

Implementation of Chatbot That Teach Programming Language

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Abstract - Learning programming language through the old traditional method (books or web) is considered outdated and inefficient in 2018. How interesting it would be if the person learning can interact with the computer so that he/she can get all his/her doubts cleared. To solve this problem AI (Artificial Intelligence) comes to the rescue. In simple words AI makes a computer to think before it gives out an proper answer to the user query. In this paper we are going to create a chatbot using machine learning techniques and simulate learning of programming language. The chatbot will be an artificial character, featuring conversational agent can reply to the user in simple language about the query made on a particular programming language.

Keywords: Artificial Intelligence, machine learning, chatbot, conversational agent.

I. INTRODUCTION

With the rapid growth modern technology, automation of different things is being made exponentially. Artificial Intelligence play a vital role in development of smart gadget. By 2019, the market value of AI is expected to be double from now and will proceed to grow exponentially until it reaches 38.6 billion dollars in less than 8 years. A Survey shows that, 54.6 percent of consumers say they use AI. But, in the era of huge automation learning process is still in lag when it comes to teaching programming languages. We have seen many students, who try to memories all the codes line by line. But, we think that's not the proper way to learn a programming language. Programming have very depth concept which can only be learned in better way by an interactive session. We realized the black board teaching is not always fruitful and interactive and also the resources are not available to the student all the time. Therefore, they don't have instant access to the content. In the paper, we implemented a human-chatbot interaction system, which focuses on effective responses of users to teach different types of programming languages. This system helps a student to learn easily by having an interesting conversation with the bot. We believe this chat-bot will help slow learners to learn through an interactive session and will get the ultimate essence of programming languages. In our perception, understanding the user's side may be crucial for designing better chatbots in the future and, thus, can contribute to make it better for the field of human-bot interaction.

II. LITERATURE REVIEW

Salto Martinez Rodrigo in his paper "Development and Implementation of a Chat Bot in a Social Network" [1] used three method: - 1)Message reception,2)Message processing 3)3 Generation of a suitable reply. Helps to easily communicate in social media. No need a human to give reply for product queries over online. Receding from the general use ChatBots are given, a useful product can be obtained, on that allows the user to have a different experience without feeling plagued with useless and senseless in formation. Thus it will create a convenient environment for business organization to interact with customers over the social network.

Haller, Emanuela, and Traian Rebedea in 2013 19th International Conference on. IEEE, 2013 stated in their paper titled "Designing a chat-bot that simulates an historical figure" [2] that Their chatbot works as an alternative for students to learn facts about historical person. They designed a chatbot which simulates Adolf Hitler.

Mohammed Hijwai, Zuhai Bandar, Keeley Crockett, David Mclean in their paper titled "ArabChat: An Arabic Conversational Agent"[3] stated that he Pattern Matching approach is based on the matching process between a user's utterance and pre-scripted patterns that represents different topics organized through scripting structure.

Bhavika R. Ranoliya, Nidhi Raghuvanshi and Sanjay Singh in their paper, "Chatbot for University Related FAQs AIML AND LSA technology" [4] provides an efficient and accurate answer for any query based on the dataset of FAQs using Artificial Intelligence Markup Language (AIML) and Latent Semantic Analysis (LSA). Answers the frequently asked

questions. Welcome and other greeting messages are responded with the aiml and rest of the queries are handled by LSA

Hanjong CHOI, Takeshi HAMANAKA in their paper, provides an efficient and accurate answer for any query based on the dataset of FAQs using Artificial Intelligence Markup Language (AIML)[5] and Latent Semantic Analysis (LSA). Technology not mentioned users take a long time to understand each electric appliance. To solve this problem, we propose an interactive product instruction system using a chatbot. It saves the time of user by interactively giving instruction on how to use a particular electronic device

AM Rahman Abdullah Al Mamun, Alma Islam in their paper titled “Programming challenges of chatbot: Current and future prospective Describes the Challenges faced by Chatbot Technology”[6] stated, chatbot needs to provide vast logic and linguistic resources which are input, output and entities phrases. Chatbot with complex queries handling need high attention in using singular and plural forms, need to take care of synonyms, hyponyms, and finally, the sentimental analysis should be done carefully.

