Chatbot in E-learning

Saqib Hussain[1], Safa Hamood Al-Hashmi[1], Mazhar Hussain Malik[2], Syed Imran Ali Kazmi[3]
[1]*Global College of Engineering and Technology, Muscat, Sultanate of Oman*
[2]*Department of Computer Science and Creative Technologies, University of West of the England Bristol*
[3]*Department of Computing, Middle East College, Muscat, Oman*
[s.hussain@gcet.edu.om, 201511127@gcet.edu.om, mazhar.malik@uwe.ac.uk, skazmi@mec.edu.om]

Abstract
In many modern apps, especially those that provide the user intelligence help, the usage of chatbots is quite common. In reality, these systems frequently have chatbots that can read user inquiries and give the appropriate replies quickly and accurately in order to speed up the support. This article describes the creation of a Chatbot prototype for the educational sector. A system for offering assistance to university students in certain courses has been established. The first goal was on the creation of the particular architecture, model to handle communication, and supply the learner with the correct answers. A system that can recognize questions and provide answers to students by utilizing natural language processing methods has been developed to achieve this goal. After the developed model was put into use, an experimental campaign was run to show how effective and enforceable it was.

Keywords: Chatbot, Artificial Intelligence, Natural Language Processing, JAVA, SQL, Database.

1. Introduction

Artificial intelligence (AI) has become a reality that not only shares our daily lives but also changes the world around us, as most areas related to our business, health or entertainment become dependent on it. AI is less about being bound to a specific structure or purpose and more about the capacity to think quickly and analyze facts. Although AI conjures up ideas of highly effective robots that resemble humans and rule the world, it is not meant to take the place of people. It seeks to significantly increase human potential and contributions and becomes a significant asset for the company as a result. The degree of safety in automobiles has grown as a result of artificial intelligence helping smartphones that provide us the information we need at an improbable pace while lowering the likelihood of human mistake. Chatbot is used in so many things in the world such as Apple started this path with Siri Voice Assistant which focused on giving users daily routine information through conversation, such as weather, maps, and calendar. Then come Google, which focused on voice search through its engine. Then the innovations continued until we got to the development of Chatbot in smart chats.

There are different ways to make the chatbot in E-learning to help user in any target area or domain. We have chosen one way of that such as chatbot in E-learning used Artificial intelligence to analyses user question then the application will response the user directly with correct answer. Natural Language Processing (NLP) which is one type of artificial intelligence. Which provides the ability of a computer program to understand human language as it is spoken. Based on the literature review, it is quite clear that there is significant need to design a customize application which should be able to manage bank of information e.g., questions bank for a particular field and then using intelligent way to handle and manage it starting from the capturing the information till intelligently answering user queries using Artificial Intelligence (AI).

When we search for a specific thing, it takes us a lot of time and effort until we find what we want, and sometimes we do not get the answer at all, so it becomes tried to us. Many students face this problem as they cannot solve their projects and duties as required in a short time and it requires them effort and a lot of time searching in the Google browser and others. Also, sometimes their research extends for more than the time required completing it due to lack of knowledge of its solution, and there is no clear, easy-to-use and helpful way for the student to solve assignments and reports.

The aim of this study is to facilitate the search for questions related to the query in the database, so that the application will answer the user automatically and give the appropriate answer. The key objective of E-learning Chatbot will be to enhance e-learning facilities to provide effective and efficient results based on inputs. The users will be able to sign-in into application and get access to e-learning material and application will be able to handle some the queries which can consist of some issue which they are facing such as explanation of particular term of computing etc. and respond efficient.
The contribution of this paper is twofold: (1) Design and implement E-Learning Chatbot; (2) Enhancing e-learning facilities effectively and efficiently based on user inputs.

After the abstract, the paper should be organized as follows: Section (1) should provide the background, context, and aim of the study; Section (2) on the review of the literature; Section (3) should detail the methodology

adopted; Section (4) should present the design and implementation; and Section (5) presents the conclusion.

