Creating a Chatbot with Deep Learning – Python

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Class: Intermediate project

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- Abstract:

My project was to design and develop my own virtual A.I. voice assistant software, that can help perform tasks on computer.

Navigating on YouTube, searching on Wikipedia without opening the web browser, and performing many other daily tasks only with the help of a single voice command.

The project was a success, all what was defined in the beginning of the project as "Must do" was implemented and tested. This project could be improved in the next years by adding new functions or by working on the dataset.

- Introduction:

Artificial intelligence (AI) has inspired how we interact in each day activities through designing and evaluating superior programs and devices, referred to as smart agents, that may carry out diverse functions (Eleni Adamopoulou & Lefteris Moussiades 2020). A chatbot is an artificial intelligence program and a Human–computer Interaction (HCI) model. It makes use of Natural Language Processing (NLP) and sentiment evaluation to speak in human language by textual content or oral speech with people or different chatbots Artificial communique entities, interactive agents, clever bots, and virtual assistants also are referred to as chatbots (Eleni Adamopoulou & Lefteris Moussiades 2020).

The objective is to be able to:

- Open and run specified programs.

- Search on Wikipedia.

- Get simple data from web browser.

- Write notes as txt file.

- Open and navigate through YouTube page.

- Simply converse with user.

- Summary:

My project is a 100% software project the tool used in my work the Python IDE "Spyder" from "Anaconda" and the programming language is exclusively Python. The software used is open source.

In the realization of this project, I was helped a lot by some videos on YouTube, you could find the links in the end of this project.
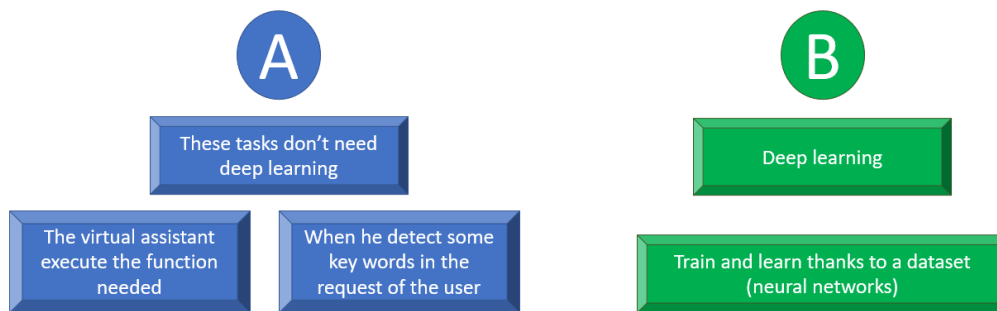
- Explanation of the algorithm and the process:
➢ How it works?

In order to explain how the algorithm and the process of this project I drew the schema below:
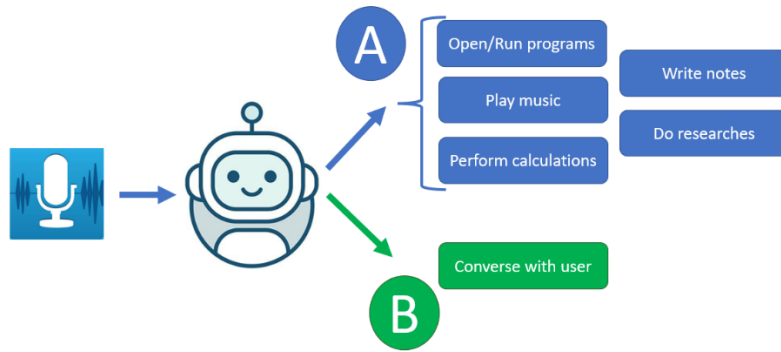
Once the program ran the user give a voice instruction to the chat bot, after analyzing this instruction the chatbot will answer by executing the task demanded. We have two types of tasks.
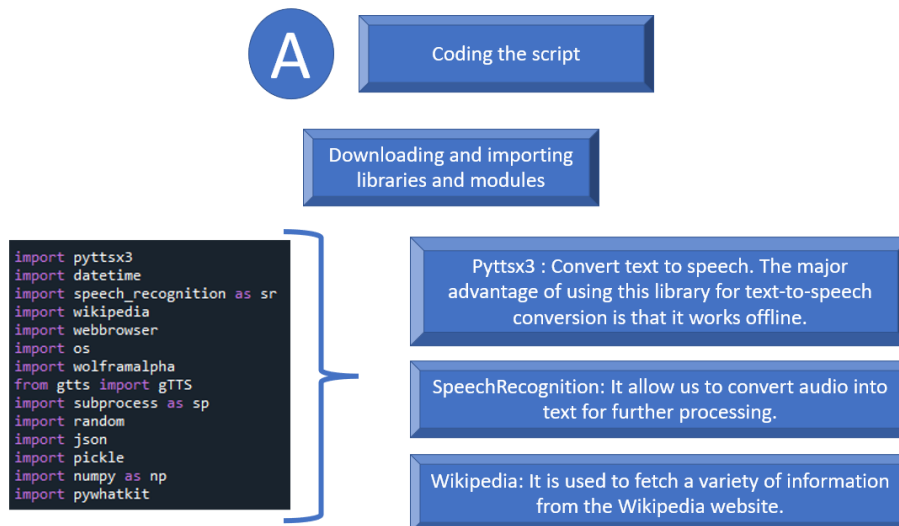

