UCEN BOT

# A PROJECT REPORT

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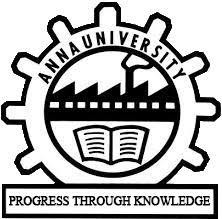
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**BONAFIDE CERTIFICATE**

Certified that this project report **“UCEN BOT”** is a bonafide work of **“Affin. S. Selvan(962818104008), Alghubs. R. K(962818104013), Antony Vijaya Adshai. J(962818104020), Eric Wilfer. J(962818104031)”** who carried out the project work under my supervision.

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**ABSTRACT**

In this modern world, people always go for the easiest and the fastest way to attain anything. The Chatbot for UCEN college is to retrieve information faster. In this

project, the detailed development and implementation of the personal assistant namely, UCEN Bot. Instead of typing in queries to attain information, the user can just speak to the UCEN bot to get information instantly. It is a website where the user can chat with the bot to get information regarding the UCEN canteen, placement cell, staffs room location, sports, students stationery store(SSS). The chatbot provides the details of the price of the accessories, canteen information like price of the food, timing of what food to be distributed , it contains all the links for the placement drive, details to be known about the placement drive. This Chatbot responds to users with its unique AI and machine learning capability. The working process of this chatbot is to listen to the user's queries. After it takes (input) from the user and it has to give the precise answer(output). For that part, it searches for an appropriate response from an algorithm to get accurate response or result. This chatbot is created using python programming language and makes use of built-in python libraries like TensorFlow, NLTK for neural language & text processing. By the usage of Artificial Intelligence and Deep Learning, this application is highly efficient in responding.

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# LIST OF ABBREVIATIONS

DDPG Deep Deterministic Policy

DQN Deep Q-Network

MDP Markov Decision Process

NS-2 Network Simulator

**CHAPTER 1**

**INTRODUCTION**

* 1. **OVERVIEW OF CHATBOT**

A chatbot is a type of software that can help customers by automating conversations and interact with them through messaging platforms. Designed to convincingly simulate the way a human would behave as a conversational partner, chatbot systems typically require continuous tuning and testing, and many in production remain unable to adequately converse, while none of them can pass the standard Turning Test.

The term "ChatterBot" was originally coined by Michael Mauldin (creator of the first Verbot) in 1994 to describe these conversational programs.

Chatbots are used in dialog systems for various purposes including customer service, request routing, or information gathering. While some chatbot applications use extensive word-classification processes, natural language processors, and sophisticated AI, others simply scan for general keywords and generate responses using common phrases obtained from an associated library or database.

Most chatbots are accessed on-line via website popups or through virtual assistants. They can be classified into usage categories that include: commerce (e-commerce via chat), education, entertainment, finance, health, news, and productivity.

* 1. **AS PART OF COMPANY APPS AND WEBSITES**

Previous generations of chatbots were present on company websites, e.g. Ask Jenn from Alaska Airlines which debuted in 2008or Expedia's virtual customer service agent which launched in 2011. The newer generation of chatbots includes IBM Watson-powered "Rocky", introduced in February 2017 by the New York City-based e-commerce company Rare Carat to provide information to prospective diamond buyers.

* 1. **CUSTOMER SERVICE**

Many high-tech banking organizations are looking to integrate automated AI-based solutions such as chatbots into their customer service in order to provide faster and cheaper assistance to their clients who are becoming increasingly comfortable with technology. In particular, chatbots can efficiently conduct a dialogue, usually replacing other communication tools such as email, phone, or SMS. In banking, their major application is related to quick customer service answering common requests, as well as transactional support.

Several studies report significant reduction in the cost of customer services, expected to lead to billions of dollars of economic savings in the next ten years. In 2019, Gartner predicted that by 2021, 15% of all customer service interactions globally will be handled completely by AI. A study by Juniper Research in 2019 estimates retail sales resulting from chatbot-based interactions will reach $112 billion by 2023.

Since 2016, when Facebook allowed businesses to deliver automated customer support, e-commerce guidance, content, and interactive experiences through chatbots, a large variety of chatbots were developed for the Facebook Messenger platform.

In 2016, Russia-based Tochka Bank launched the world's first Facebook bot for a range of financial services, including a possibility of making payments.