2. Literature Review

Today, the development of artificial intelligence has become widespread, and chat bot is only one aspect of this tremendous development. So a Chatbot, popularly known as a conversational agent, is a typical computer program designed to mimic an intelligent discussion with one or more users (humans) using voice or text and consumers have increased interest in it because of the advantages it provides to them that facilitate their lives as a study was made in the Fourth International Conference on Internet Sciences in November 2017 to find out the reasons people choose to interact with the chatbot. The results have shown a set of key factors that motivate people to use them such as namely productivity where Chatbots provides assistance or access to information quickly and efficiently and a means of entertainment where Chatbot is considered an entertainment tool, it helps them spend time when users have nothing to do Factors, so that is some of results about using chatbot as many developers have studied many theories to come out for implementing different concepts in artificial intelligence.

(Comendador et al., 2015) developed a type of chat bot and it was the title as "Pharmabot: A Paediatric Generic Medicine Consultant Chatbot". It is a conversational chatbot that can recommend, prescribe, and provide details on generic medications for kids. Therefore, the study presents a computer program that serves as a medicine adviser for patients or parents who are uncertain about generic medications. The system is developed using Visual C# as its frontend and MS Access as its back end and works as a standalone system.

(Hettige & Karunananda, 2015) a study which title as "Octopus: A Multi Agent Chatbot". To manage its intelligent capabilities, it comprises of 8 sub multi-agent systems, including the core system, GUI system, Natural Language Processing system, communication system, learning system, action system, searching system, and data access system. Java has been used to implement Octopus. In addition to the multi agent systems (MAS) technology is a contemporary software technology that may be utilized to handle complexity; these systems have some built-in properties such as autonomy, proactivity, and social ability. These qualities make it simple to improve the chatbot systems' intelligence. However, creating chatbot systems using multi agent technology is a cutting-edge method for the field of natural language processing.

(Dahiya, 2017) a new project chatbot which is developed by M Dahiya which is title "A Tool of Conversation: Chatbot". This Chatbot can be used for the entertainment purpose. The bot may be used as amusement whenever a person is bored. A chatbot has a very basic design and If the user's inquiry is addressed in the database, it just responds to it. The text-only chatbot is the foundation of this project. A chatbot may acquire information, identify human input using pattern matching, and offer a pre-set acknowledgment. Assuming the user asks the bot, "What is your name?" for instance. The most likely response from the chatbot is "My name is Chatbot." Or, depending on the user's statement, the chatbot responds, "You can call me Chatbot.". Java was used to develop this dialog window.

(Winkler, 2019) developed a chatbot titled “Conception and Realization of a Chatbot-System to support Psychological and Medical Procedures”. In order to provide solutions for the psychological and medical sectors, the project thesis's goal is to develop a system concept comprising a conversational agent, a mobile application, and a back-end application. This implies that the chatbot must be able to react to urgent circumstances like medical emergency. However, the system is unable to handle life-threatening circumstances, thus aid from humanitarian assistance is constantly required. Therefore, the concept also includes human participants such as experts.

(Haristiani, 2019) developed a chatbot titled “Artificial Intelligence (AI) Chatbot as Language Learning Medium: An inquiry”. The need for education to advance quickly in order to keep up with these changes was influenced by the industrial revolution, which eventually gave rise to the word education. The goal of this study is to identify and analyse the different forms of chatbot artificial intelligence and the potential applications for using them as language learning tools. This study also attempts to monitor a chatbot designed for learning Japanese. The user's message triggers the chatbot's fundamental workings. The message then processed by NLP (Natural Language Processing) and chatbot responded by replying to the message according to the existing database. Gengobot is a chatbot-based dictionary application about multi-language grammar developed by the author, using CodeIgniter (CI) framework. CI is a PHP framework that can be used to develop PHPbased. Gengobot's development is primarily focused on giving beginning Japanese language learners a tool for studying grammar. Gengobot uses MySQL as its database system.

