2.1 *Chatbot :*

A chatbot is a computer program that can simulate a conversation or chat with a user in natural language through messaging applications, website, or mobile applications and interact with users according to their input and should be available 24/7.

Chatbots are developed and became so popular due to the increased use of smart devices and IoT technology.

2.2 Types of chatbots

a. Base-line chatbot:

It is a chatbot that is based on a database and uses if / then logic to create a conversation flow and that takes a lot of time to ensure the understanding of the question and the answer needed.[1]

b. AI chatbot:

This type of chatbot is more complex than base-line but it is more interactive and personalized and needs big data training to be impressive if the problem is matched to their capabilities.[2]

c. Hybrid Model:

A hybrid approach mixes the Base-line & AI chatbot to make it smart and his behavior more expected by depending on database and Ai algorithm to work together.[3]

2.3 How do chatbots work?

Briefly and as mentioned in the definition, humans interact with chatbots.

There are two ways to interact with a chatbot:

a. Text

chatbot analyzes the inputted text and matches the text with predefined data called intents which are categorized to manage the conversation. The user utterance is tagged with one of these intents, even if what the user says stretches over two or more intents. Most chatbots will take the intent with the highest score and take the conversation down that avenue.

2.4 Options to build a chatbot.

a. From Scratch

At first we have to identify the opportunities for our chatbot and decide its field and scope to achieve efficiency and accuracy. and a precise understanding of the customer needs is required to solve the operational challenges.

Then the design of the bot comes to be a significant stage to decide the user engagement with your app or website.

and we can categorize chatbot interactions as structured and unstructured interactions.

- ❑ Structured interaction. You already know about this kind of interaction. You know what your customers will ask and can design it easily — it's just like an FAQ section of your app or website[4] . This information will link to your contact information, services, products, etc.
- ❑ Unstructured interaction. The unstructured conversation flow includes freestyle plain text. It's hard to predict what queries will emerge and it looks like an extempore speech competition for your chatbot. the role of AI comes to lights here, it decodes the context of the text based on NLP analysis. while the same NLP will provide a voice to the chatbot.[5]

The later choice will need specialized chatbot developers with an understanding of programming languages, machine learning, and AI. We can use some of the code-based frameworks to build and handle the chatbot like wit.ai and api.ai.

b. Using platforms

It is similar to scratch chatbots but the only difference is that you do not have to hire a specialized developer and use the chatbot builder platforms like Chatfuel, Botsify and Rasa, it's not hard or impossible to achieve it. but it's not possible to create a NLP-enabled chatbot that can deal with unstructured data.

2.5 Chatbot Platforms alternatives:

a. **IBM Watson:** is touted as a question-and-answer system that can be used to build applications and chatbots. The IBM Watson platform allows us to create an application that shares a dialog interaction between our chatbot and users on Quick n' Easy Projector Rentals. The IBM interface is simple to use, and no back-end coding is shown at first glance. The chatbot can be easily integrated into other applications such as Slack, Facebook, and Twilio.

b. **Google Dialogflow:** is an easy to understand conversational agent. Theoretically, we can have a bot up and running by understanding 3 core concepts: intents, entities, and dialog control. As stated earlier, these general concepts are followed across a majority of the chatbot platforms we played with.

c. **Rasa:** is an open source chatbot that is equipped with a natural language processing tool. The open source tool is called Rasa NLU. You can tweak and customize the machine learning algorithm that Rasa uses so that you can create a model that provides the results you desire. Rasa NLU can be run wherever you want it to, and none of your training data has to be passed over to Google, Microsoft, Amazon, or Facebook to train your chatbot.

2.6 Selected Platform:

We will use the rasa framework to build the required chatbot, but why did we choose rasa ?

