

## Chatbot as a Personal Assistant

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### Abstract

Chatbots usually work as an optimiser of customer service. Chatbots are designed in such a way that the users are made to believe that they are talking to an actual human being but rather they are talking to a machine. The main advantage of this explicit characteristic of a chatbot is that it can be given a virtual personality of its own just like a specific person of a particular profession. This paper proposes an idea of an artificially intelligent chatbot as a personal assistant that can serve as your resume. Also, this chatbot helps the user in fixing meetings and adding them in the calendar. Our chatbot is basically a resumeBot. It is a resume in the form of a chatbot. A resume in the form of chatbot is the new generation in the field of job applications. A chatbot will help the recruiter to know your personality along with all your qualifications and personal details. The chatbot will communicate with the user with the help of natural language processing and AIML files.

**Keywords:** Artificial Intelligence, Chatbot, Personal Assistance.

### INTRODUCTION

A chatbot also known as a talkbot, IM bot, chatterbot, Bot, interactive agent, or an Artificial Conversational Entity. Chatbot is a computer program that helps you to communicate via messages. They are formulated to mimic human behavior. They can reproduce exactly how a human would act as a conversational partner.[3]

A chatbot as a personal assistant will be able to not only control your schedule on Google calendars but also will be able build an immaculate resume.

A personal assistant controls and handles all the home appliances with a single touch. Chatbots are those computer programs that mimic human conversation using artificial intelligence and are transforming the way people interact with the Internet for information and assistance and knowledge. It's not surprising that chatbot apps are considered the new browsers and the new websites. Google Now Cortana, Siri and

Alexa are all examples of chatbots. And Facebook has opened up Messenger, making it not merely an app but a platform upon which developers can build an entire chatbot system. Facebook Messenger provides over the 30,000 chatbots and it also stays as their main habitat.

In this today's generation, it is really important to stand out from the crowd and make a mark. It is really important to prove your worth in this era of competition. Having a basic is just not enough. So, the best way to make yourself stand out of the crowd is to use latest technology. By using the technology like Artificial Intelligence will surely make you and your professional profile to stand out. So presenting your resume in the form of chatbot is the best way of implementing Artificial Intelligence to make your professional profile better.

However, chatbots have a big potential for implementation in personalized corporate accounts on every social media platforms. Chatbots are designed to be the ultimate virtual assistant, helping you to accomplish various tasks ranging from answering questions, getting driving directions, turning up the thermostat in your smart home, or play your favorite tunes and even draft a question and answer survey.

Chatbots are being made to ease the pain that the industry is facing today. The purpose of chatbots is to support and help to scale business teams in their relationship with customers and consumers at the same time.

### OVERVIEW

#### A. Existing System

Additionally, there are some existing systems from which the idea of creating an application of chatbot (virtual personal assistant) was inspired.

1. A.L.I.C.E. One of the most famous chatbot which works on Pattern Matching Strategy is the Artificial Linguistic Internet Computer Entity (A.L.I.C.E.). The AIML files for A.L.I.C.E. are available online which contain categories like music, art, philosophy, etc. So for the basic working of our chatbot, these AIML files are being used. Also, another original AIML file for the category "Meetings" has been generated, which

answers specific meeting related questions. Thus, as the project concentrates more towards the scheduling module, AIML files are being used for the pattern matching framework of chatbot.[1]

### B. Proposed System

We have made a chatbot that will change the way you look at a resume. Our chatbot is basically a resumeBot. It is a resume in the form of a chatbot.

In past years we have not seen much changes in LinkedIn profiles. Our LinkedIn profiles surely give a good impression and are more interactive than resumes but they are not interactive in a way a chatbot is. A resume is normally a list of dates and details of the candidate written down. But what if the resume you build is actually interactive. A resume in the form of chatbot is the new generation in the field of job applications. A chatbot will help the recruiter to know your personality and actually see examples of your work. Chatbots give a sense of personality of a person instead of just a word document with some facts written down.

### SYSTEM ARCHITECTURE

There are four modules in the architecture.

- i. **Presentation layer**
- ii. **Service layer**
- iii. **Data access layer**
- iv. **Database layer**

#### i. **Presentation layer:**

In this interface the user communicates with the chatbot. The output generated in this layer of the system is served as the input of the next layer i.e. service layer.

#### ii. **Service layer:**

The service layer consists of Gmail API and the calendar API and various other APIs.

#### iii. **Data access layer:**

This is the intermediary layer of the system. The function of this layer is to exchange the data between the database and the chatbot. It uses pattern matching algorithm to select most favourable response and sends it to the presentation layer.

