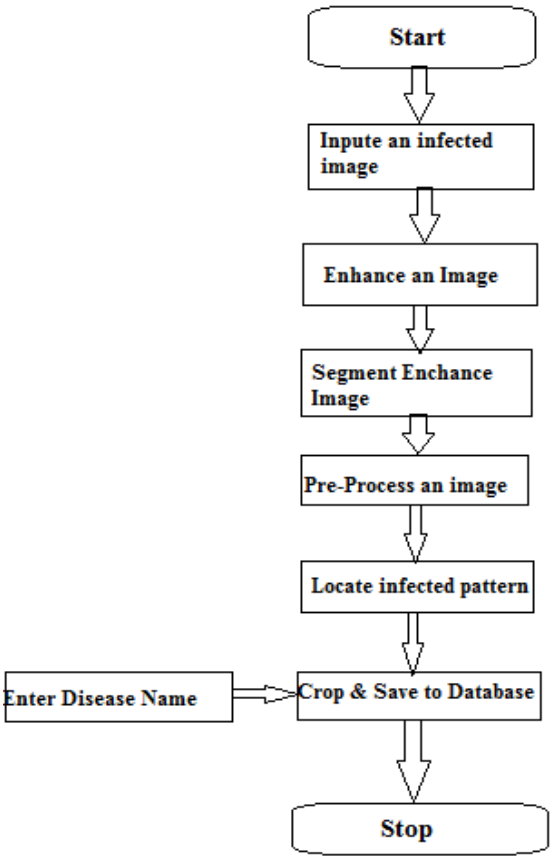

Figure 3.2: Disease Pattern Collection from an Image

3.2.2 Testing Phase

Testing phase is phase which is use for common person or patient to diagnosis disease from image and symptoms.

Disease predict from symptoms follows following steps.

- Enter disease symptoms.
- Pre-process symptoms.
- Extract feature of database by applying fuzzy logic.
- Predict disease.

Disease predict from image follows following steps.

- Give input image.
- Pre-process image.
- Extract feature of database by applying fuzzy logic.
- Highlight infected area.
- Predict disease.

Software Requirement

Operating System: Window 8 and above

Programming Language: Matlab, .net, MS office.

Hardware Requirement Processor: 1GHz

Memory (RAM): 1GB

Graphics Card: DirectX 9 g1 device with EDI or higher driver

HDD free space: 16GB

3.3 K-MEANS CLUSTERING ALGORITHM

In proposed system used k-mean clustering algorithm is a one of the type of data mining. It is commonly used in medical imaging, biometrics and related field.

k-means algorithm is an evolutionary algorithm that gains its name from its method for its method of operation. The algorithm clusters observation into k group, where k is provided as an input parameter. It assign each observation to clusters based upon the observation's proximity to the mean of the cluster. The cluster's mean is then recomputed and the process begins again. Below mention how the algorithm works:

1. The algorithm arbitrarily select k points as the initial cluster centers i.e. the means.
2. Each point in the dataset is assigned to the closed cluster, based upon the Euclidean distance between each point and each cluster center.
3. Each cluster center is recomputed as the average of the points in that cluster.
4. Steps 2 and 3 repeat until the clusters converge.

5. RESULT AND DISCUSSION

5.1 ANALYTICAL RESULT

Above propose system we are conclude that common person predict multiple disease without visit to doctor. It is possible by using fuzzy logic. It provide more accuracy and easy to understand.

Below figure shows training phase which is only use for expertise to store disease database. Training phase visible only some task shown in given figure. Such as input image, enhance image, image segmentation, register image, extract features and disease prediction. Register image shows infected area with respective input image.