Will, rasa has a lot of advantages such as:

- Highly customisable with various pipelines can be employed to process user dialogues.
- The rasa framework can be run as a simple http server or can be used from python, using APIs.
- It has the Rasa-nlu, when run on a server, can mimic other commercial NLP platforms such as LUIS or wit.ai. This makes it easy to migrate an existing application to rasa-nlu.[3]

But as we know, nothing is perfect and rasa has its disadvantages like :

1. server requirements although spacy is a very fast NLP platform, it seems to be very memory hungry.
2. Learning curve - Installation, configuration and training phases require machine learning expertise (at least basic level)
3. Context based conversation not available out of the box - Rasa-nlu does not maintain the context automatically. This has to be programmed separately into the chat service.

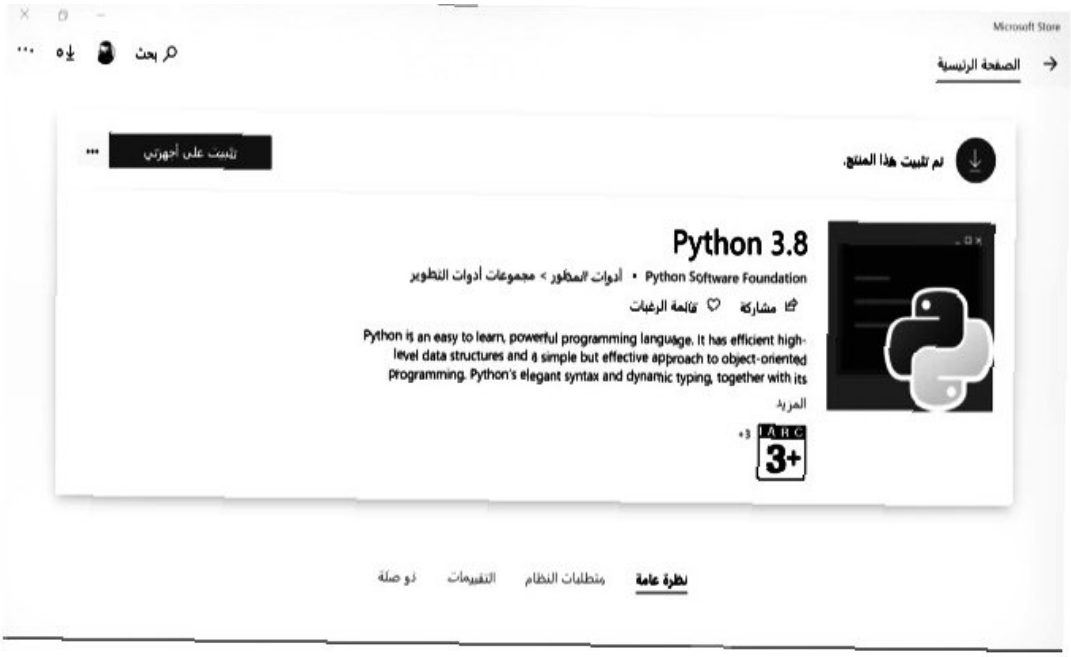

Figure 2.1:Python main screen in microsoft store.

Go to Microsoft Store and search for python 3.8. Then,Check if your Python environment is already configured by opening the cmd : type **python3 --version**

