

## Prediction of Human Health using Decision Tree Technique

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**Abstract:** Now a day's prediction of diseases is gaining importance in a hospital management system, rather than giving treatment for the diseases after it is being diagnosed. It is better to avoid that in an initial stage, by taking proper suggestions from the doctor. Artificial intelligence and machine learning are used for this purpose, so in this project we are using decision tree technique based on prediction mechanism to predict the future occurring diseases and avoiding that before it is forthcoming. The main aim of using artificial intelligence in healthcare is to analyse relationships between prevention and treatment of the diseases. We survey the current status of artificial intelligence applications in healthcare and discuss its future. This proposed system highlights the use of artificial intelligence for decision making and Prediction of diseases in the medical field. Decision makers should be aware of giving proper treatment for the particular disease and which will be the evolution of the patient during the treatment.

**Keywords:** Artificial intelligence, machine learning, deep learning, prediction, Image Net, decision tree technique.

### I. INTRODUCTION

We may find hard to imagine our life without the power of computers. In recent decades we have witnessed reliance on big data and analytics, development of smart, self-learning machines. These machines are useful in decision making, prediction, planning, aid in business analysis and logistics. Deep learning has made its foundation in artificial neural networks is emerging as a powerful tool for machine learning. They are promising to shape the future of artificial intelligence.

Prediction is an important aspect in the medical field. The prediction rules are implemented periodically. Mechanism of artificial intelligence have several benefits it assists human intelligence in decision making and also helps to predict the diseases [1]. Artificial intelligence uses algorithms and software to analyze the complex medical data. Artificial intelligence can be applied to various types of healthcare data i.e., structured and unstructured. For structured data, the machine learning techniques are included. For unstructured data modern deep learning and natural language processing are used [2]. Machine learning healthcare applications growing rapidly in recent years. Deep learning plays an important role in diagnostic applications it is more accessible and have more data sources which became a part of artificial intelligence diagnostic process [3]. Artificial intelligence in health care is considered as scientific discipline that are interconnected to research studies, projects and applications which in support with decision based medical tasks [4]. An intelligent computer aided

diagnosis system can help doctors to determine the type of disease [5]. Prediction is not new to medicine field. For the patients in intensive care unit to monitor their cholesterol medications to risk stratification, prediction is like a data routine in medical practice. Clinical data sources enable us to generate prediction models for large number of similar clinical questions in combination with modern machine learning. Machine learning methods are suitable for the predictions which can be made on the basis of existing data, but precise predictions about the distant future are often fundamentally impossible. The practice of medicine is constantly evolving in riposte to new technology and social phenomena [6].

ImageNet large scale visual recognition challenges are providing evidence that computers can achieve human like competence in image recognition. Artificial intelligence has also enabled significant progress in natural language processing image processing and speech recognition [7]. Health supervisors may feel difficulty in estimating risks of diseases which are frequently occurring over time. So in this paper we are proposing a model for prediction and suggests treatment for better health care using the concept of artificial intelligence and machine learning.

In this paper, Section I contains introduction of artificial intelligence and machine learning, Section II contains the literature survey of using artificial intelligence and machine learning techniques used in healthcare systems, Section III explains the methodology and contains the architecture and essential steps of proposed work, Section IV explains the

system implementation with flow chart, Section V describes the results and discussion of proposed work, Section IV concludes research work with future directions.

## II. LITERATURE SURVEY

The advancement of technologies which is developed in artificial intelligence may lead to arise of questions about how such capabilities can enhance human decision making in health and healthcare. The accessibility to relevant data and health domains remain a significant challenge in United States. On one part health data has privacy issues associated with it, making the data collection and sharing of health data complex and inconvenient when compared to other types of data. Further the lack of interoperability of electronic health record systems hamper even the simplest of computational methods. Later on by conducting experiments the problem was resolved with the artificial intelligence [7].