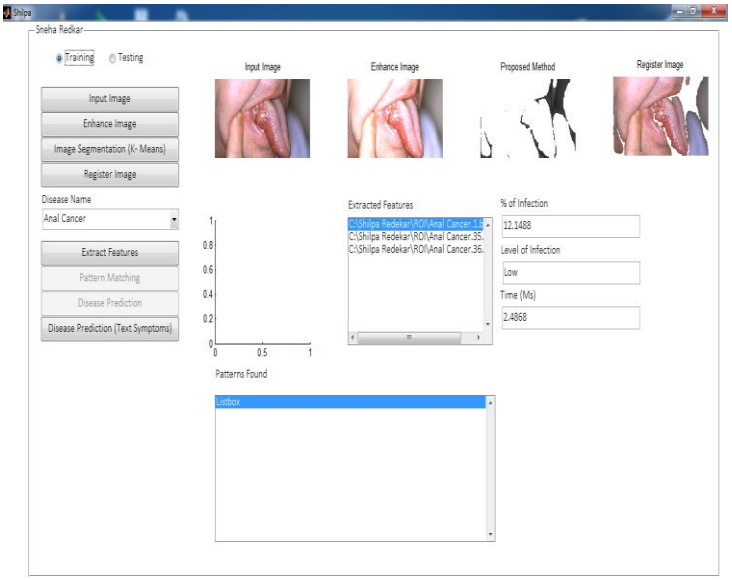

Figure 5.1: Training Phase

Expertise save image with disease name in ROI folder which shown in extract feature table image.

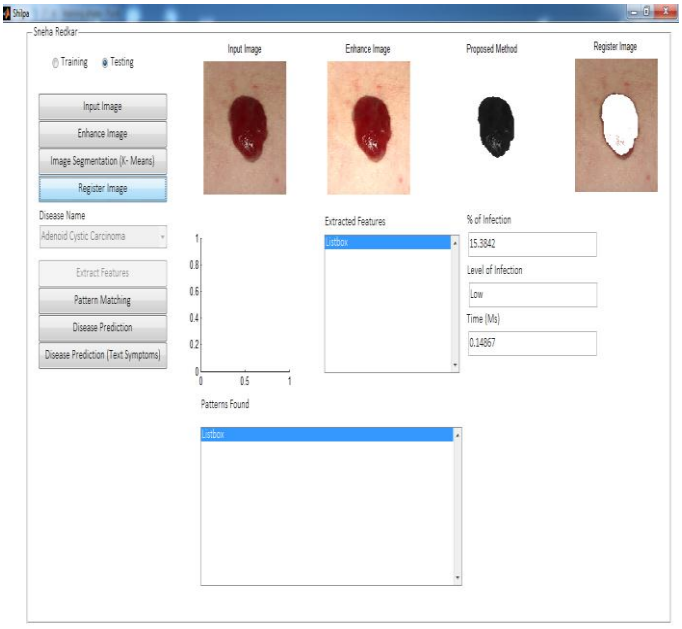

Figure 5.2: Testing phase (from Image)

Above figure is testing phase in enhance image segmentation to highlight infected area. This phase only use for patients to analysis their disease. Matching pattern and disease prediction visible only in testing phase shown given figure.

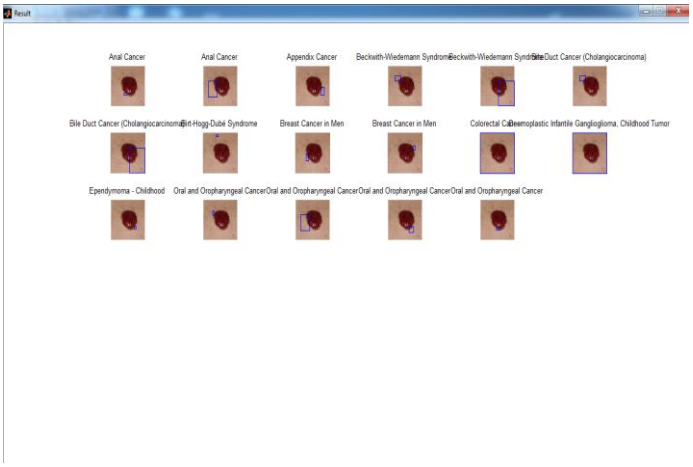

Figure 5.3: Pattern matching from database

Above figure match image from database and provide its name. In database saved various images by expertise.