#### iv. **Database layer:**

It comprises of three main databases. The first database is of the AIML files i.e. the AIML database. The second is the information stored about the user that includes all the information in his resume from name to hobbies. The third database is the user's Google calendar.

### DESIGN CONCEPT

The design of a Chatbot is represented here:

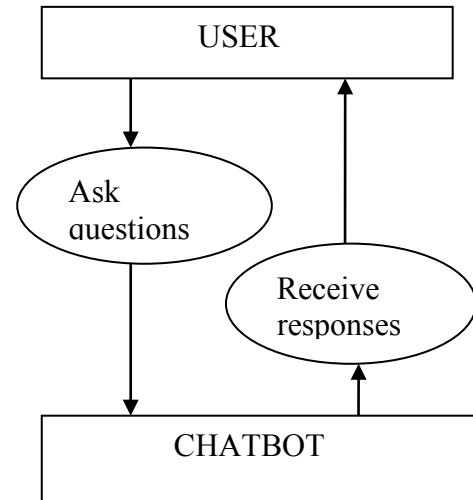


Figure 1: Use Case Diagram of Chatbot Design.

A Chatbot can be designed by these steps:[2]

#### Selection of OS:

We have Windows OS since it's the most user friendly and best OS in the market till date.

#### Selection of Software:

Eclipse software is used for programming in java because of its great user friendly nature. It is compatible with multiple platforms being a java IDE.

#### A. **Creating a Chatbot:**

Chatbot is created by writing a program in java language. Chatbot can also be created without any involvement of coding for beginners. Websites like Chatfuel, Botsify and Moton.ai helps one to create their own chatbot without any coding.

#### B. **Creating a Chat:**

A chat is created between the user and the chatbot. The chat is easily understandable by the bot.

#### C. **Pattern Matching**

The whole concept of a chatbot lies on its ability to match various given patterns. It is the speciality of artificial intelligence which is used during the designing of a chatbot. During pattern matching the input of the text which is given by the user is compared with all the texts stored in its database. After executing the comparison recognition an output is generated accordingly.

#### D. **Conversational and Entertaining**

The chatbot responds in a friendly way and that too in English language. If you ask about any data regarding the user the chatbot will answer it almost instantly. And that too in the best and most accurate way possible. It is just as talking to the

same person whose resume is loaded in the database and commanding a person to check the calendars.

- **Creation Platform**

Creation platforms provide a wide range of software foundations, frameworks and toolkits like APIs. There are other features like, natural language processing, searching, and image processing. These platforms can be distribution-platform-specific or can be used across multiple platforms, such as the Microsoft Bot Framework, Botkit, and Pandorabots. These provide services from documentation and code templates to even no-code-required bot-building and managing interfaces just as Chatfuel. Chatfuel is one of the amazing feature that lets one create chatbot apps without any advanced coding and is very helpful in creating prototypes.[3]

- **Distribution Platform**

Distribution platforms tells us about where and how users will access bots. These days many are centered around messaging or social networking like Messenger, Skype, and WeChat,Telegram etc.. Other platforms which are domain specific mainly concentrate on developers for example, Slack, Teams, and HipChat.

These platforms support human-bot, bot-bot , or even system-bot interactions. These platforms define and improvise on how users interact with bots and have built-in support for commands, natural language, speech, and more rich and efficient UI controls. The interaction with a bot strongly influenced by the experience of the user and the types of tasks users can perform with chatbot. Some of the third-party sites like BotList and ChatBot provide online catalogs of bots. It makes easier for developers to promote and market their bots. Some distribution channels have monetization features that let bots safely collect payments from users, which is particularly useful for people developing transactional style bots.[3]

The new areas of technology can be unleashed by making this into reality.

## IMPLEMENTATION

The chatbot is an exceptionally made app that can be used as a personal assistant. When a person logs into the given app it asks you for some personal details regarding one's name, alarm time and mainly the to do list.

You can also send mails and messages automatically if the app is connected with your email-id. This helps get a new arena of the technology into perspective.

Chatbot is an application of the computer which uses artificial intelligence to imitate human conversation. It helps the user by answering the questions asked by them. The program is implemented using Java programming language. Particularly, one uses the Java applets. Applets are used as it is easy for it to create dialog boxes needed for communication between the user and the chatbot. Detailed implementation is given below :

### A. Fundamental Design Techniques and Approaches

Creating the dialog box

The variety of packages needed for making the dialog box are transferred. The text area and size of dialog box is already given. To scroll the screen during the conversation a vertical scrollbar is used. As the size of the horizontal dialog box is not fixed it is not used. The conversation always takes place vertically and never horizontally.

