

# Expert System using Artificial Intelligence

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**Abstract** – The idea of expert system as assistant in improving healthcare was a plan to transform industrial robots into precision machines for surgery and beyond. But no matter how impressive, robotics in healthcare is still a system controlled by humans. The real magic of the 21st-century expert system will come from artificial intelligence systems that can learn so much that it will outperform the best doctors by combining all the available knowledge in all medical repositories. However, most experts agree that AI will not replace trained medical staff, just make them more efficient in several areas. Expert System using Artificial Intelligence interacts with the patients with the help of the Natural Language Processing (NLP) and takes the required information or data regarding the disease. The Expert System then calculates the possible outputs or diseases and their root causes and says those predictions back to the patient.

**Keywords** – Natural Language Processing (NLP), Artificial Intelligence, Expert System, Machine Learning.

## II. INTRODUCTION

The real power of AI, lies in detecting patterns that describe various conditions by studying healthcare records and other data. The machine can scan thousands of cases and look for correlations between hundreds of variables, some of which are not even listed in current medical works. Tests so far have proven that robotic systems can rival the best doctors and even surpass them in some areas.

There is much work in a hospital, and not only doctors can use a helping hand. Nurses and hospital personnel can benefit from the help of robots as assistants. The existing system follows manual process to collect the data from patients.

In which the expert system predicts the disease and describes the causes for the disease. But these systems are just collecting information through keyboard and gives the predictions on the screen. So, the existing system consumes more time to do a piece of work for this reason, the expert system using artificial intelligence is used. The proposed system also uses NLP(Natural Language Processing) for the face to face interaction with the user.

The objective of Expert System using Artificial Intelligence is to interact with the patients with the help of the Natural Language Processing(NLP) and takes the required information or data regarding the disease. The Expert System Then calculates the possible outputs or

diseases and their root causes and says those predictions back to the patient.

### 1. Expert system language

Expert Systems language is a set of programs which allow the building of an expert system through the creation of knowledge and rules. Expert systems have three essential components

- **User interface:** presents questions to the user and accepts inputs from them.
- **Knowledge base:** contains data, facts, rules and objects in a specific knowledge domain. The knowledge base obtained from the human expert is prepared by a knowledge engineer as most human experts are not skilled in computer programming.
- **Inference engine:** this is software that matches the users input with data contained in the knowledge base to reach appropriate answers. This is done using inference rules e.g. IF conditions THEN statements ELSE statements rules. The proposed expert system as assistant in improving healthcare was a plan to transform industrial robots into precision machines for surgery and beyond. But no matter how impressive, robotics in healthcare is still a system controlled by humans. The real magic of the 21st-century expert system will come from artificial intelligence systems that can learn so much that it will outperform the best doctors by combining all the available knowledge in all medical repositories. However, most experts agree that AI will not replace trained medical staff, just make them more efficient in several areas.

## II. LITERATURE SURVEY

### 1. Literature Review

There are many expert system that were designed to diagnose diseases .But there is no specialized expert system all kind of medical experts available. Although it's linked to several human diseases such as: Diabetes, bacterial, Ear, Eye, Mouth Problems Talayeh developed an expert system for diabetes diagnosis MYCIN is a famous expert system for diagnosing bacterial infections . Some of these Expert Systems are specialized in one specific disease and other in a few diseases. However, the current proposed expert system is specialized in the medical expert for some disease predictor without any age limits.

### 2. Materials and Methods

The proposed medical expert system performed by asking questions that requires True/False answers. The proposed expert system will ask the user to choose the correct answer in each frame. At the end of the session, the proposed expert system provides the proper problem and offer a recommendation of the symptoms to the users.

### 3. System Requirement Specification

The main purpose of System Requirement Specification is to translate the ideas in the minds of a client into a formal document. Through System Requirement Specification the client clearly describes what client expects from the proposed system and the developer clearly understands what capabilities are required to build the system. The purpose of the particular document is to serve as a guide to developers and testers who are responsible for the development of the system.