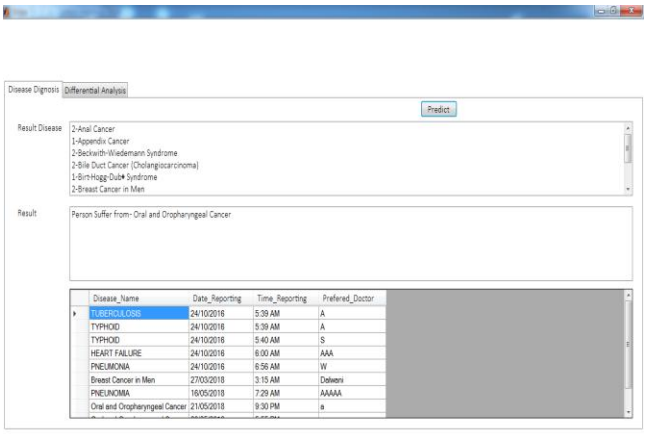

Figure 5.4: Diagnose disease

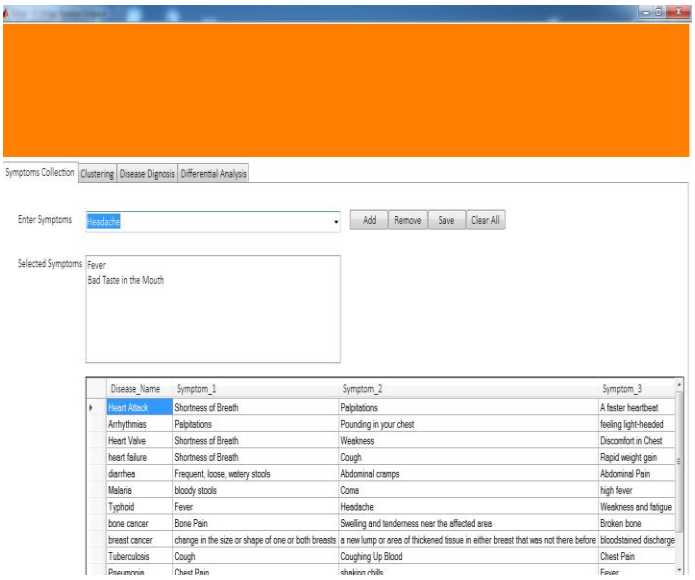

Figure 5.5: Database save for symptoms (Testing Phase)

Common person disease predict by two way first from image and other from symptoms. So expertise/ doctor save database through use of fuzzy logic. Expertise /doctor also save two type database that is in image and symptoms. Above figure shows how to store database. This only use for expertise/ doctor, symptoms collection. They can add symptoms using add buttons and cancel symptoms using cancel buttons. Save symptoms using save button which is shown in above figure.

Below Figure: If patient enter his/ her symptoms and its symptoms found more than one disease name. Because of this patient get confuse to analysis and predict. For this situation patient use differential analysis disease.

Differential analysis shows result on the basis of maximum patient suffering from disease.