In July 2016, Barclays Africa also launched a Facebook chatbot, making it the first bank to do so in Africa.

The France's third-largest bank by total assetsSociété Générale launched their chatbot called SoBot in March 2018. While 80% of users of the SoBot expressed their satisfaction after having tested it, Société Générale deputy director Bertrand Cozzarolo stated that it will never replace the expertise provided by a human advisor.

The advantages of using chatbots for customer interactions in banking include cost reduction, financial advice, and 24/7 support.

* 1. **MALICIOUS USE**

Malicious chatbots are frequently used to fill chat rooms with spam and advertisements, by mimicking human behavior and conversations or to entice people into revealing personal information, such as bank account numbers. They were commonly found on Yahoo! Messenger, Windows Live Messenger, AOL Instant Messenger and other instant messaging protocols. There has also been a published report of a chatbot used in a fake personal ad on a dating service's website.

Tay, an AI chatbot that learns from previous interaction, caused major controversy due to it being targeted by internet trolls on Twitter. The bot was exploited, and after 16 hours began to send extremely offensive Tweets to users. This suggests that although the bot learned effectively from experience, adequate protection was not put in place to prevent misuse.

If a text-sending algorithm can pass itself off as a human instead of a chatbot, its message would be more credible. Therefore, human-seeming chatbots with well-crafted online identities could start scattering fake news that seems plausible, for instance making false claims during a presidential election. With enough chatbots, it might be even possible to achieve artificial social proof.

* 1. **TYPES OF CHATBOTS**
* Menu/button-bases chatbots

Menu/button-based chatbots are the most basic type of chatbots currently implemented in the market today. In most cases, these chatbots are glorified decision tree hierarchies presented to the user in the form of buttons. Similar to the automated phone menus we all interact with on almost a daily basis, these chatbots require the user to make several selections to dig deeper towards the ultimate answer.

While these chatbots are sufficient for answering FAQs that makeup 80% of support queries; they fall short in more advanced scenarios in which there are too many variables or too much knowledge at play to predict how users should get to specific answers with confidence. It’s also worth noting that menu/button-based chatbots are the slowest in terms of getting the user to their desired value.

* Linguistic Based (Rule-Based Chatbots)

If you can predict the types of questions your customers may ask, a linguistic chatbot might be the solution for you. Linguistic or rules-based chatbots create conversational flows using if/then logic. First, you have to define the language conditions of your chatbots. Conditions can be created to assess the words, the order of the words, synonyms, and more. If the incoming query matches the conditions defined by your chatbot, your customers can receive the appropriate help in no time.

However, it’s your job to ensure that each permutation and combination of each question is defined, otherwise, the chatbot will not understand your customer’s input. This is why a linguistic model, while incredibly common, can be slow to develop. These chatbots demand rigidity and specificity.

* Keyword recognition-based chatbots

Unlike menu-based chatbots, keyword recognition-based chatbots can listen to what users type and respond appropriately. These chatbots utilize customizable keywords and an AI application - Natural Language Processing (NLP) to determine how to serve an appropriate response to the user.

These types of chatbots fall short when they have to answer a lot of similar questions. The NLP chatbots will start to slip when there are keyword redundancies between several related questions.

It is quite popular to see chatbots that are a hybrid of keyword recognition-based and menu/button-based. These chatbots provide users with the choice to try to ask their questions directly or use the chatbot’s menu buttons if the keyword recognition functionality is yielding poor results or the user requires some guidance to find their answer.

* Machine Learning chatbots

Ever wondered what is a contextual chatbot? A contextual chatbot is far more advanced than the three bots discussed previously. These types of chatbots utilize Machine Learning(ML) and Artificial Intelligence (AI) to remember conversations with specific users to learn and grow over time. Unlike keyword recognition-based bots, chatbots that have contextual awareness are smart enough to self-improve based on what users are asking for and how they are asking it.

For example, a contextual chatbot that allows users to order food; the chatbot will store the data from each conversation and learn what the user likes to order. The result is that eventually when a user chats with this chatbot, it will remember their most common order, their delivery address, and their payment information and merely ask if they’d like to repeat this order. Instead of having to respond to several questions the user just has to answer with ‘Yes’ and the food is ready!