### B. Creating a database

Two dimensional string arrays are used to build a database to store data. Arrays contain rows and columns. All the rows are used for request and response. Even rows contain request and all the odd rows contain answers or responses. Columns in the given array are applied to store and save various types of questions that a chatbot has to answer. Default responses are stored in a different row in the array. And this row is not used for storing any other data. When the matching question is not found in the array then the default response statements are used.

### C. Modules Description

The description of the modules are as follows[6]:

- **Chatbot()**

In this function, all the variables that are used for creating the dialog box is added.

There is a default close operation set to EXIT\_ON\_CLOSE so that the dialog box closes whenever it is exited. It requires background colour. And it is set using the built set Background() function.

- **Random()**

The input is given by the user. and the same is accepted using text(). By using trim() function all the punctuations are removed. Uppercase letters are converted to lowercase. There is a variable response. And this is used to hold a byte value. This value is set to 0. When the response is 0, the database finds a match for input given. It is then returned as a response and is later displayed on the dialog box in the text area. And if the response is 1 then no match is found in the database. In such cases a default response will be returned. The function Random() is used chose responses stored in database[7].

- **AddText()**

This function is used to add all the strings and texts used for input and output. They are added in text area part of the dialog box.

- **InArray()**

This is specifically used to match the pattern. Variable matches are used to hold the Boolean values. It is then set to false. If a match is found for inputs given by the user in the database then true is returned or else false is returned. The result is now returned to keypressed() function. This result will then be displayed on the dialog box.

- **Google APIs:**

Google APIs are program interfaces. They were developed by Google. They help us in authorization with services provided by Google. These APIs include gmail, maps, search etc. Third party apps can use these APIs for authorization. If they need to access Google's services [9].

- **Calendar API:**

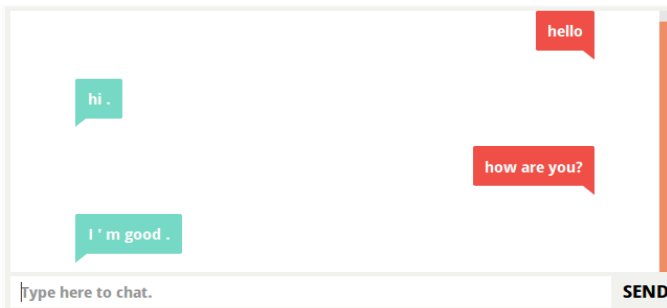
Anyone can use Google calendar APIs to find out and view calendar events. Both public and private events are accessed. Our main function is to set up meetings and updates like a to-do list. Also our chatbot can be set so the user is reminded of his schedule regularly. Events on this calendar can also be acquired and altered easily at the click of a button.[10].

### EQUATIONS AND ALGORITHM

Chatbots have always fascinated humans with their self operating technology. Day by day chatbot technology is becoming more like humans and more automated along with being more interactive. Chatbots are known for their impulsive responses and persistent connectivity. These tempting features have made them capable of replacing the ongoing trend in web application.[5]

#### Working of a chatbot:

The input that the user gives in the form of text is first analysed and processed by a "classifier". A classifier is a software function present in the system. The output of the classifier is then associated with a conversational intent. This intent is the one that is responsible for the responses of a chatbot.



**Figure 2.** Example of a chatbot.

A classifier can be thought of a method of categorizing a sentence under some categories. The sentences are the input from the user and the categories are the intent which is responsible for a response. So, if a user asks "How are you" then it can be considered as a classifier and responses like "I'm good" or "All fine" can be considered as intents.

Classifiers can be divided into three types.

- i. **Pattern matchers**
- ii. **Algorithms**
- iii. **Artificial Neural network**

#### i. Pattern Matchers

Pattern matching is the most effective and commonly used concept in chatbots. Pattern matching is used to categorize a text input given by the user to generate appropriate response for the user. AIML stands for "Artificial Intelligence Markup Language". It can be considered as typical framework for pattern matching.

An easy pattern matching example:

```
<aiml version = "1.0.1" encoding = "UTF-8"?>
<category>
  <pattern> WHO IS ABRAHAM LINCOLN </pattern>
  <template>Abraham Lincoln was the US President during American civil war.</template>
</category>

<category>
  <pattern>DO YOU KNOW WHO * IS</pattern>
  <template>
    <srai>WHO IS <star/></srai>
  </template>
</category>
</aiml>
```

**Figure 3.** Example for pattern matching

#### ii. Algorithms

In chatbot technology for each kind of input given by the user a distinct pattern is stored in the database. These patterns help in providing users a suitable response. The use of algorithms is to reduce the classifiers and to create a large combination of patterns. These patterns generally follow a hierarchy which creates an effective and manageable structure. These algorithms follow the basic algorithm called Multinational Naive Bayes.

