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# AlzBot: An Intelligent Chatbot for Alzheimer Patients

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***Abstract*: Chatbot is a program that simulates human conversation by using historical data, statistical information, etc. It is fully based on Artificial Intelligence (AI). Chatbots are mostly used for customer related services, super-markets, social networking, etc. The problem we are trying to solve is to give senior people and patients suffering with Alzheimer's disease, the opportunity to communicate, talk, share their experiences, memories and help them when they are in problem. This is done by using natural language processing (NLP), artificial intelligence mark-up language (AIML), pattern matching and ML algorithms.**

***Keywords*: alarm, alzbot, nlp, text-to-speech, tokens.**

## 1. Introduction

Alzheimer is a type of dementia that causes problems with thinking, remembering things, and even change in behavior. It is a disease that causes a progressive brain cells to degenerate and die. Major symptoms are memory loss, confusion in thinking, mood swings, anxiety, poor communication, etc.

Our main aim of the chatbot is to help the Alzheimer patients diagnosed with early and moderate level. The problem we are trying to solve is to give senior people and patients with Alzheimer's disease the opportunity to communicate, to share their experiences and memories. Our Bot will help patients as an alarm system for reminders, reminds his/hers schedule and daily routine, medicine times, initiate conversations and talk to the patients. The patients can also initiate the conversation when lonely, talk them to sleep when insomniac which is a very common issue in aged people. It is a self-learning chatbot which will remember the information given by the patient and also learn from past mistakes. It will also contact the emergency near-dear ones/doctor when he patient doesn't respond for quite a long time excluding his/her sleep hour.

## 2. Methodology

Here we have demonstrated the methodology that we will be using in our project. We have briefly mentioned about the Artificial Intelligence, Natural Language Processing and the algorithms that we have used.

Our system follows Structured approach.

- *Planning:* We have planned to make a chatbot cum assistant for Alzheimer's patients which will help them to fulfil their day to day ask without any hindrance. The chatbot will interact with the patient to solve his/her problems & make his life simpler.
- *Analysis:* We will require pattern matching algorithms and NLP.
- *Design:* We made flowcharts and system block diagrams to understand the flow of our system. We have also specified the hardware and software designs.
- *Implementation:* We use AIML to make the basic chatbot, NLP system for text-speech conversion, Android for the UI and python to implement the ML algorithms.
- Support: We will rectify the errors once the system is deployed.

## 3. Architecture

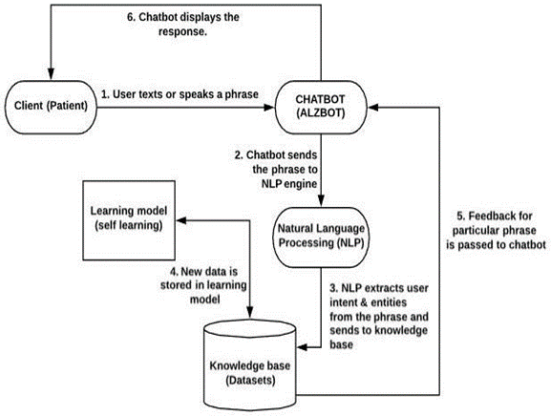


Fig. 1. Architecture of Alzbot

We have proposed an architecture which contains two sections:

- Pre-processing System: The patient will be having the application with him attached on his/her wrist most of the time.

The patient will see 3 icons on the application screen:

1. A grid icon which is displayed on top right corner of the application from where patient's family members can do the setup of adding patient details, his/her medicine's information, his/her schedule and emergency contact details.
2. A People I know tab from where patient can refer his emergency contacts & doctor's details.

3. A chat icon from where patient can chat with the bot using his own voice.

As the patient will speak any phrase, it will be detected with the help of the mic and converted to text by using Text-to-Speech algorithm and the spoken text will be displayed on the screen. In the background chatbot will send this phrase to the NLP engine which will extract the user intent in the form of keywords and will further search for the answer for specified keyword from the knowledge database where predefined dataset with thousands of keywords and corresponding responses to the particular keywords are already stored. If the particular keyword does not match to any keyword from the knowledge database, then that keyword will be stored in learning model from where it's response will be updated by the client so from next time it will generate response for that keyword. After matching the keyword, the corresponding response/feedback is passed to chatbot which displays it on the screen and speaks it.

Other functionalities:

1. After entering the schedule in the application, the chatbot will remind the patient to take his medicines on specified time and remind other tasks as mentioned in the schedule.
2. The chatbot will also continuously send the patient's location co-ordinates (mobile location) to the family member's and doctors mobile in another application so that they can track the patient whenever they want for safety purposes.
3. If patient fails to respond to chatbots question for a long time the patient will trigger the emergency contact and doctor with emergency message/call so they can assist the patient as soon as possible.

In this system, user will enter the medical history and ask health related questions. This information is useful to generate basic text responses for the queries [1]. We have sets of data and patterns to respond to corresponding answers to the questions for better accuracy of the chatbot. Chatbot uses general principle of artificial intelligence and machine learning for developing intelligent system. These systems are used in various applications such as health related queries, telecommunication, banking, super market, education [4], [5].

The system is based on Speech to text recognition that converts spoken words into text. The text is then analyzed and processed using Natural Language Processing (NLP) [6]. Different methods and algorithms are applied to extract user intent and entities from the phrase and sends to database to generate particular responses. The overview of challenges and problems faced in cloud based chatbots are noted and resolved [7]. The location of the patient is continuously updated in the database so emergency contacts and doctors can keep a regular check on the patient from anywhere in the world.

- *Conversation System:* The interaction between chatbot to patient and patient to chatbot is shown with the help of flowcharts.

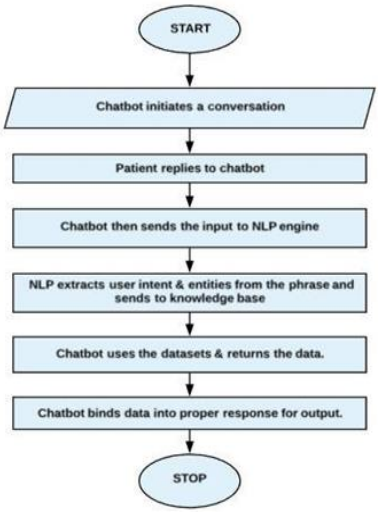


Fig. 2. Chatbot to patient

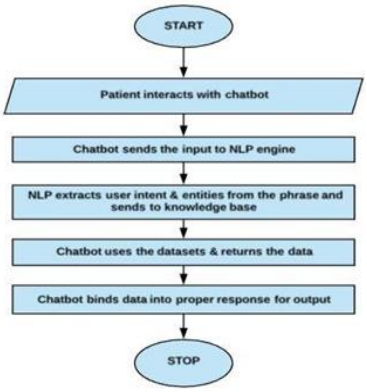


Fig. 3. Patient to Chatbot

## 4. Conclusion

Our Chabot aims to assist Alzheimer patients in order to help and guide them in their daily routine, help them maintain their schedule, remind them to take medicines. It will alert the emergency contacts and the patient's doctor during emergencies & help them track the patient using GPS system. Our Chabot acts as a companion to solve their problems and help them live a simple life.

## 5. Future scope

Here chatbot uses NLP technology to process the data, but majority depends on rule based system. It retrieves the responses rather than generating it. Self-learning is required to make a chatbot intelligent. The bot should create intelligent response based on the keywords present in the request or generate new responses from scratch [8]. Sequence to sequence models like RNN encoder-decoder can be used for training a chatbot to generate smarter responses [9].

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