One of the first successful applications of artificial intelligence are clinical decision support systems, which focuses on diagnosis of a patient's condition given his symptoms and demographic information. In 1970s a rule based efficient system called Mycin was introduced for identifying bacteria that cause severe infections and recommending antibiotics to treat these infections for the patients [8]. The data needs to give accurate prediction of future behaviour in scientific field. And the domains demands for the techniques which is capable of understanding from the observations from past and also in the future [9]. Machine learning plays an important role in medicine and it is being applying in large amounts to healthcare, medical image segmentation, image registration, computer aided diagnosis, image guided therapy where failure could be fatal [10]. now a days machine learning techniques applied in medical imaging field for developing computer-aided diagnosis models are gaining importance. To solve multimodal medical imaging related problems in healthcare the Machine learning techniques such as supervised, unsupervised, semi supervised, and deep learning are used [11].

Nearly in every domain of science and engineering it's been discussed the artificial intelligence where computer perform tasks that are usually assumed to require human intelligence. The role of data analysts in health informatics has grown rapidly in the last decade. Speedy improvements in computational power, fast data storage, and parallelization processing have also contributed to the rapid uptake of the technology. Thus result in increasing interests in generations of analytical data riven models based on machine learning in healthcare.

Hospitals are currently using manual system for the treatment, management and maintenance of critical information in the system. The current system requires enormous amount information about treatments, diseases,

and consultations spread throughout the hospital management infrastructure this may not follow the management standards. Multiple copies of the same information which exist in the hospital may lead to inconsistencies. To get the proper treatment for the disease and to consult the right doctor and data in various data stores needs to be managed efficiently.

## III. METHODOLOGY

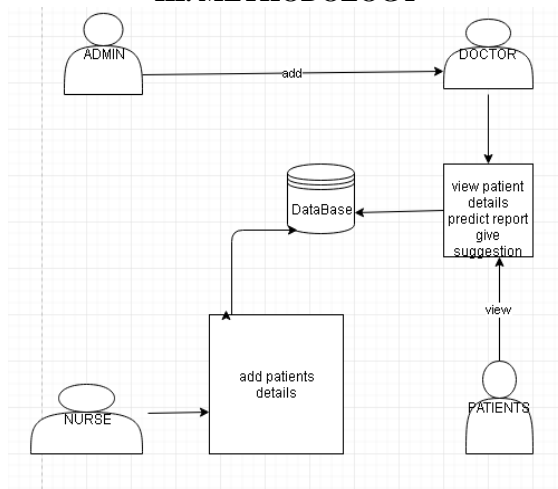


Figure 1. Architecture diagram.

There are more disadvantages existing in the current state of the hospital management system and these disadvantages can be overcome by applying artificial intelligence and machine learning techniques in hospitals. In this paper we are proposing a model that contains four prominent modules admin, doctor, patient, nurse. All the four people are allotted by their own user id and password. They need to login to the system using those user id and password. After the successful run of the application, admin will login to the system. Admin is authorised to add or remove any of the doctor, patient and nurse. Admin can add any of the desired registrations to the hospital management system and also has the rights to remove any pointless registrations in the system. Nurse adds the details of the patients which includes name, age, gender, contact details, health conditions, and family history and also mentions the name of the doctor from whom the patient should take treatment from. By collecting all the above said details from patient, nurse generate report and sends that report to the doctor. Doctor will login to the system using their own user id and password then doctor's work is to view patient's report which is generated by the nurse by examining the patient's condition. Then doctor will make prediction which are generated using the artificial intelligence and machine learning techniques these techniques examines the historical details of the hospital management system and predicts the possibility of the diseases using decision tree technique.

### A. Decision tree

Decision tree is the technology which is mainly used for classification and prediction. Learning of a decision tree is a typically algorithm based on instance, which mainly focus on classification rules. [12]. It is one of the popular techniques in the emerging field of data mining [13]. Decision tree classification algorithms are have been used for machine learning and artificial intelligence. One frequent algorithm in machine learning is ID3 i.e., iterative dichotomiser 3 to generate a decision tree from dataset it is used. And it is invented by Ross quinlan [14]. Decision tree impacts in the development of machine learning algorithms. A tree-like structure of decisions is drawn that can be visually represented and can be saved in the file format [15].