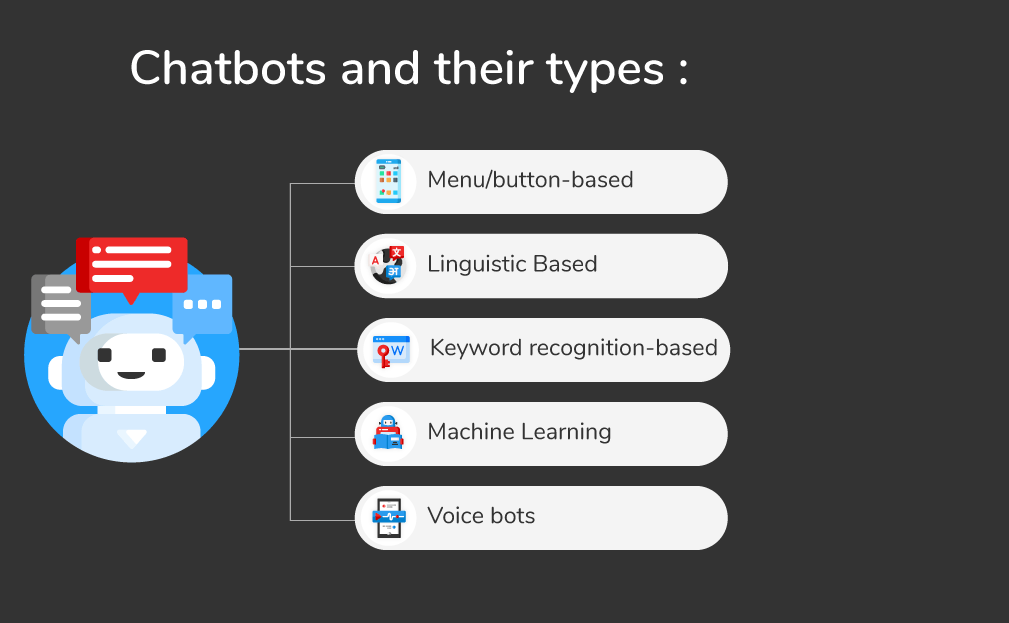
While this food ordering example is elementary, it is easy to see just how powerful conversation context can be when harnessed with AI and ML. The ultimate goal of any chatbot should be to provide an improved user experience over the alternative of the status quo. Leveraging conversation context is one of the best ways to shorten processes like these via a chatbot.

* The hybrid model

Businesses love the sophistication of AI-chatbots, but don’t always have the talents or the large volumes of data to support them. So, they opt for the hybrid model. The hybrid chatbot model offers the best of both worlds- the simplicity of the rules-based chatbots, with the complexity of the AI-bots.

* Voice bots

To make conversational interfaces even more vernacular, businesses are now beginning to use voice-based chatbots or voice bots. Voice bots have been on the rise for the last couple of years, with virtual assistants like Apple’s Siri, to Amazon’s Alexa, and why? Because of the convenience they bring. It’s much easier for a customer to speak rather than type. A voice-activated chatbot brings frictionless experiences directly to the end customer.

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**OBJECTIVE**

To Create to highly accurate chatbot which will give most of the details about the University College of Engineering Nagercoil. The chat is able to understand the user queries and respond appropriately while reducing the need for human interaction.

# SCOPE

* To save valuable time of the students.
* To provide assessing information, anywhere anytime.
* To provide information faster.

# ORGANIZATION OF THE REPORT

The report consists of 6 chapters. They are:

Chapter 1 – Introduction, deals with the overview and scope of the project .

Chapter 2 – Literature Review, discusses various related works

Chapter 3 – An Improved and Power Efficient Vehicle Tracking in Wireless Sensor Networks, provides a clear description of the existing methods and proposes system and its principle of operation

Chapter 4 –System Description, Gives the software details which are used in this project and their interfacing methodology

Chapter 5 – Result and discussions, provides the simulation results

Chapter 6 – Conclusion and Future work, concluding the project and mentioning possible future works

**CHAPTER 2**

**LITEATURE REVIEW**

**2.1 LITERATURE SURVEY**

Literature survey is the most important step in software development process. Before developing the tool it is necessary to understand the tools and external support needed for the system.