➢ How I did that?
  ▪ Tasks A:

Concerning the explanation of how I did that I would start by the tasks A, as I mentioned before deep learning is not used in this part. We only need to code the script to be able to satisfy the requirements.
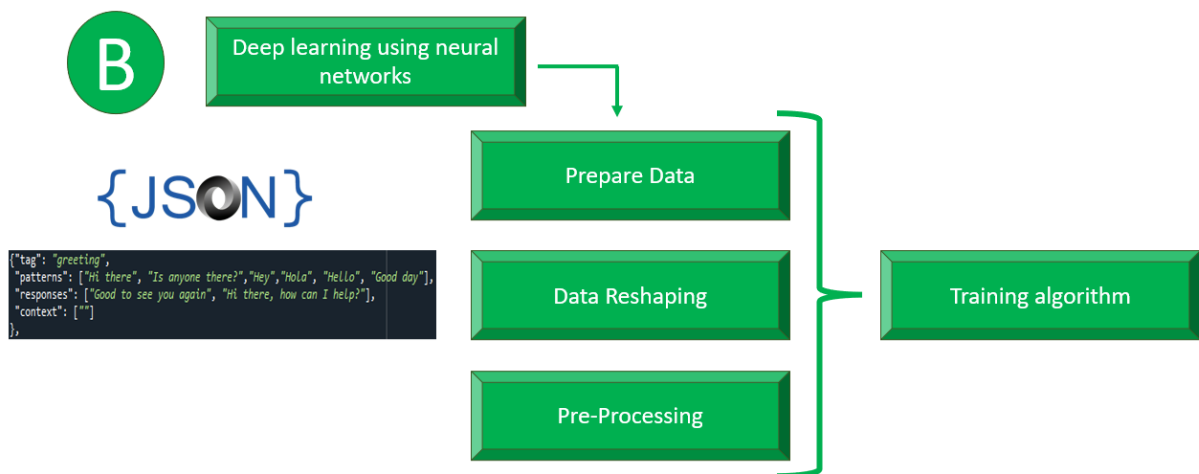
The most important thing in this part are the libraries used. Thanks to these libraries programing become easier, and the script more optimized.

In the figure below, you could see in the left all the libraries I used in this program concerning the tasks A, the most important ones are the three libraries that I mentioned in the right with their function.

A — Coding the script

Downloading and importing libraries and modules

```
import pyttsx3
import datetime
import speech_recognition as sr
import wikipedia
import webbrowser
import os
import wolframalpha
from gtts import gTTS
import subprocess as sp
import random
import json
import pickle
import numpy as np
import pywhatkit
```

Pyttsx3 : Convert text to speech. The major advantage of using this library for text-to-speech conversion is that it works offline.

SpeechRecognition: It allow us to convert audio into text for further processing.

Wikipedia: It is used to fetch a variety of information from the Wikipedia website.

- Task B:

To accomplish this part of the project I used the deep learning using neural networks model.

B — Deep learning using neural networks

{JSON}

```
{"tag": "greeting",
 "patterns": ["Hi there", "Is anyone there?","Hey","Hola", "Hello", "Good day"],
 "responses": ["Good to see you again", "Hi there, how can I help?"],
 "context": [""]
},
```

Prepare Data

Data Reshaping

Pre-Processing

Training algorithm

One of the most important things in this part is the Database. We need to prepare the data in a JSON file. After that we need to reshape the data if it needed for example erasing question marks, exclamation marks, dots, commas …

In the preprocessing step, we need to add grammar into the machine learning so that the chatbot can understand spelling errors correctly.

After all what we have to do is running the training algorithm and let the chat bot learn.

Training algorithm using neural networks are widely used in machine learning. As the first part the libraries are so useful in our code.

- Results:

I prepared a demonstration of the project to test the different functions of the chatbot. You could watch the video of the demonstration by clicking on the link below:

https://youtu.be/mLu2lAYzkEQ

The goal of the demonstration is to give voice instructions to the chatbot and test these functions:

- Resources and references:

Neural networks:
https://www.youtube.com/watch?v=1lwddP0KUEg&ab_channel=NeuralNine

Introduction reference:

https://www.sciencedirect.com/science/article/pii/S2666827020300062