The project is mainly concentrated on the prediction of multiple disease. The current system is used to find out one or two diseases. But the Medical Expert System can be used for finding multiple diseases at a time. They find out the possible diseases and then gives the list of medications. Also the NLP (Natural Language Processor) is used for the interaction between user and the expert system.

**3.1 Functional Overview:** User need to give the genuine details. The expert system asks certain amount of questions regarding the disease. User have to answer the questions asked by the expert system. The expert system gives the predictions regarding the disease. The expert system gives the details of the list of medicines and other things to be done by the user.

### 3.2 Functional Requirement:

- User need to give the details consisting of name, age, phone number, Blood Group.
- The expert system asks questions regarding the disease.
- With the help of NLP system and user interaction in the natural language is possible.

- User should provide the data regarding the disease to the expert system.
- Expert System uses certain sensors for checkups.
- The expert system gives the details about the possible diseases that the user might be having.
- The expert system also gives the details about the medicines the user should consume with specified quantity and time.
- The expert system also suggests things to be done during the medications and things not to be done.

### 3.3 Non- Functional Requirement:

- The system that has been designed is reliable, and the user can use the system anytime.
- By knowing about the possible diseases that the user might face, user can take precautions
- The complete details about the user will be stored in the database and can be accessed any time.
- The expert system is a very user friendly so any user can understand the application very easily

**3.4 Performance Requirement :** The expert system can help the user to avoid to meet doctors. Thus the proposed expert system results in efficient usage of time. The expert system will come in great use in case of a situation where doctors are not available at all.

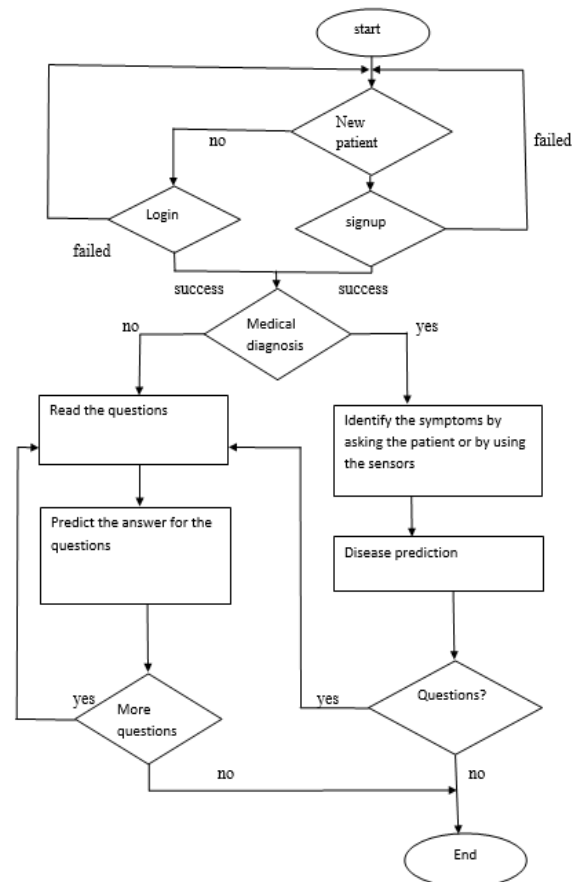


Fig.1. flowchart of Medical Expert System Using Artificial Intelligence.