(Rana, 2019) developed a chatbot titled “EagleBot: A Chatbot Based Multi-Tier Question Answering System for Retrieving Answers From Heterogeneous Sources Using BERT”. The goal of this project is to design a multi-tier system that uses three different forms of data storage to address Question Answering on a particular topic. How to respond to the enormous number of queries from students in a quick and effective way is one of the major issues at any university or institution. As a result, this project will assist the student at Georgia Southern Campus (GSU) in responding to the various inquiries that visitors to the university frequently pose. To find similarities

between the user's query and the anticipated response, they tested a number of sentence similarity finding models using Dialogflow's Natural Language Understanding (NLU) toolkit.

Therefore, all chat bots have been developed by some programmers in different ways and by using different programs and languages. It was found that it is similar to the idea that we are trying to develop and this is to be used specifically for education purpose in Higher Education Institution (HEI).

3. Methodology

At the present time many people seek to find the right solution in a short time in any area of life and most of all, the students who study in colleges and universities need a solution to their questions that they want in a short time and through their studies in the specialty of software engineering. Chatbot works automatically through artificial intelligence, which will understand the question of learners and then analyses the question by matching it to the questions that you trained the chat bot on beforehand. this chat is for special questions related to database. So, it would be great idea to have one application to solve database related queries.
The "chatbot in e-learning" is implemented using the waterfall model for the System Development Life Cycle (SDLC) as a methodology for this study. This methodology is chosen because this model provides a structured approach through separate phases that are easy to understand and explain. In order to design a system in a linear and sequential manner, the waterfall model has traditionally been utilized. Because the model progresses methodically from one phase to the next in a downward direction, it is known as a waterfall model. As illustrated in Figure 1., this model is separated into several stages, with the output of one phase serving as the input for the subsequent phase. There is no overlap between stages; each must be finished before the next one begins. The planning, analysis, design, implementation, and testing phases make up the waterfall model.

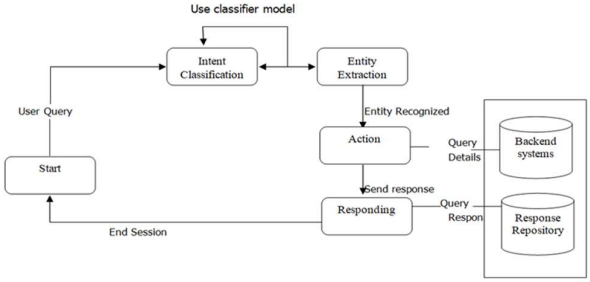

Figure 1. Chatbot in e-learning methodology

When the user send query to the application then the application will understand intent classification of user query then will entity extraction of this query that means the AI will know what the user query need. Therefore, the AI will send this entity to the server. Then, the action step the AI will match that question with the questions which I have saved it in database before. Then the application will send this detail question to backend system then will find the response for user query. Last step, the artificial intelligence will responses for specific query for user so this step is the end session of chatbot.

4. Design and Implementation

To development the application, we have used android studio program to written codes, for Java, I used SQLite to store the database which is going to be used for the application. Also, I have used QSEE Superlite program to drown the UML diagrams and all those about how system in application worked such as use case, sequence diagram along with the application implementation.

4.1 Design

This application will use by all personal who can access it by downloading the application into their devices. Chatbot in e-learning app designed to help each one to find some result about database query. As shown in Figure 3. This diagram is about the operations of user and how user will use this application. On other hand how the application will react with users to answer question.

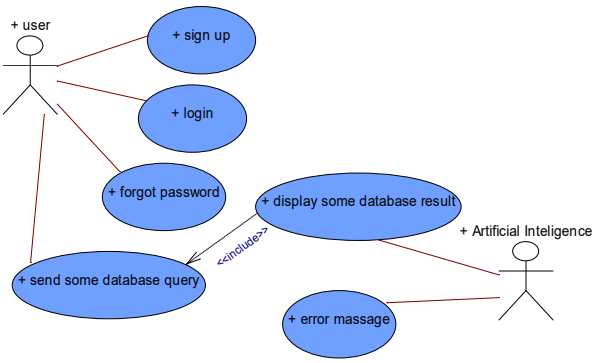

Figure 2. Use Case Diagram

All applications have main functions to run it. So in this chart have the functions for chatbot in e-learning application, and they will run this app during the below sequence chart. Figure 3. is showing what users will be able to do once he opens the application.