**S. P. Reddy Karri and B. Santhosh Kumar, "Deep Learning Techniques for Implementation of Chatbots," *2020 International Conference on Computer Communication and Informatics (ICCCI)*, 2020, pp. 1-5, IEEE, 2020.**

Chatbots are software programs that interact with clients using natural languages. The motto of the researchers was to know if chatbots can able to fool the clients that they were real humans. To develop a chatbot that can pass the Turing test, plenty of effort done with the introduction of the ELIZA chatbot in the year 1966. Various approaches for the development of chatbots and different technologies in the creation of chatbots developed because of those efforts. NLTK is a module in python which can able to perform Natural Language Processing. It is used to analyse the input in the form of speech and generate responses that are similar to humans. Nowadays there is a lot of demand for virtual assistants such as Siri, Cortana, Google Assistant and Alexa, and speech-based search engines. Nowadays Chatbots are gaining massive demand mainly in the business sector for automating client service and also for reducing efforts of humans. Chatbots typically used for information acquisition in dialogue systems. To perfectly imitate a human response, a chatbot should examine the query asked by a client correctly and design an appropriate response. In this study we compare and discuss the different technologies used in the chatbots and also address the design and implementation of a chatbot system.

**P. Anki, A. Bustamam, H. S. Al-Ash and D. Sarwinda, "High Accuracy Conversational AI Chatbot Using Deep Recurrent Neural Networks Based on BiLSTM Model," *2020 3rd International Conference on Information and Communications Technology (ICOIACT)*, 2020, pp. 382-387, IEEE, 2020.**

In the modern world, chatbot programs are implementations that can be used to store data collected through a question and answer system and then can be applied in the Python program to optimize the results based on highly rated questions asked in a service center. The application of chatbots in the Python program can use various models. Specifically in this program, the BiLSTM model will be applied. The output produced from the chatbot program with the application of the BiLSTM model is in the form of accuracy and alsos data set that matches the information the program user enters in the chatbot's input dialog box. The selection of models that can be applied to the program is based on data which can affect program performance, with the objective of the program which can determine the high or low level of accuracy that will be generated from the results obtained through a program, which can be a major factor in deciding the selected model. Based on the various considerations that are the requirements for choosing a model of a program, in the end the BiLSTM model is selected will be applied to the program. In addition to model selection, the next step is to determine the method used in the program, in this program the greedy method is a form of implementation of the BiLSTM model with the aim that when running the program, data processing time can be faster, and increase the value of the model selected in program. In addition, supporting attributes such as the seq2seq model are a determining factor in a program that can function to verify whether data processing matches the criteria that can be used as new in data processing. In addition, a program evaluation method is needed that can be used to verify whether the program output matches the data expected by the user. Based on the application of the BiLSTM model into the chatbot, it can be concluded that with all program test results consisting of a variety of different parameter pairs, it is stated that Parameter Pair 1 (size-layer 512, num-layers 2, embedded-size 256, learning-rate 0.001, batch-size 32, epoch 20) from File 3 is the BiLSTM Chatbot with the avg accuracy value of 0.995217 which uses the BiLSTM model is the best parameter pair.

**A. Ramaditiya, S. Rahmatia, A. Munawar and O. N. Samijayani, "Implementation Chatbot Whatsapp using Python Programming for Broadcast and Reply Message Automatically," *2021 International Symposium on Electronics and Smart Devices (ISESD)*, 2021, pp. 1-4, IEEE, 2021.**

The use of VPS (Virtual Private Server) in Indonesia is still very expensive. The Chatbot application system is very important in the marketing field, especially for disseminating information directly and acceptable to many users at a time. This paper focused on using the WhatsApp application for the Chatbot system. This Chatbot system uses the Python programming language. The message Chatbot flow system will be sent first to the user. Then the Python program will read the incoming message to enter Chatbot. If the incoming message matches the existing conditions, the chatbot will send the information according to the condition. But if it doesn't match, Chatbot will continue to repeat the process of reading incoming messages. The Chatbot system is designed to run successfully on 15 contacts at a time. Chatbot server connection speed affects the speed of sending messages and checking every incoming message. Chatbot simulation program cannot read messages that enter the server if the message contains stickers, emojis and gifs. This is because Python program cannot read the message. This research can still be developed by adding a random message feature.