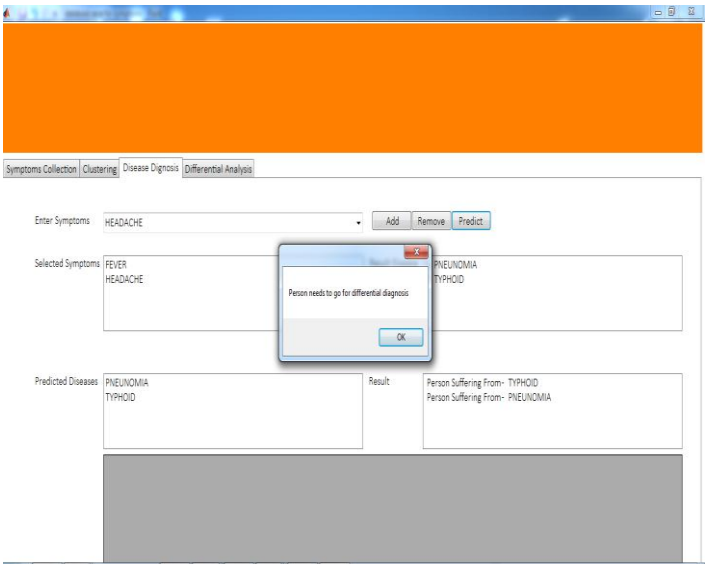

Figure 5.6: Disease Diagnose from symptoms

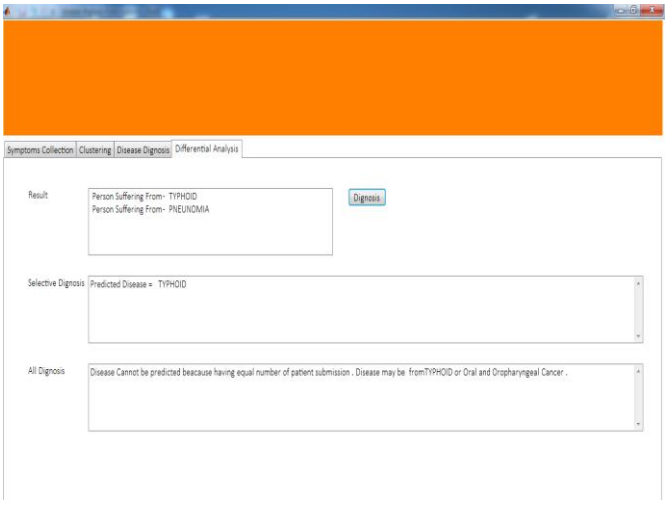

Figure 5.7: Disease diagnose for differential analysis.

5.2 EXPERIMENTAL RESULT

In proposed system disease prediction performed on data base of symptoms and images either manually enter by the common person.

Below table shows the result in between existing system and proposed system. Consider the parameter disease prediction, accuracy and time.

Parameters	Existing System	Proposed System
Accuracy	30%	90%
Disease prediction by symptoms	20%	90%
Disease prediction by images	40%	90%
Time for 1000 samples in ms	6.22%	2.6%

Table 5.2.1: Experimental Result

5.3 GRAPHICAL RESULT

Here shows the graphical representation in between existing system and proposed system. Parameters are at x-axis accuracy, disease prediction with symptoms and disease prediction with images and time in ms.

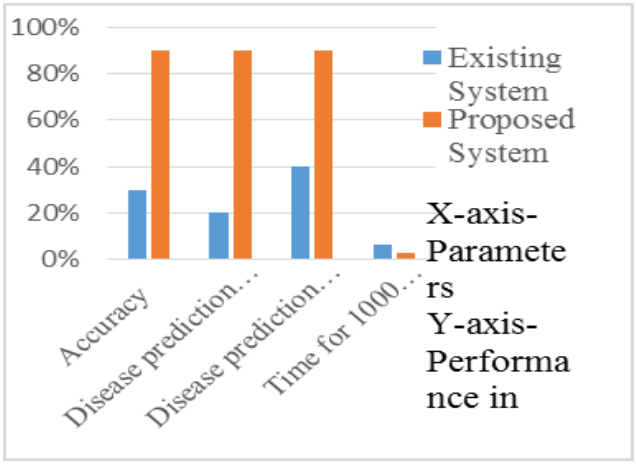

Figure 5.3.1: Graphical Result

6. CONCLUSION AND FUTURE SCOPE

6.1 CONCLUSION

Proposed System conclude that, the common persons predict their disease by two way first from symptoms and second from image. Enter symptoms first of all to search from database. And database created by expertise or doctor. Predict correct disease by Doctors knowledge and their experience. This possible to used k-means clustering algorithm to cluster.

Above propose concept, it is possible for common person to predict his/her disease without visit to expertise (doctor). This is pattern & fuzzy logic applied on it. It provide more accurate result which are based on decision given by expertise (doctor). This concept provide better accuracy and easy interface to common person than any other existing application available in market.

6.2 FUTURE SCOPE

1. For the future work, the improvement of image classification techniques will increase accuracy value and subsequently feasible to be employed for computer-aided-diagnosis, and more robust methods are being developed.

2. It also improve for animal disease prediction.

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