



# BUILDING A SMART CHATBOT

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**Abstract:** A chatbot is a piece of intelligent software that can interact with users in a way that is similar to how a human might. Chatbots are utilised for client communication, social media marketing, and instant messaging. According to HubSpot research, 71% of people prefer using messaging applications for customer assistance. Because it is a rapid solution to their issue, chatbots have a promising future in business. We'll put in place a chatbot that can comprehend what the user is saying and respond appropriately. Algorithms like Natural Language Processing are used by chatbots.

**Keywords:** Chatbot, Deep learning techniques, HubSpot, Natural Language Processing

## 1. INTRODUCTION

Chatbots are prevalent in today's world. In any particular domain where it operates, chat bots are a source of information for users seeking answers. In any particular domain where it operates, chat bots are a source of information for users seeking answers. An automated computer programme that communicates with people is known as a chatbot. A chatbot is simply a computer software that mimics human talks on a basic level. An artificial neural network used by a chatbot powered by AI and machine learning is modelled after the brain's neural pathways. Programs called chatbots may effortlessly mimic human conversational speech. For instance, Facebook has a machine learning chatbot that offers businesses a way to engage with customers via the Facebook network.

Chatbots exploded in popularity on Messenger in 2016. Chatbots are where the software industry is primarily focused. Many chatbots are created by startups and deployed by businesses to enhance customer service by keeping customers waiting with polite conversation. According to research, chatbots are now employed in many different industries, including education, e-commerce, insurance, banking, healthcare, finance, legal, telecom, logistics, retail, auto, leisure, travel, sports, entertainment, media, and many more, to handle a variety of business functions. Consequently, that was the appropriate time to consider chatbots as a novel communication technique. The college inquiry system will respond by summarising the user's enquiry and then outputting replies. It also gives the user with only the information they want.

A college system will provide all responses in relation to topics like admission, fee, courses, subjects, and other unrelated topics. The college inquiry system will serve as a quick, standardised, and informative way to provide users with accurate information. When a user sends a message, the bot will study it, understand it, and then respond appropriately.

## 2. LITERATURE SURVEY

In this paper, Ujjwal Kumar etc. This paper describes telemedicine can be used by medical practitioners to connect with their patients during the recent Coronavirus outbreak, whilst attempting to reduce COVID-19 transmission among patients and clinicians. Amidst the pandemic, Telemedicine has the potential to help by permitting patients to receive supportive care without having to physically visit a hospital by using a conversational artificial intelligence-based application for their treatment. Thus, telehealth will rapidly and radically transform in-person care to remote consultation of patients. Because of this, it developed a Multilingual Conversational Bot based on Natural Language Processing (NLP) to provide free primary healthcare education, information, advice to chronic patients. The study provides a revolutionary computer programme that serves as a patient's personal virtual doctor. The programme has been expertly built and extensively trained to communicate with clients in a manner similar to that of a human doctor. This application is based upon a serverless architecture and it aggregates the services of a doctor by providing preventive measures, home remedies, interactive counseling sessions, healthcare tips, and symptoms covering the most prevalent diseases in rural India. In order to increase patients' access to healthcare information and leverage the capabilities of artificial intelligence to close the gap between demand and supply of human healthcare providers, the paper proposes a conversational bot named "Aapka Chikitsak" on Google Cloud Platform (GCP) for telehealth delivery in India. This conversational application has resulted in reducing the barriers for access to healthcare facilities and procures intelligent consultations remotely to allow timely care and quality treatment, thereby effectively assisting the society [1].

In this paper, Parth Thosani etc. This paper demonstrates An interactive AI tool called a chatbot attempts to mimic human behaviour by interpreting input and responding in either text or audio format. These days, chatbots are employed to conduct digital communication effectively. Our concept introduces a new field of research in chatbot communication. This essay demonstrates An interactive AI tool called a

chatbot attempts to mimic human behaviour by interpreting input and responding in either text or audio format. These days, chatbots are employed to conduct digital communication effectively. The majority of chatbots nowadays successfully carry out the needed duty, however there is something to note. Conversations between a person and a chatbot frequently repeat themselves. Because technology has always reduced human effort, a multi-agent system with a chatbot serving as a middleman between the user and the outside world is proposed. It is comparable to having a personal assistant who is aware of the user's needs. Now that it has this understanding of the user, it is able to make decisions on the user's behalf. This chatbot has something unique, i.e. it understands the user and their requirements. It is comparable to having a personal assistant who is aware of the user's needs. Now that it has this understanding of the user, it is able to make decisions on the user's behalf. Our concept of considering one task that is done with the help of a chatbot is demonstrated. The proposed system adapts and acts accordingly on behalf of the user[2].