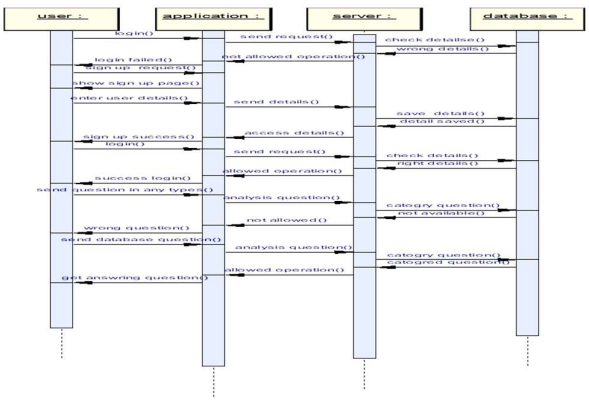

Figure 3. Use Case Diagram

4.2 Implementation

In any application we see the welcome page so in my application we have designed a splash page will appear every time you open the application for a few seconds as an introduction to the application which is have main information such as application title and developer name with University of West England (UWE) ID as shown in Figure 4.

Figure 4. Splash Interface

The sign in page will appear directly after splash page. In login page we have three connections the first one is sign up uses it if the users are new they need to register in application because this app have security so cannot every one access in chat before signing up. So the users need to click on sign up button to register himself information. On the other hand, login has second connection which is the users is uses this application and register before they can access in application by entering username and password which are the same ones who entered it on the registration page. Then users can click on sign in button and will access to chat. Also, if the user manages wrong user name or password the application will show massage “username or password is not correct”. The third connection is forgot password as shown in Figure 5.

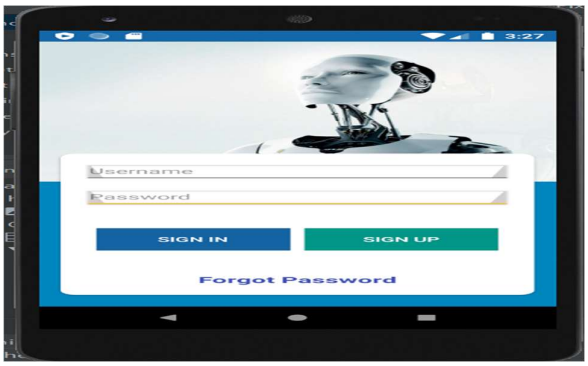

Figure 5. Sign in Interface

The is the first connection with login so needs to enter the user information in it such as username, mobile, email and password when the user manage himself information then can click on sign in button then the users will show massage “Successful”. Also, the users cannot have same user email in sign up because my app have secured therefore every user must have different information to keep their privacy in the application. So, if any user uses same email for other user then when the user clicks on sign in button the application will show massage "email is duplicate” as shown in Figure 6.

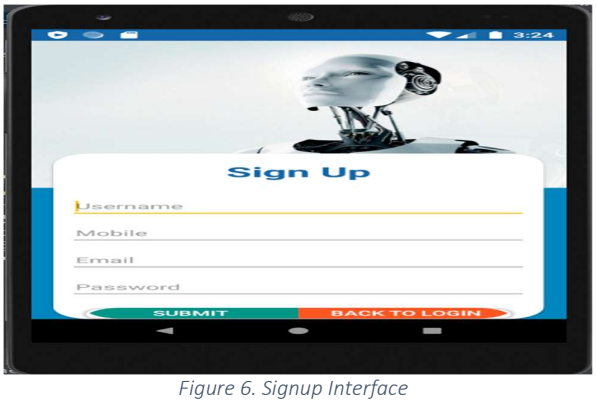

Figure 6. Signup Interface

Figure 7. page shows if any users forgot password can click on forgot password then the users will see this page. In this page user need to insert specially him email then the application will show users massage about the password.

