

## **A Novel Approach to Arabic Chabot, Utilizing Google Colab and the Internet of Things: A Case Study at a Computer Center**

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*Received May 06, 2021; Accepted September 05, 2021*

*ISSN: 1735-188X*

*DOI: 10.14704/WEB/V18I2/WEB18365*

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### **Abstract**

A Chabot is a software program for humans to interact with natural-language computers. It has numerous applications in business, service, education, and healthcare, among others. Arabic Chabot's, on the other hand, fight to generate and display Arabic characters correctly because of linguistic problems. In this paper, we propose a new method for the development of effective Arabic Chabot's, which is improved by the use of the Internet of things (IOT). An experiment was performed utilizing Google Colab and the Python Chatterbot library to build and deploy an Arabic Chabot for a computer center based on IOT.

### **Keywords**

Google Colaboratory, Chatterbot, Machine Learning, Artificial Intelligence, Arabic Chabot's, Google Colab, IoT, Twillio.

### **Introduction**

Chabot's are artificial intelligence-powered conversational systems (AI). By using natural language, Chabot is capable of interacting with humans and learning their language. It is responsible for three functions: receiving, evaluating, and responding to user requests. There is a significant connection between Chabot and human language. The efficacy and severity of Chabot are language-dependent. According to studies, Chabot's has been proven to be successful in the vast majority of languages presently spoken worldwide.

Apart from that, Chabot is equipped with the necessary levels of Arabic, Arabic grammar, and Arabic vocabulary. Chabot's has recently made an attempt to address the many grammatical issues raised by the Arabic language (Almurayh, 2021).

Chabot's may be written in a variety of different computer languages, including PHP, Python, XML, AIML, C++, and JAVA. Chabot's may be created in a number of ways, one of which is via the usage of chatterbots, which can either create a Chabot or another bot performing a similar job. In the Chabot's knowledge database, there is still a pre-programmed question bot, as well as rules on how it should reply to each unique question, phrase, or word. Due to its reliance on automatically generated information, the method begins with a blank database and develops from there.

When any of the aforementioned methods are used, a chat log is generated throughout the session and is used by the botmaster to enhance the Chabot's answers (Suanpang & Jamjuntr; 2021; Bii, & Langat, 2013).

Cloud notebooks like Google Colab, completely free to use, are used for machine learning and Python programming. With Colab's assistance, it is possible to collaborate with other individuals online (Canesche et al., 2021). The Google Corporation discovered the Jupyter Notebooks, the first to do so. This was created by the Google corporation. Using interpreted programming languages, tools, and libraries, all of which are available through a web browser to allow users to construct visualization processes for use in their applications, users may construct visualization processes for use in their applications. After your notebook work is completed, it is immediately saved to the cloud. It includes cells that incorporate a scripting language as well as any other material needed to operate correctly to produce the page output. The Google Collaborator's primary goal is to enhance machine learning via scientific research and development. That's one of the primary goals of cooperation. Because all Colab notebooks are structured around a narrative explanation augmented by interactive visuals produced by coding, they are intended to support learning (Bisong, 2019; Oliveira et al., 2021; Nelson, & Hoover, 2020; Popovič, 202).

Internet of things (IOT) is a technological model that acts as a worldwide network of machines and gadgets capable of interacting with one other. It is developing rapidly in wireless telecommunications, aimed at achieving the goal of interaction and collaboration as a united entity (Lee & Lee, 2015; Stergiou et al., 2018).

A novel approach to dealing with Arabic Chabot's problems has been suggested in this paper, which makes use of the Google Colaboratory (colab) and chatterbot libraries. It is improved by utilizing the IOT application as a tool to notify about any case that is implemented in the chatrooms. The following is the structure of the paper: (1) a short history of Chabot and the Arabic Chabot's, as well as their features, (2) a depiction of the suggested approach, (3) the results and limitations, and (4) a discussion of the implications of the findings. (4) The discussion, conclusion, and recommendations for future work to further improve the suggested technique are included.

## **Background**

### **a. Background of Chabot**

"Computing Machinery and Intelligence" was the title of a paper written by Turing in 1950 that received widespread attention. He was intrigued by the idea that the computer might chat with numerous people at the same time without him being aware of who was talking to whom and when (Turing, 2009).

On this day in 1966, the development of the world's first computer-controlled robot (ELIZA) was completed. Elizabeth's manner was modelled after that of a psychologist, and she offered good advice. ELIZA defines user input and repeats previously recorded input through the use of a pattern matching methodology, which is implemented in the program.

Chabot's, on the other hand, laid the groundwork for future generations of robots. It was coined in 1995 (Joy et al., 2021) to refer to a computer entity that can communicate with other computer entities through the use of artificial language.

ELIZA established A.L.I.C.E., also known as "ELIZA's first online Chabot," which stands for "ELIZA's first online Chabot." It was a bot that used natural language processing to communicate with the user (NLP). She interacted with people by applying heuristic patterns and matching rules to the information they provided her in response to her questions and statements.