In this paper, Adamopoulou etc. The author explains the use of chatbots evolved rapidly in numerous fields in recent years, including Marketing, Supporting Systems, Education, Health Care, Cultural Heritage, and Entertainment. In this paper, we first give a historical summary of how interest in chatbots has changed throughout the world. Next, we go over the reasons why people use chatbots and explain how valuable they are in a variety of contexts. Additionally, we emphasise the influence of societal stereotypes on the design of chatbots. We continue on to a classification of chatbots based on several criteria, such as the area of knowledge they refer to, the need they serve, and others, after delineating key technological aspects. Furthermore, we present the general architecture of modern chatbots while also mentioning the main platforms for their creation. Our engagement with the subject so far, reassures us of the prospects of chatbots and encourages us to study them in greater extent and depth[3].

In this paper, Prakhar Srivastava etc. This Paper explains automated medical chatbots are conversationally developed with technology in mind, with the potential to minimise efforts to increase access to medical services and knowledge and reduce efforts to healthcare expenditures. We developed a diagnosis bot that converses with patients about their medical issues and questions in order to deliver a personalised diagnosis based on their identified manifestation and profile. Our chatbot system is qualified to identify symptoms from user inputs with a standard precision of 65%. Using these extracted diagnosed symptoms correct symptoms were identified with a recall of 65% and a precision of 71%. Finally, the chatbot returned the expected diagnosis for further more operations. The fact that a medical chatbot can diagnose patients with a fair degree of accuracy using straightforward symptom analysis and a conversational approach indicates that a successful spoken language medical bot might be feasible. Moreover, the relative effectiveness of this bot indicates that more proceeds automated medical products may flourish to serve a bigger role in healthcare[4].

## 2.1 PROBLEM STATEMENT

Colleges want their administrators to clear the doubts of students. So the most primary way to do this is to have a good interactive session. But in this advanced world, just having a call and answering every question is very tough and this can not solve the queries of the students. Also, it is impossible to assign humans to respond to everyone at once, 24/7. So for that, you need "An ChatBot" which is very easy to use. Using natural language, chatbot technology allows for interactions between people and robots. Depending on the topic of the current conversation, a chatbot may respond in a variety of ways to the same input provided by the user. By using our "ChatBot" you can overcome all the above-given issues. A chatbot is a typical agent that can converse with operators in natural languages. The main aim is to reduce manual work for administrators. This project uses technologies of deep learning to create a chatbot. The chatbot is trained using data sets of various types so that it can answer questions. It is different from a normal human machine interaction because the chatbot learns quickly. The programming language that has been used in this project is Python. Chatbots play a key role as human computer interfaces. A chatbot essentially functions as a conversational agent that can use Natural Language Processing to communicate with any user in a specific field. The goal of this project is to answer the queries of students about college through chatbots easily.

## 3. PROPOSED SYSTEM

Our project is to build a chatbot using deep learning techniques. The information, which includes categories (intents), patterns, and responses, will be used to train the chatbot. The technology used for the advancement of chatbot is natural language processing (NLP). Our Proposed System aims to develop an smart chatbot application, which gives responses to the query of the user/student very efficiently and effectively. Students just have to enquire doubts through the bot which is used for asking questions and get answers. We can help if the user wants to have any query she or he wants to enquire about something. It also contains various deep learning algorithms to learn the Chatbot by experiencing various user's responses and requests. The conversational agent, also known as a chatbot, engages users in a specific domain or on a specific subject by taking input in the form of natural language sentences. The system examines the user's query. With the help of deep learning techniques, answers to the query is answered by the person. The user can query about the college related courses and information. This chatbot system helps the student doubts clarified easily.

Advantages:

- It enables the students to be updated with college information.
- It saves time for the students as well as administrators.
- Without requiring any physical effort on our part, it offers us a conveniently accessible knowledge source.
- It is simple to access and also saves time and money.
- Chatbot once installed can answer queries at any time i.e 24/7

### 3.1 SYSTEM ARCHITECTURE

The architecture describes how CHATBOT functions, starting with user requests and ending with the Bot response. The User Interface component, Natural Language Understanding (NLU) component, Dialogue Management (DM) component, Backend component, and Response Generation (RG) component make up the five essential parts of a basic chatbot architecture.