**M. Dharani, J. V. S. L. Jyostna, E. Sucharitha, R. Likitha and S. Manne, "Interactive Transport Enquiry with AI Chatbot," *2020 4th International Conference on Intelligent Computing and Control Systems (ICICCS)*, 2020, pp. 1271-1276, IEEE, 2020..**

Public transportation is used efficiently by millions of people all over the world. People tend to travel to different places and at certain times they may feel completely lost in a new place. Our chatbot comes to rescue at this time. A Chatbot is often described as one of the most promising tools for communication between humans and machines using artificial intelligence. It is a software application that is used to conduct an online chat conversation via text by using natural language processing (NLP) and deep learning techniques. It provides direct contact with a live human agent in the form of GUI. This AI chatbot confirms the current location and the final destination of the user by asking a few questions. It examines the user’s query and extracts the appropriate entries from the database. The deep learning techniques that are used in this chatbot are responsible for understanding the user intents accurately to avoid any misconceptions. Once the user’s intention has been recognized, the chatbot provides the most relevant response for the user’s query request. Then the user gets all the information about the bus names along with their numbers so that the person can travel safely to the desired location. Our chatbot is implemented in python's Keras library and used Tkinter for GUI.

**B. Kohli, T. Choudhury, S. Sharma and P. Kumar, "A Platform for Human-Chatbot Interaction Using Python," *2018 Second International Conference on Green Computing and Internet of Things (ICGCIoT)*, 2018, pp. 439-444 IEEE, 2018.**

Over recent years, we've seen various customs for conversational agents. Chatbot is a conventional agent which is capable to communicate with operators by using natural languages. As numerous chatbot platforms already exist, there are still some problems in building data-driven system because a huge amount of data is required for its development. Thus, this paper describes various such agents which depend upon natural expressions implemented in Python. Moreover, to provide a better platform, web connectivity is also provided to evaluate the chatbot on a web-based platform which will help in analysing Human-Chatbot interactions.

**S. Hu and C. Qu, "Design and Implementation of a Chatbot System Integrated with Facial Expression Recognition," *2021 International Conference on Intelligent Computing, Automation and Applications (ICAA)*, 2021, pp. 468-473, IEEE, 2021.**

Different from those who desires to talk, those “empty-nest youth” who do not take the initiative to talk about their emotions still want someone to be with them, and interacting with them, give them some care, although they cannot talk about their emotions. In order to pay attention to the mental health status of this group of people and meet their inner demands, this paper first uses facial expression recognition technology to analyze users' emotions in real time. Then employs chatbot technology to intervene the user's mood through automated responses. In the process of realizing the chatbot function, MongoDB is introduced to store the sayings of chatbots with different emotions, and seven chatbots with different emotions are divided. In addition, MongoDB is used to store the scores of users' emotions, which can achieve the function of recording users' emotions. Finally, Django framework is used to realize the page of the web side, which can call all the functions of the system and achieve the effect of different interventions according to the user's emotions.

**E. Kasthuri and S. Balaji, "A Chatbot for Changing Lifestyle in Education," *2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV)*, 2021, pp. 1317-1322.**

In this pandemic situation, all are learning education online. There is a lot of drawbacks to these methods, the main drawback of this system is the interaction between students and teachers become low. A chatbot is one of the most convenient ways of studying for students and it also rectifies student doubts at any time without human support. This paper aims to approach a typical way to design a chatbot for MATLAB practical dataset. Students can ask a question in the chatbot in the form of text then, the question is processed with natural language processing and deep learning technology. Finally, the chatbot can answer the students with exact answers. So this kind of chatbot is useful for both the students and teachers.