Siri, a voice-activated personal assistant, was introduced to the public for the first time in the year 2010. Siri's primary function is to aid you in talking with all of your iOS-enabled devices, including your iPhone. Siri, Apple's virtual assistant, may be accessed with voice commands. In addition, it merges them with other files like music, photos, and movies. User inquiries are answered and ideas are created through the use of the internet. It

responds correctly to the diverse word choices made by different people. Siri, while extremely intelligent, has a number of problems that must be addressed. There is a strong desire to gain access to the internet. Currently, only a few languages (Almahri et al., 2020; Zubair & Yassin, 2021) are supported by the application. The public's interest in Chabot's illness has risen considerably in recent years, with the most recent spike coming in 2017.

### **b. Arabic Chabot Literature Review**

According to Abu Shawar and Atwell (2004), Chabot was used to query the Arabic Web QA corpus using logical inference and natural language processing. The Chabot was designed to produce AIML files from the Qur'an using Java in 2003. This Chabot sought to visualize the Qur'an's data content. To retrain ALICE, a machine learning methodology was employed to transform a corpus into an AIML format. To do that, we just need a huge yet basic pattern-template rule set. The existing Arabic Web QA chatbot's response was reused. Rethinking issues from Arabic into other languages may provide no results since the language has various unique characteristics.

Khan and Al Hagbani (2016) built BOTTA, an Arabic-speaking chatbot. This app mimics talking using the Cairene dialect of Egyptian Arabic. Anyone may join and communicate in-game using the game's public database files (AlHagbani & Khan, 2016). Nabiha, a Saudi Arabic Chabot, was built in (2020) by D. Al-Ghadhban and N. Al-Twairesh, with funding from the University of King Saud. It is the first chatbot in Saudi Arabic. You may get it on several platforms (including on Twitter, on the web, and on Android phones). Anyone is invited to download the app from Twitter or go to the website to connect with Nabiha. IT students tested the application, and the results were positive. Their Chabot was constructed in five stages: gathering information from students, like opinions and complaints, creating a corpus in the Saudi dialect from text files, running a program that converts characters to readable AIML text, publishing the Chabot on the Pandorabots platform, and integrating it with Twitter and Android (Al-Ghadhban & Al-Twairesh, 2020).

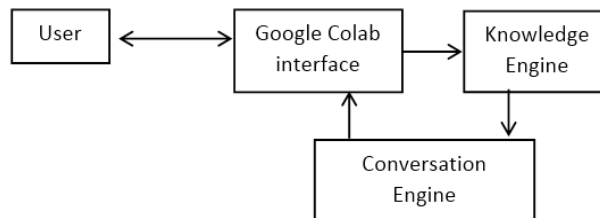
Yassin, Zubair Khan, (2021), created an Arabic-language Chabot that was designed to provide users with useful information about the prophet's biography. SeerahBot is the first Chabot related to the biography of the Prophet. The system was built using two techniques: the first is an NLP language processing retrieval Chabot, and the second is a Chabot design framework. Chabot has now been made available on Telegram (Zubair & Yassin, 2021).

Abu Laban, Alnaima, and Sweidan in (2021) show an Android chatbot app (SIAAA-C). An electronic guidebook created by students. It's got many alert types and a campus map. This is a well-researched and well-documented book. Additionally, students at the University of Jordan selected by several academic departments spearheaded SIAAA-C implementation, and the results were positive (Sweidan et al., 2021).

## Methodology

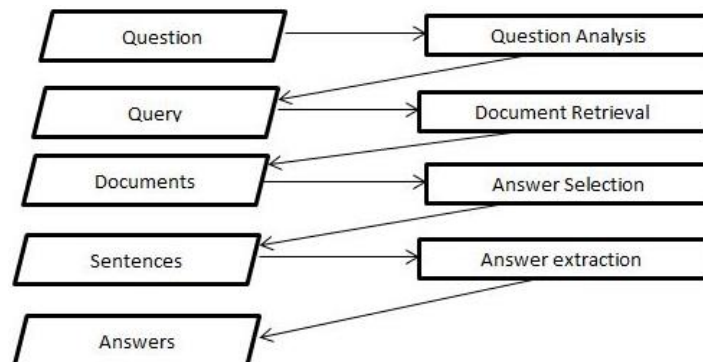
A number of Arabic Chabot's are currently accessible because of the intricacies of the Arabic language and dialect. Using the Google Colaboratory (colab) and the chatterbot library, we offer a novel method for building Arabic Chabot's that is simple, easy, and efficient. This method is made accessible to the public in this article. Our case study of Chabot, a service named A on a university computer known as "CCsci bot," which is meant to function as an automated system, is presented in this paper. The user may choose to continue the conversation if he or she writes an erroneous term using a method known as proximity processing, which involves selecting random words from a pool of suggestions and selecting one of those words from the pool of suggestions. Our main aim is to make it simple to build an Arabic Chabot that performs correctly and responds in a timely and appropriate manner.