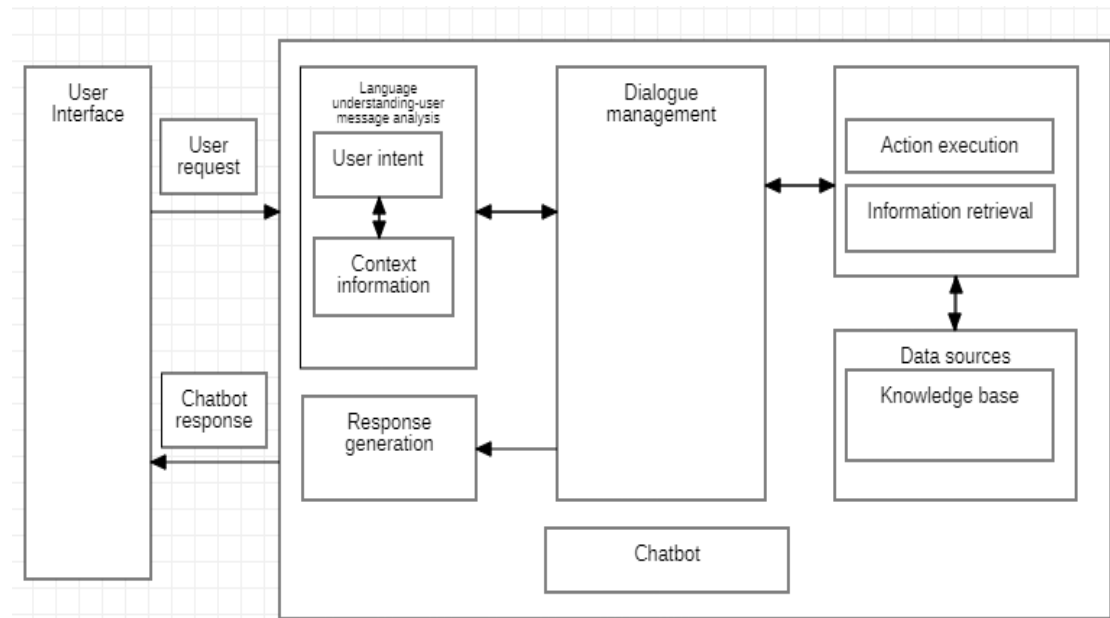


Fig 1. System Architecture

### 3.2 ALGORITHMS USED

Natural Language Processing (NLP):

The most significant of these algorithms, the most important technique within chatbots, is Natural Language Processing (NLP). A chatbot's ability to interpret human language and, as a result, create acceptable responses, is determined by natural language processing (NLP). If the chatbot is to achieve its main objective, which is to engage users in meaningful conversations, this algorithm must be operating effectively. NLP is of particular importance for chatbots because this technique determines how the bot will understand and interpret the text input. The goal of an ideal chatbot would be to converse with the user in such a way that the user is completely unaware that they are talking with a machine. Natural language processing, or NLP, enables chatbots to respond to user queries in natural language. Natural language processing enables machines to take in input, deconstruct it, and extract its meaning before deciding on the best course of action and responding to users in their own language. Natural language understanding (NLU) and natural language generation (NLG) are two subgroups of natural language processing (NLP). NLU transforms unstructured data into structured data so that machines can comprehend and act on it. The goal of NLU is to derive meaning from user input queries. Natural language generation (NLG) merely transforms a chatbot's answer from structured data to naturally intelligible English.

These NLP chatbots help human agents by taking over repetitive and time-consuming communications. The new generation of chatbots are NLP-powered virtual agents that get smarter each day. They make notes during the chat and pick up new information. Python is now the most widely used language for building AI chatbots and is the ideal option for NLP because the original Natural Language Toolkit was created in Python. The NLP layer, which enables software to translate and imitate human speech, is a crucial component of the chatbot algorithm. Deep learning chatbots may simulate human-like conversations and are developed using machine learning algorithms, but they also require less human interaction. Deep learning chatbots use structured data and human-to-human communication to create many layers of artificial neural networks, which are used to create intelligent judgements. To comprehend the context and intent of a user's language, chatbots use natural language processing (NLP) and machine learning.

### 3.3 IMPLEMENTATION PROCEDURE:

- i. Import modules and load intents file
- ii. Preprocessing the Data
- iii. Bag of words and Training sets

- iv. Build the machine learning model
- v. Predicting the response for user's query
- vi. Run the Chatbot

#### 4. RESULTS:

Results were got after training and testing the code. After training and testing the chatbot is runned. Fig 2. is chatbot gui the user can ask questions in this interface. Fig 3 and Fig 4 are some of the questions asked by the user in chatbot gui.