For example, assume a set of words are given which belong to a specific class. With each new input of a word, each word is counted for its occurrence. And each class is assigned a score. The highest score in the class is the closest to be linked with the input word.

Few sample Input sentence classification:

- Input - "Hello good morning"
- term - "hello" (no matches)
- Term - "good" (class: greeting)
- term: "morning" (class: greeting)
- classification: greeting (score=2)

With the help of such an equation, word matches are noted for each class. Classification scores identify the class with the most term matches. But it also has certain limitations. The

score explains that which intents to most likely match the sentence. There is no certainty that it is perfect.

### iii. Artificial Neural Networks

Artificial Neural Network are used to calculate the output from the input given by the user with the help of weighted connections. These weighted connections are generated from recurrent iterations during the processing or training of the data. At each step of training or processing the data the weights are modified. These modification in weights result in an output with utter accuracy.[4]

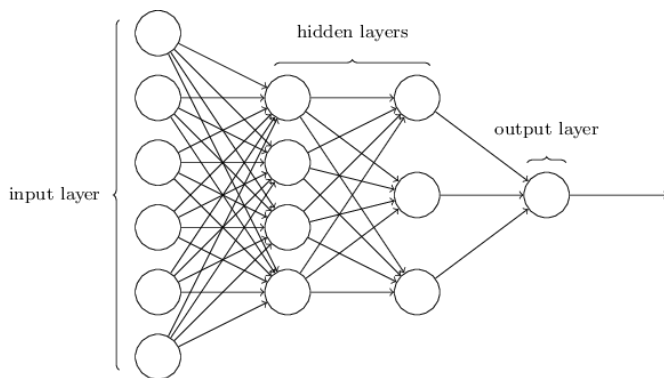


Figure 4. Artificial neural network.

In Artificial Neural Network, each sentence given as input is divided into separate words. Each word is then used as an input for the neural network. There can be many different kinds of neural network and pattern matchers but as the complexity increases the output of the chatbot becomes more accurate.

### NLU (Natural Language Understanding):

It consists of three concepts:

- **Entities:**

Entity can be considered as the main ideology of your chatbot. It can be a payment system chatbot or customer support chatbot or a resume bot as proposed in this paper.

- **Intents:**

Intents are basically the outputs or the responses that a chatbot gives on encountering an input by the user. In short these are the actions that a chatbot performs when a user gives a text input.

- **Context:**

In NLU algorithm whenever a sentence is processed or scanned, the system does not have any information about the past conversations of the user. It means if a user asks a question, and the chatbot has given a response to that question, but, the chatbot will not have a record of the question that has been just asked. So for distinguishing the parts of the conversation,

the states of the conversation are recorded. A state can be a flag like “school studied” or parameter such as “educational qualification”.

### NLP (Natural Language Processing)

In Natural Language processing (NLP) chatbot uses a collection of steps that can be a collection of questions to transform the user’s input text into relevant data and then give an appropriate answer or response.

These are the steps involved in Natural Language Processing:

- **Sentiment Analysis:**

This analysis keeps a track on the conversations to check if the user is having a good quality experience.

- **Tokenization:**

The NLP separates the sentence into different words or tokens. NLP classifies and divides a string of data into small parts or tokens.

They are differently used for application purposes.

- **Normalization:**

In this step the chatbot looks for misspelled words or any kind of typing mistakes in the text input by the user.

- **Dependency Parsing:**

In this step the chatbot finds out the subject, verb and object of the sentence given by the user. It looks for nouns and related or dependent phrases in the user’s text input to understand what the user is trying to convey.

Similar to all the web applications present today, chatbots also need to have a database. The database is the collection of information and facts that is used to generate a suitable and most appropriate response to the user. The data related to all the activities are stored in the database. So, NLP converts common human language to relevant information. The information can be a collection of patterns and relevant texts that can be applied to get a proper response.

### CONCLUSION

Therefore, a chatbot can be used to not only to chat and get information but it takes artificial intelligence in a whole new light. The main advantage of a chatbot is that it can provide services at any given rate. They respond immediately to the users’ demands with precisely relevant information.

This enhances the rate of the communication operation. In simple terms, chatbots make your service faster and as a personal assistant it is the best. You can use it for the betterment of common people. They can also be used to instantly book or buy tickets, rooms, tables and also set alarms, notes, send reminders regarding meetings, alarms for medication timings and various other reasons.

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