N T Thomas Amrita Vishwa Vidyapeetham University in their paper titled “An e-business chatbot using AIML and LSA”[7] stated that, AIML AND LS technology provides quick response to customer and also provide a sufficient time to customer service provider to give proper solution of problem improves the customer service

III. PROPOSED WORK

We have seen chatbot simulates historical figure to improving customer service all the way to teaching a new language. So how about chatbot teach a programming language. Here comes advance ProgBot.

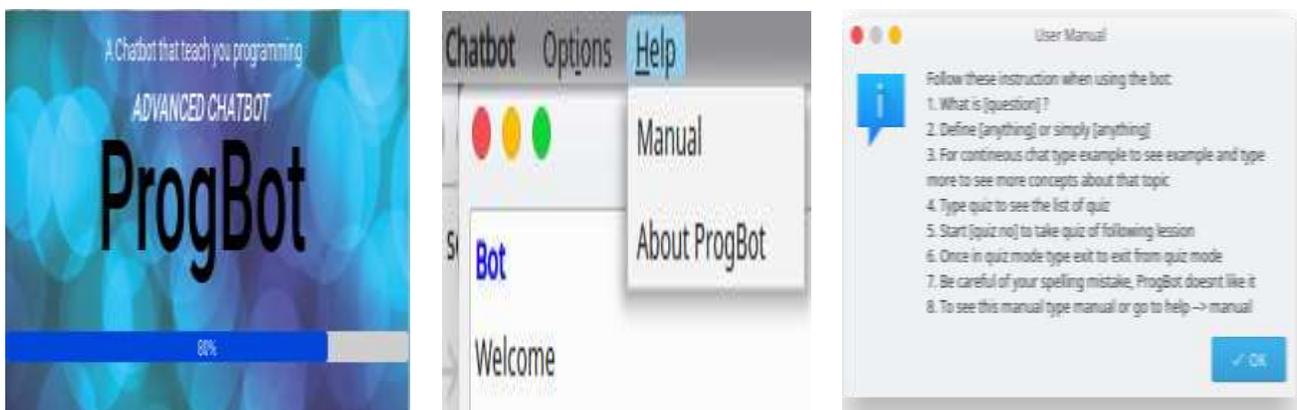


Figure 1. (a) Loading Screen (b) Menu of ProgBot (c) User Manual of ProgBot

Updated Progbot can teach Programming language in new effectively and in interactive manner. For beginners who don't know where to start from the new version will still be helpful to them in advance way and can ask the chatbot to start the lesson and it will automatically start will basic and slowly move to more complex things [8]. New updation of the chatbot includes support for new emerging languages such as python and c++. A drop-down menu is introduced to select any language at any point of time. After learning a topic user can take quiz based on that topic and user progress will be saved in database next time he / she plays can view their last score and improve it. Chatbot makes life easier for beginner learning programming language [9]. It will feel more like teacher teaching you in class room, any queries can be asked to the chatbot and receive instant answer of the question.

It will not be useful for just beginners but also for the person who know the programming in prior and want to brush it up. It will be beneficial to the person who works on that programming language every day or quite often with multiple languages [10]. In practical scenario developers face the problem of remembering the syntax of programming language as today's industry demand for multiple language and it become difficult to remember each and every syntax of all programming language. In such situations Advance Progbot can play a vital role as the user can directly interact with the bot and get the syntax of that program along with the example of any language which will save time of searching on internet or reading the documentation [16-20].

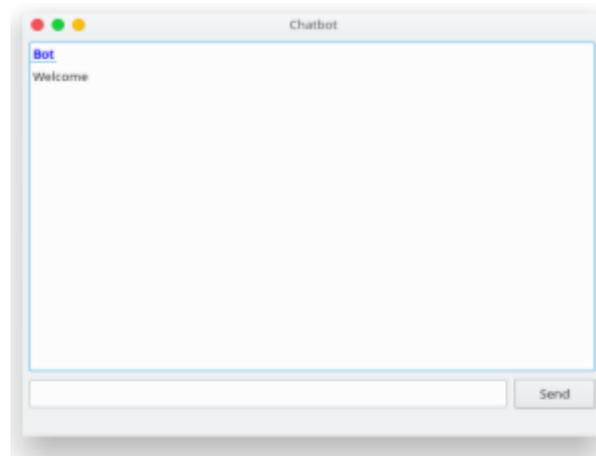


Figure 2. Welcome Screen of ProgBot

Advance Progbot works offline and is based on the original documentation of the programming language thus provide the genuine result in effective way. User has to enter the query and it will give you reply with definition, syntax.