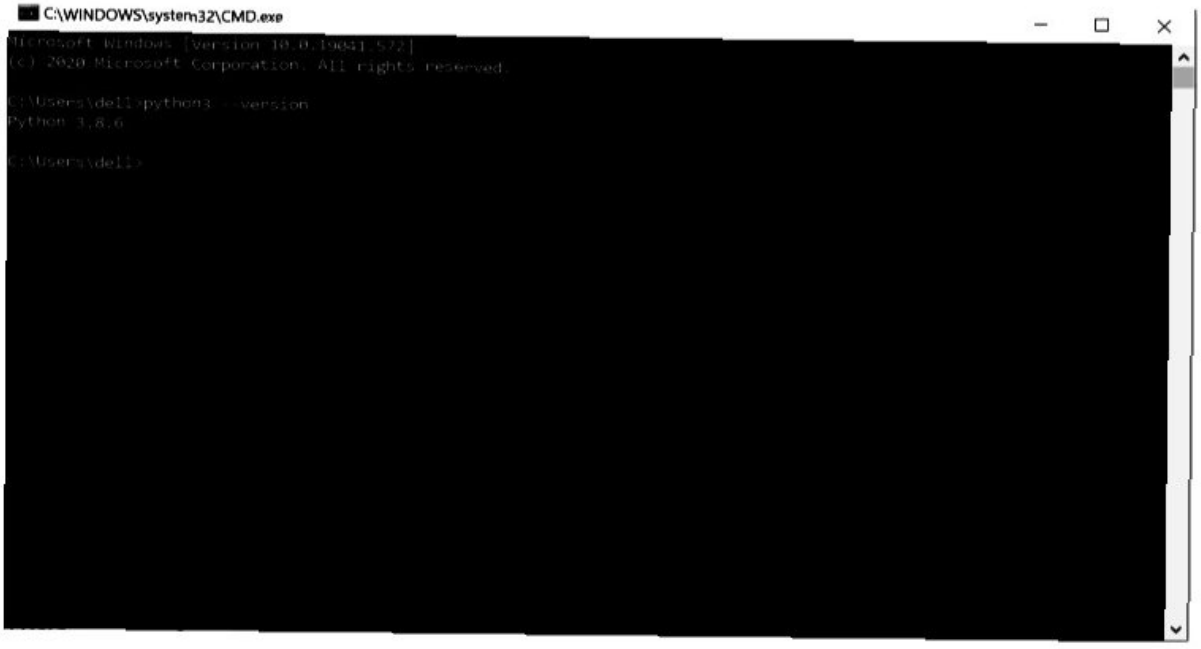

Figure 2.2: Testing python version.

IF you did NOT find a version, then type this command :**pip3 install -U pip**

- **Virtual Environment Setup**

  Create and activate the virtual environment using the below commands.

  python3 -m venv ./venv

  Activate the virtual environment:

  .\venv\Scripts\activate

- Install Rasa open-source with the below command:

  pip install rasa

- make a directory and move to it

  mkdir test-chatbot && cd test-chatbot

Create the new project with **rasa init** command and start the conversation with the initial demo chatbot.

Figure 2.3: Rasa bot initial chatting.

2.8 supportive information:

After a great effort in searching and exploring personalities related to the topic of chatbot and natural language processing (NLU), we want to thank Mr. Jonathan Wheat, who is a certified developer for a framework Rasa for all his efforts and time to communicate with us and to provide wonderful, useful and inspiring answers about several Questions we asked him about Rasa and NLU. The following is the information that he provided us.


C:\Users\user\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/user/PycharmProjects/pythonProject/NewGoogleAssistance.py
Hey there! I'm Shield, your virtual assistant.
How can I help you?
Searching for what is python
Python is a high-level, interpreted, general-purpose programming language.
Process finished with exit code 0
Run
TODO
Problems
Terminal
Python Packages
Python Console
Event Log
30:32 CRLF UTF-8 4 spaces Python 3.9 (pythonProject)


Run:
NewGoogleAssistance
C:\Users\user\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/user/PycharmProjects/pythonProject/NewGoogleAssistance.py
Hey there! I'm Shield, your virtual assistant.
How can I help you?
Current time is Jun 01 2022 10:05 AM
Process finished with exit code 0
Run
TODO
Problems
Terminal
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Python Console
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30:32 CRLF UTF-8 4 spaces Python 3.9 (pythonProject)


Run:
NewGoogleAssistance
C:\Users\user\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/user/PycharmProjects/pythonProject/NewGoogleAssistance.py
Hey there! I'm Shield, your virtual assistant.
How can I help you?
Playing song on youtube
Process finished with exit code 0
Run
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Run: NewGoogleAssistance
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