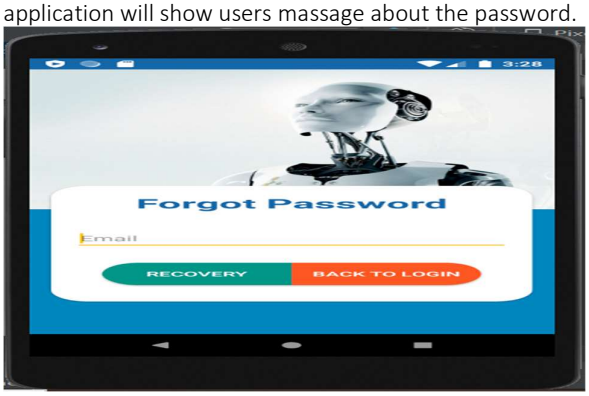

Figure 7. Forgot Password Interface

Figure 8. page is for massage where we used some attributes to do it like that the first things is list massage so that need when the user sends a massage and the AI will answer it so this page how the massage page will look like then I use text massage which will the user use it to write a text of question what he need to answer it also I use the button sent this button will click on it when finish write a massage.

Figure 8. Message Design

When the user signs into application will see the chat and can send any question his need. Also, if the user sends any

greeting in first time such as "hello "or any sentence same meaning of this word to application the AI will analysis the question then will matching this word in database with which category name same it then will give the answer for user which is "Hi dear friend, have a good. What questions do you have about me in the field of databases? ."Also, if send to AI the second greeting such as "how are you "or any sentence same meaning of it the application will response "Thank you, I'm fine; ."Also, if the user will send to AI any question does not belong to database or I'm not saved it in tables question when I'm designed database before so the application will response "Your question is incorrect or does not apply to my knowledge of your question. Please ask me about SQL and databases" as shown in Figure 9.

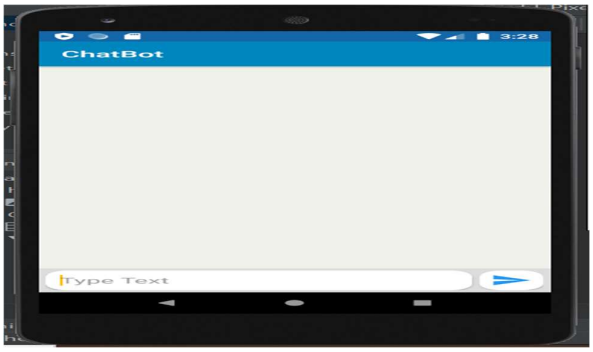

Figure 9. Chat with Chatbot

Figure 10. show about how the chat will appear to us when we use the application, and this means that the message that the application sent will be on the right and that the message is sent by the user on the left.

Figure 10. Chatbot chatting

5. Conclusion

At the moment, users may quickly enter their inquiry in natural language and obtain information using a chatbot, which is one of the easy methods to convey data from a computer without having to think of appropriate keywords to look up in a search or explore numerous web sites to collect information. So chatbot has become widely spread around the world. It is considered a helping hand because it provides assistance to society.

Application design is made to use and easy to access because the application was designed to cater students from database specialization. This paper describes the idea of chatbot in e-learning to help students in database specialization. This application will help to increase the motivation and enhance students learning at the same time in a fun way. This application will decrease the problems that new software students face while other IT experts will take less time to remember the queries. As a result, it will save time and effort.

Despite the various factors that can affect the success of a chatbot, its core competency is still the knowledge base. This is the most critical factor that a chatbot needs to have in order to improve its efficiency and respond correctly to users.
In addition to having a well-designed knowledge base, a chatbot also needs to have a variety of external sources to keep its users updated. This can be done through the use of forums, websites, and encyclopaedias. These sources can provide the chatbot with valuable and timely knowledge.

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