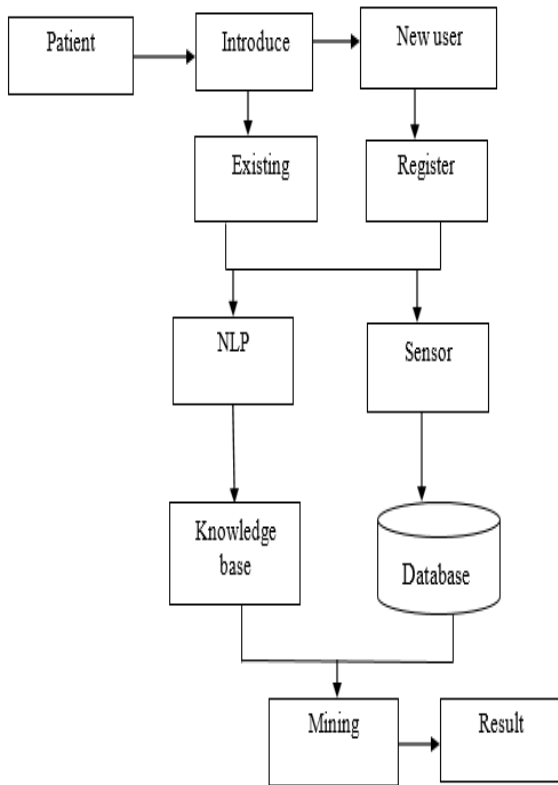


Fig.2. system architecture of Medical Expert System Using Artificial Intelligence.

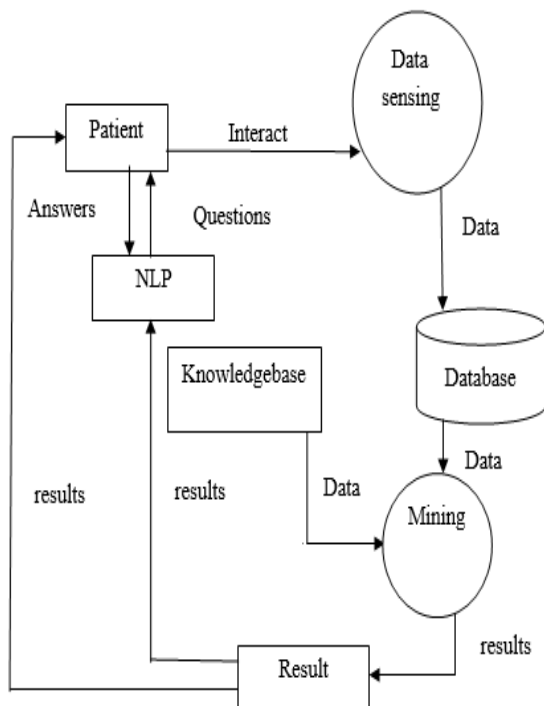


Fig.3. the data flow diagram for Medical Expert System Using Artificial Intelligence.

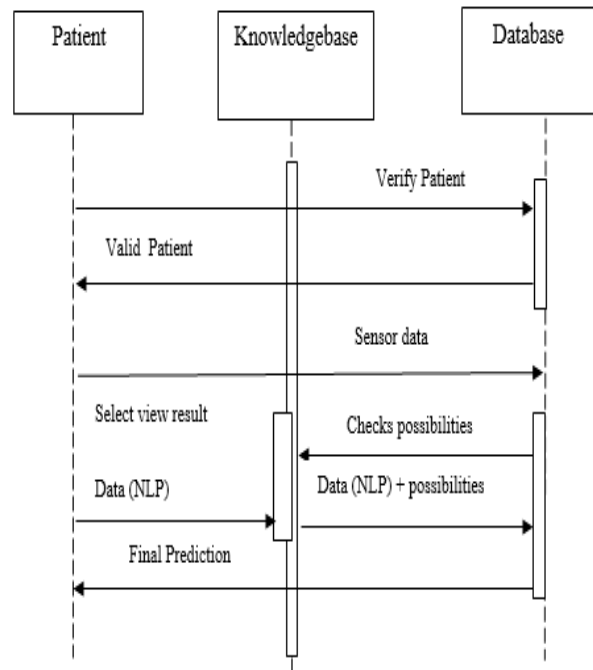


Fig.4. the sequence diagram for Medical Expert System Using Artificial Intelligence.

### III. CONCLUSION

In this paper, a proposed expert system was presented for aiding doctors in understanding patients with possible symptoms and disease in human body. The patients can get the solution faster and more accurate than the traditional medicine done by doctors. This expert system does not require rigorous training to be used. It has a straightforward and user friendly interface. It was developed using NLP, AI and expert system language. The results of the preliminary testing of the expert system showed potential.

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