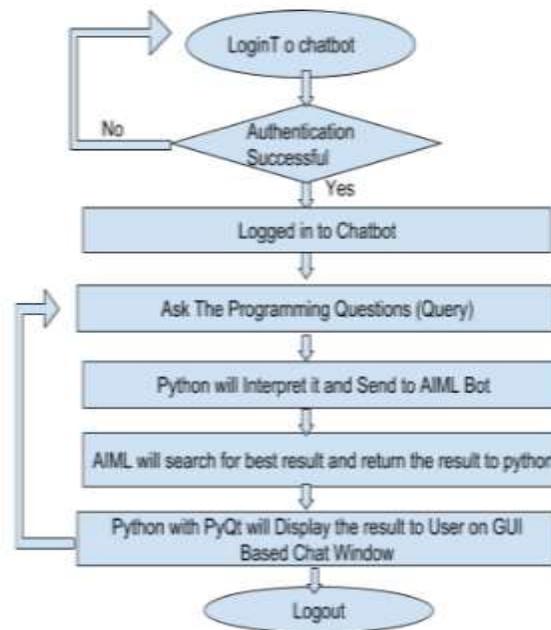


Figure 3. Flowchart

Figure 3 shows how the chatbot works and how the user query is processed and it generate the result.

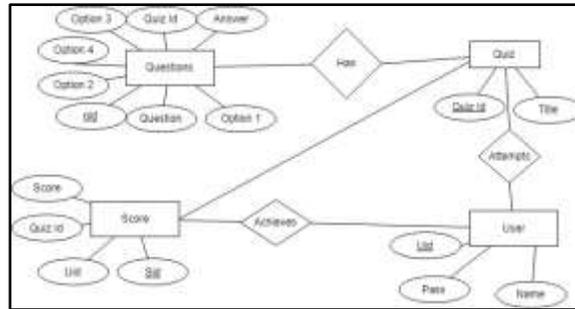


Figure 4. Entity relationship diagram

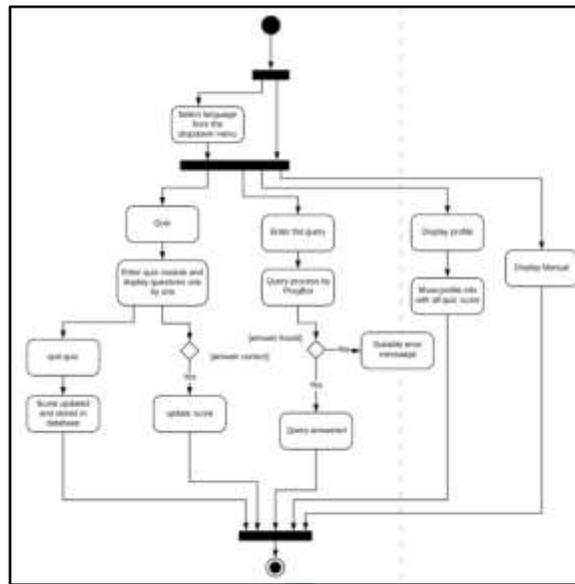


Figure 5. Activity diagram for complete workflow

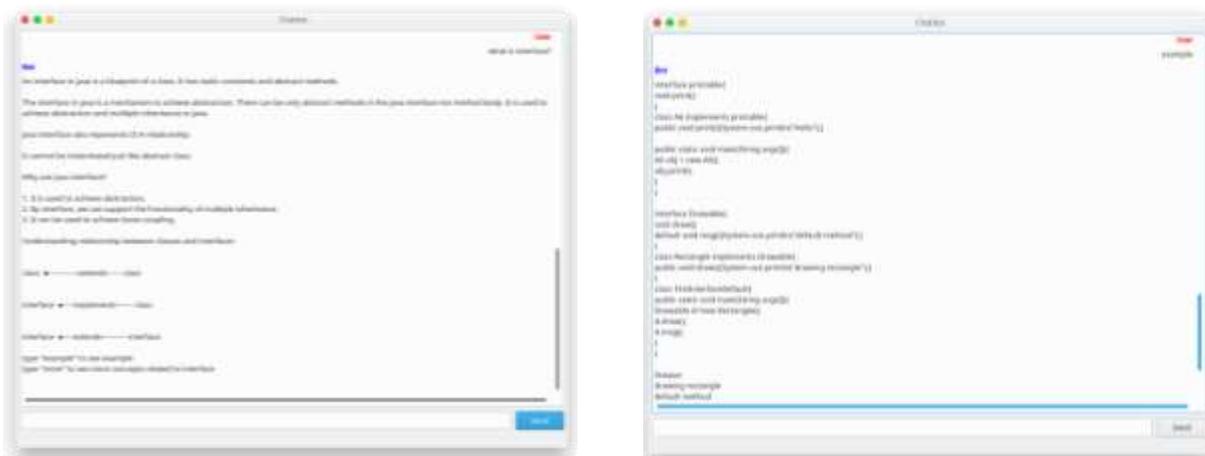


Figure 6. (a) Continuous chat (b) Continuous chat 2

Features of ProgBot include the Login module which ensures the security of user data and also helps to maintain the session information of particular user so that we can easily track user performance and its information that is stored in database. ProgBot has feature of Teaching a module as a chapter so user can continue their learning when they log in back. It can take quiz also which can check whether you have understood the programming language or not. And gives you score also and