A representation of the structure of the suggested approach is shown in the figure 1.



**Fig. 1** Depicts the structure of an Arabic Chabot created with Google colab

The process of answering the questions is displayed in figure 2.



**Fig. 2** Answering questions process

Dataset of questions and answers: 30 randomly-selected questions and answers were sent to the "CCsci" bot.

Question-processing: The codes start preparation by the following steps.

1. Create a Google Colaboratory, or "Colab" notebook.
2. Install package chatterbot.
3. Install chatterbot\_corpus.
4. Importing all the required libraries (Importing chatterbot).
5. Create object of Chabot class.
6. Create a Chabot object with a Storage Adapter.
7. Create a class ChatBot with a Logic Adapter.
8. Import ListTrainer.
9. Response to the input text.
10. Creating a greeting for user input and providing a randomly-generated greeting answer.
11. Generating the response.

In this phase, machine learning takes the role of Chabot as:

1. A user's reaction (query).
2. The extra answer is inserted to the sentence list.
3. Term frequency, and inverse document frequenc, The term's frequency in the document is counted in Word. a rare word. It turns tokenized text.
4. The index of the most comparable sentence is returned.
5. It publishes the most comparable phrase.
6. When there is no matching sentence for the user answer, it apologizes.
7. Additionally, the dialogue between Chatbot and the user must be looped.

### **Execution of Chabot Model Using Platform**

As part of their Google Research effort, Google created the Chabot model. Anyone on the web may now use Python code to analyze and handle data. It is ideal for machine education, data analysis, and training. Colab provides services free of charge. Resources are limited and the availability may thus be modified. Colab provides resources free of charge, provided that they are compensated. In an experiment with university users online and students (students or academic staff), the Chabot prototype was evaluated to support an on-line system. After the finished prototype, the Chabot prototype was tested. Figure 3 shows an example of a missing user password which a bot may automatically reply to and resolve. The Chabot was created with IOT technology and uses the Twillio application to

deliver telecommunications notifications. In the case of the example above, the password may be transmitted to the mobile user. Figure 4 illustrates the user including a password will get the SMS message.

```
List Trainer: [#####] 100%
Bot Response: The current time is 11:58 AM
Welcome to the Bot Service! Let me know how can I help you/ أهلا بك في خدمة ال bot الخاصة بشبكة الحاسبة كيف يمكنني مساعدتك
Bot: لطفاً، أدخل أيميلك الرسمي
Bot: لطفاً، أدخل اذخ ريقم الهاتف المرتبط بكلمة السر
Bot: تم إرسال رساله لهاتفك المحمول بكلمة السر
```

Fig. 3 Example of bot answer

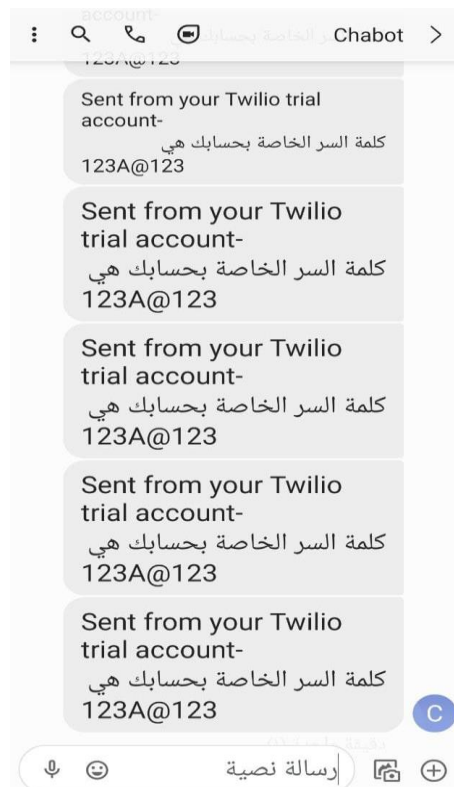


Fig. 4 Example IOT SMS message

## Results and Limitations

The output of our Chabot is "CCsci". It has four unique roles. These characteristics include:

1. Hello and respond.
2. A mistake should be apologized for.
3. Send an answer to the user that closes up the dialogue, like: (thank you or bye).
4. Assist the user in answering.

In the case of limitations, Additional drawbacks to examine include: The app may not run on a Colab notebook. To run the code, you must first install all the needed libraries.

## **Discussion and Conclusion**

Our method for developing the Arabic intelligent Chabot is to use Google Colab to create an intelligent Arabic Chabot to avoid the complexity of the language with a quick and easy design, and any software installed and used is cloud - based, with all the library files on the cloud. It also responds quickly and accurately to the user's questions, and the proposed method can be modified to work with telegrams or any other software. Furthermore, an IOT technology is used in this Chabot implementation which is used to notify the user of any secret answer to the bot.

## **Acknowledgment**

We would like to express our heartfelt gratitude to the people in the Department of Computer Science at Mustansiriyah University in Baghdad, Iraq. For the support with this research.

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