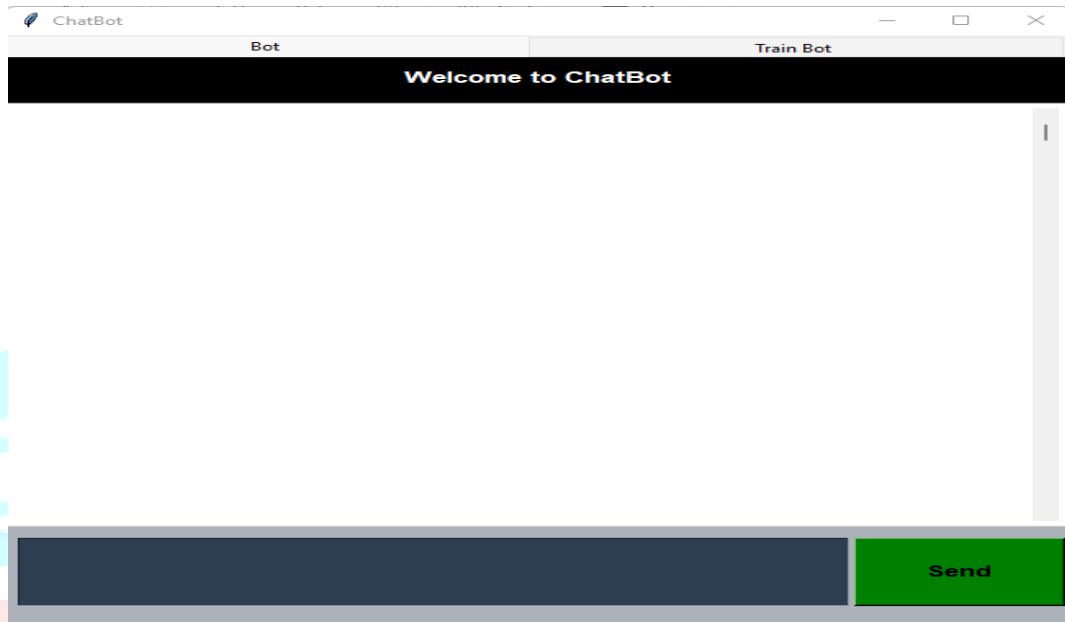


Fig 2. Chatbot gui

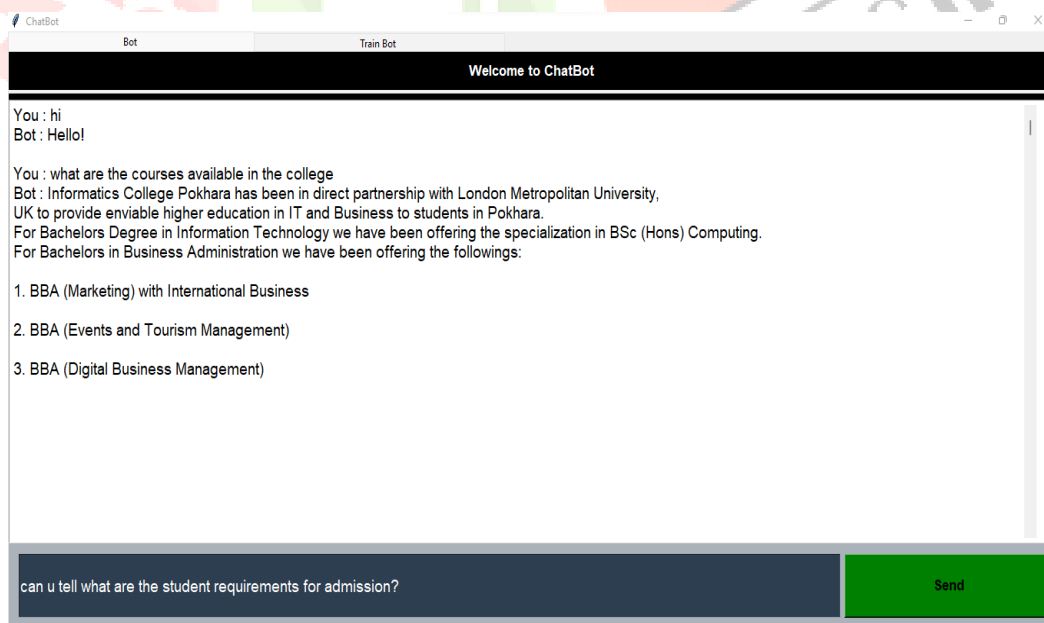


Fig 3. Chatbot gui

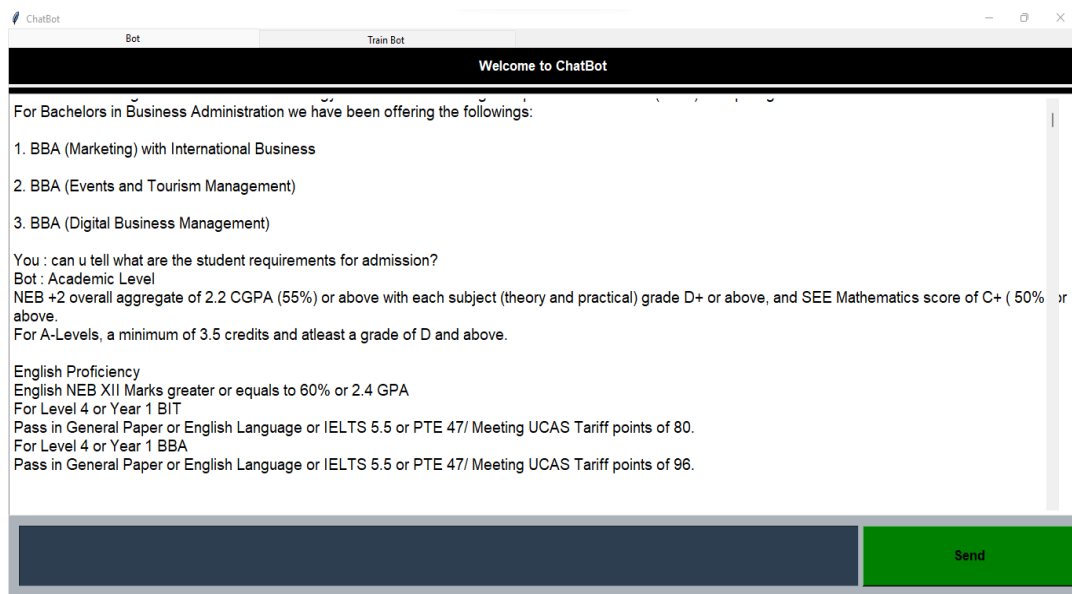


Fig 4. Chatbot gui

```
Epoch 198/200
12/12 [=====] - 0s 1ms/step - loss: 0.1647 - accuracy: 0.9310
Epoch 199/200
12/12 [=====] - 0s 1ms/step - loss: 0.1789 - accuracy: 0.9483
Epoch 200/200
12/12 [=====] - 0s 1ms/step - loss: 0.2034 - accuracy: 0.9483

C:\Users\Public\Python37\chatbot-code>python testing.py
2022-11-22 19:38:45.252780: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'cudart64_110.dll'; dLError: cudart64_110.dll not found
2022-11-22 19:38:45.252912: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.

C:\Users\Public\Python37\chatbot-code>python chatbot_gui.py
2022-11-22 19:39:06.876242: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'cudart64_110.dll'; dLError: cudart64_110.dll not found
2022-11-22 19:39:06.876344: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.
[nltk_data] Downloading package punkt to
[nltk_data]   C:\Users\aleky\AppData\Roaming\nltk_data...
[nltk_data]   Package punkt is already up-to-date!
[nltk_data] Downloading package wordnet to
[nltk_data]   C:\Users\aleky\AppData\Roaming\nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
C:\Users\aleky\AppData\Roaming\Python\Python370\site-packages\chicago\feature_extraction\tfidf.py:51: UserWarning: The parameter 'token_pattern' will not be used since
```

Fig 5. Accuracy

## 5. CONCLUSION

In this project, we have built a chatbot that is able to interact with users. The purpose of chatbot is to simulate a human conversation. This chatbot aims to solve the queries of students. Chatbot makes one to one conversation easier and faster. Thus the chatbot will be used to identify answers related to user submitted questions. This chatbot is helpful in guiding students with correct source of information easily. We got an Accuracy of 94% and we have visually represented the output.

In future, the rapid developments in NLP can build more powerful human-like chatbots in the near future. We can include voice-based queries. The users will have to give voice input and the system will give text output. Also, the chatbot is successfully executed in a college domain, so we can implement it in other domains like medical, sports, etc. All domains will benefit from this because we can quickly access the necessary information without spending a lot of time on it.

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