save it to database. This makes progBot more interactive as user can see their progress and motivate to learn more. All these features make Advance ProgBot more interactive and enhanced piece of technology that can help enthusiastic learner to learn about different programming language in the best possible way. Another neat feature of ProgBot is continuous chat option, it keeps in memory what was the previous asked questions and answer the follow up questions.



Figure 6. (c) Continuous chat 3

Like here user asked for 'what is interface', then he just types example and ProgBot responds with the example of interface, finally user types more to see some more concepts about interface.

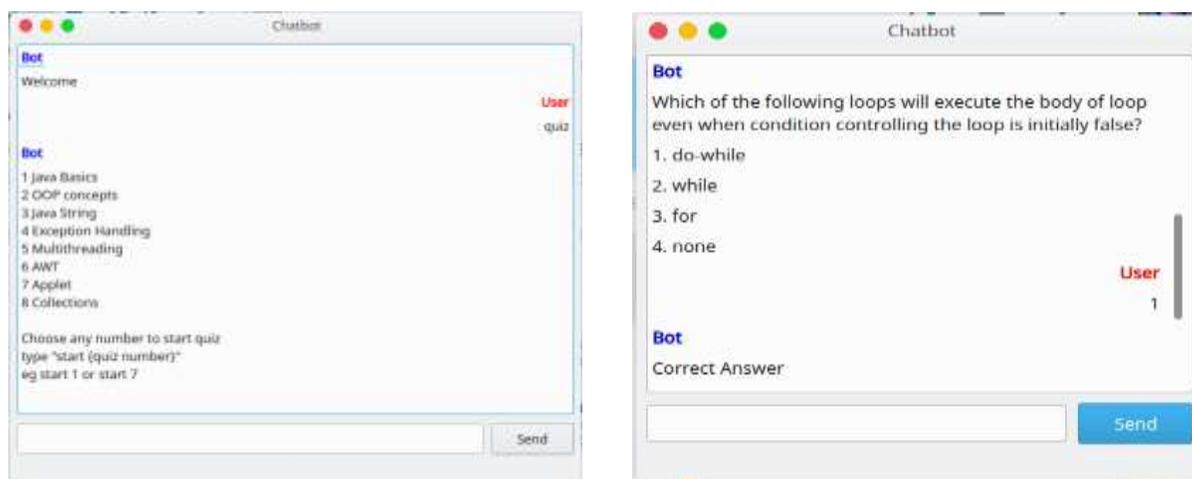


Figure 7. (a) Conducting quiz (b) Conducting quiz for java

Here we can see that we have option to start quiz on any particular chosen topic. By this process we can enhance our knowledge and skill in a particular topic which we maybe feel that we are weak. This type of interactive learning will help students to quickly learn about their mistakes and it will indicate their faults. Therefore, by this process the tendency of doing mistake will be very less among students.