Decision tree is a representation for classifying examples. It is constructed in a top-down method which involves separation of the data items into subsets. Those subsets contains instances with homogeneous values. A decision tree can be drawn like upside-down tree. We start from the root node and then we split the nodes at each and every level until we reach the leaf nodes which represents the outcomes [15]. In this artificial intelligence in healthcare decision tree is built based on the good health condition and healthy lifestyle practices.

- The patient who practices healthy life style and balanced diet will have less probability of getting diseases.
- The patient who consumes more alcohol, follows unhealthy diet and does not follow healthy lifestyle have more chances of suffering from diseases.

**IV. FLOW CHART**

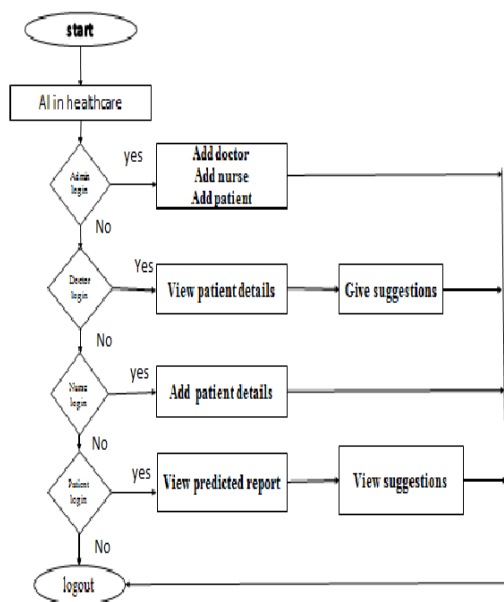


Figure 2 . Flowchart of hospital management system

- **Admin module :**
  - Admin will view the registrations
  - Admin decides whether to accept the registration or else will reject the registration
  - Admin will verify all department (Doctor, Patient, and Nurse).
- **Doctor module:**
  - Doctor should register and login through user id and the password.
  - Doctor views the patient details and will receive report from nurse
  - After doctor will check the patient report details and predict the disease based on history of data (using Decision tree technique) and give suggestion to patient
- **Patient module:**
  - Patient are also allotted to their own user id and password and register and login through that user id and the password.
  - Patient enter the all symptoms he is going through.
  - After consulting the doctor he go for the tests
  - Patient will view the final report and take suggestions from doctor.
- **Nurse module :**
  - Nurse should register and he will login through user id and password.
  - nurse will view the patient details
  - generate the patient reports and send to the doctor

**V. RESULTS AND DISCUSSION**

Results and discussions are used to prove the concept and evaluated it. This proposed system is designed using visual studio with additional frameworks. MYSQL databases are used to store the data in databases. CSS is used for front end design, and SQL server tags are used. We reviewed the motivation of using Artificial intelligence in healthcare, presented the various healthcare data that Artificial intelligence has analysed and surveyed the major disease types that Artificial intelligence has been deployed. Advanced algorithms are needed to train thought out the healthcare data before the system can assist physicians with disease diagnosis and treatment suggestions.

Here we use decision tree algorithm, this algorithm uses entropy and information gain to construct decision tree. To calculate the homogeneity of a sample it makes comparison with the historic values if the sample is wholly homogeneous the entropy is zero and if the sample can be equally divided it has entropy of one. By this way if the patient report details contains problem of family history, diabetes condition, cholesterol condition and cardio problematic condition are

checked if it is true the probability of the disease occurrences are more. Otherwise disease is likely to occur is less. Based on the predicted results occurrences doctor will give the suggestions to the patients.

## VI.CONCLUSION

This proposed system is very useful to maintain the healthcare in any country or region. Patients as well as doctors can be benefitted by implementing Artificial intelligence and machine learning in their hospital management system to predict the disease. Artificial intelligence system gets deployed after the initial training with historical data, and predicts the future circumstances efficiently. In future we can make this application to tell exactly the name of the disease, with the help of advanced artificial intelligence, neurological emergencies can also be managed in future. Chronic neurological diseases can be recognized in the early stages and treatments can also be suggested.

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