**V. Gupta, A. Sood and T. Singh, "Disease Detection Using RASA Chatbot," 2022 International Mobile and Embedded Technology Conference (MECON), 2022, pp. 94-100.**

Chatbots, or conversational AI(Artificial Intelligence) Interfaces, provide individuals a new way to interact with computer systems. Chatbots allow users to have conversations with the system by asking questions in the way that they would with another human beings. The current adoption rate of chatbots on computer chat platforms is very high. Such robots use artificial intelligence to understand human input and respond accordingly. The core technology for the rise of chatbots is “Natural language processing” (NLP). The recent advancements in NLP have allowed chatbots to be more receptive than ever. Today, humans can interact with the chatbot systems anytime, anywhere. Chatbots can perform predictive tasks (especially in the medical field), which is now possible with advances in artificial intelligence and data mining technology. Healthcare, agriculture and education are important areas that need the most attention. In today’s world, with the change in lifestyle and the current pandemic, illnesses have increased in the general population. As a result, the need for hospitals and doctors have increased substantially. Patients have to spend their time waiting to be taken care of by the doctors. Also, doctors have an immense amount of workload with the amount of visits they have. Thus, the future of healthcare depends on the ability of care providers to perform accurate remote diagnosis. This can be done by collecting data remotely, and by using artificial intelligence to analyse data to improve business and health outcomes. In this paper we analysed datasets to accurately detect diseases with classification techniques such as SVM Classifier and Naïve Bayes Classifier.The tools used are RASA, machine learning classification algorithms, data extraction etc.

**S. K. S, L. M. R, S. p. C, S. S. P, J. J. Paul and T. Bella Mary I, "Chatbot - Attendance and Location Guidance system (ALGs)," 2021 3rd International Conference on Signal Processing and Communication (ICPSC), 2021, pp. 718-722.**

Well, Timely prediction and decision making are most indispensable in this modern era of internet of things (IoT). In this paper we propose a prototype of a CHATBOT for attendance and location guidance system (ALGs) using a raspberry pi-based computer. The proposed prototype autonomously marks attendance for the registered/known students and a guidance system for unknown students/parents in a school or university. The CHATBOT includes a webcam with Haar-Cascade classifier using OpenCV machine learning cross platform library for face recognition and a Google API for speech recognition. This speech recognition API converts the voice from the microphone into written text (speech into text) and vice versa. The prototype also includes an additional switch module, preferably when the user's microphone fails or unable to detect the user's input voice. The switch module comes with a set of 6 push button switches with predefined questions for each switch. The prototype is tested and provides good results for all the different use cases.

**S. -H. Lin, R. -S. Run and J. -Y. Yan, "Chatbot Application in Laboratory Equipment Management and e-assistant," 2020 International Symposium on Computer, Consumer and Control (IS3C), 2020, pp. 39-42.**

For most of school employee usually meet a difficult task about manage a lot of equipment. For instance, recording their status, malfunction and repair history. The purpose of this study was to design a small chatbot system to help these people works easily. Due to technological advances in communication and Artificial Intelligence, user not only can access the chatbot service in everywhere but for Natural Language Understanding helps, chatbot can handle complex requests through simple natural language in Chinese. Compare with the traditional management approach, that was full of paper work and reaction against with malfunction condition inefficient, Database can help to collect and track their status. By review the older equipment records, researchers found those cause of the malfunction and repair steps for those same type of equipment were similarly. It also can be found by analyzed the database of this system. Hence, the system not only shows and records the equipment usages status but also provides a quickly and flexible troubleshooting according to analyzed their malfunction and repair history. We also planned to open source this system's architecture to help those people who needs to process the objects status such as books in Library, the equipment status and products quality in manufactory processing.

# 2.2 SUMMARY

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# 

Many kind of chatbots are developed for various fields to make works easier. Nowadays Chatbots are gaining massive demand mainly in the business sector for automating client service and also for reducing efforts of humans. Chatbots typically used for information acquisition in dialogue systems. The application of chatbots in the Python program can use various models. Every Model has its own ups and downs. Some Models like BiLSTM model has double LSTM cells which is so costly and also its is not good for speech recognition. Some chatbot models does not have speech recognition model so users are only forced to type on the keyboard to communicate with the chatbot. since some models doesn't have speech recognition the interaction rate becomes comparatively slower than the one with speech recognition. Also model needs to respond with natural speech language to respond with the user. Users need to change the chatbot voice for their own preference either it is male or female.