The bot will conduct quiz in a MCQ pattern. Four option will be given. Out of each user have to choose one option. If it is correct answer it will be shown as 'correct' below otherwise it will show as 'Not Correct' in the corresponding area. If the chosen option is correct, user will get 1 marks and if not correct will get 0 marks. After finishing the quiz, user can view their total score based on particular topic along with the username. After seeing the result, user have to click on 'ok' button to close the window.

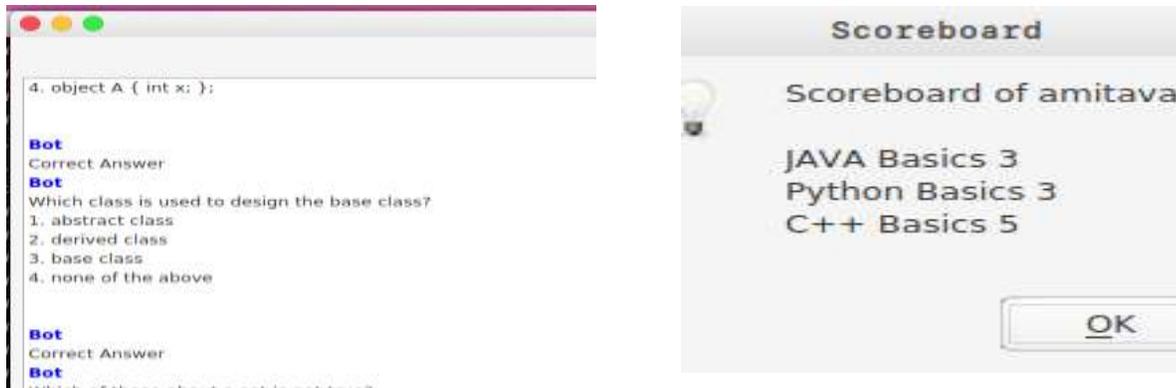


Figure 8. (a) Conducting quiz for C++ (b) Scoreboard

All these features make ProgBot more interactive and enhanced piece of technology that can help enthusiastic learner to learn about programming language in the best possible way. The chatbot is created using python. We have created aiml files where we have stored all the data about specific programming language.

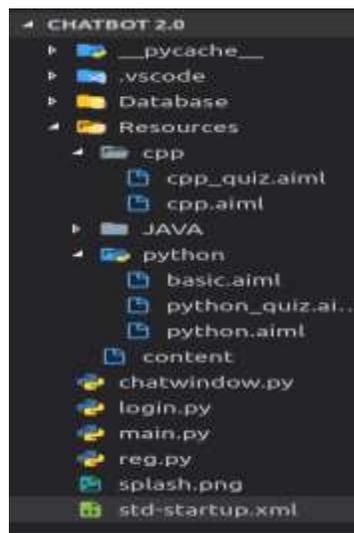


Figure 9. Project Structure

When user asks for a query progbot retrieves data from these aiml files. Thus, data is shown in a organized manner to the user and user can see the relevant answer for the query in a organized manner. Therefore user doesn't have to haphazardly search for the intended data like google search engine. Where people search for one type of things and thousands of results are shown which leads user in a deep confusion. These approach will shown only for the specific topic without showing unnecessary content. Therefore, user will be able to interact and understand about the specific topic, which will make them convenient to learn in this environment.

IV. Conclusion

ChatBots made a great impact in human life because of their high impact with low cost .Almost all business are develop their own. Our updated ProgBot will continue to serve in best possible way in learning field. It's relatively simple to get one trained and it cuts the cost of operation by 80%, once built it's available 24/7 without little to no maintenance. Our Advance ProgBot is no less than any other chatbots available. It's like a companion, at your disposal ready to teach you programming language whenever you want. Users will feel like chatting with a real person. Due to high impact of availability users can get their answers instantly without scrolling through the unnecessary information of a webpage or turning pages of the book, which may be overwhelming for new users. Intuitiveness of new ProgBot makes it ideal for learning programming language.

V. Future Work

As of now ProgBot is capable of teaching JAVA,Python and C++ so in future we will add support for further programming language, Javascript is next on our list. We are also planning to make it as a WebApp so that other users can access the facility provided by the progbot. Different Login options for users and administrators, so as admins can enter more modules and support for programming language through gui without have to go through knowledge of the code.

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