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# ELLA: Design & Development of Virtual Voice Assistant with Integration of AIML with Python

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Abstract

The project's main assets are Python and Machine Learning. It is basically designed and inspired my technological development. As like Iron Man character he had a Voice Assistant named Jarvis which can be able to do anything in the world of technology and it is the most powerful AI. So, I also wanted to developed something like this and I have developed Ella. The Ella is my personal voice assistant which can perform some type of tasks by only my voice. This type of tech is beneficial in many fields like for disabled peoples who can perform some of their needed tasks by commanding a computer, and also used as in security like in bank. If this tech will further be updated then can be used on border securities.

*Keywords:* *Artificial Intelligence, Machine Learning, Python, virtual Assistance, Deep Learning.*

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## 1. Introduction

Nowadays in the era of technology where everyday and every minute or sec, there is a new AI bot is generated and continues to redefine convenience, meet ELLA. It is inspired by the character JARVIS played by Edward Jarvis in the Marvel Studio Productions Iron Man who served Tony Stark [Robert Downey Jr] as his most intelligent hypothetical assistant lending him help into every possible as aspect such as Technology and also in other aspects.

Similarly, ELLA provides spoken solution to any real time problems. It is basically designed for completing the daily life tasks only by voice. This is made possible with the integration of the most enhanced platform in the world for the computer programming industries i.e., Artificial Intelligence which is consequently provides by the google but it is re-transformed by many of world wide community of developers who are trying to solve the complex problem that cannot be solved easily by any computer program by the help of AI. Here, there is an python interpreter which is also an sub ordinate Text-to-Speech engine for ELLA.

## 2. ELLA : About The System

Analyzing the speech recognition in the acknowledged platforms from the viewpoint of the Neural Processing language[NPL], there are many assets are using here.

Neural Networks

A Neural Network can refer to either a neural circuit of biological neurons (sometimes also called a biological neural network), or a network of artificial neurons or nodes in the case of an artificial neural network[II]. Basically, it is used to reflects the behaviour of the human brain, computer program to solve some common errors and patterns by the help of AI. An Artificial Neural Network (ANN) is a brain of computer as like human brain. It consists of layers, including input layer, hidden layer and an output layer. So, each node is connected to another node with weights and threshold associated with it. There is a condition if the output of a node is greater then specific threshold then that node is wakes up and sends the data to the next layer of the network. Otherwise, the data will not be sends to next layer. The network relies on training datasets to learn and improve accuracy over time[3].(Figure 1)

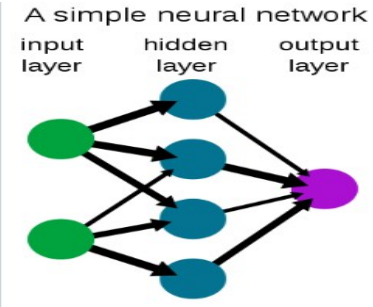



Figure 1 : Neural Network

**Natural Language processing**

Natural language processing is a pert of user of computer science and also the application of artificial intelligence. It makes the machine talking and understanding the human commands. This technology is used to machine understand, analyses the pattern, manipulate and interpret the human language. In ELLA, for this work I have used the Pyttsx3 Package of python, By the help of this the program will trying to analyse the pattern and also trying to solve that thing. It helps to organize the knowledge and to perform the needed tasks for that command such as translation, speech recognition and topic segmentation.

1. NLP helps the user to ask questions and get direct answer related to that topic within a seconds.
2. It also provides the accurate answers that a user needed. It is not providing any other unnecessary or unless answer. (Figure 2)[3].

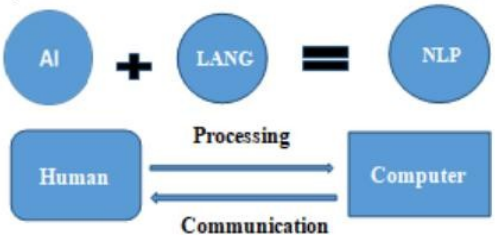



Figure 2 : Natural Language Processing

**Speech Recognition**

The speech recognition system is the most important art of a voice assistant. In other words it's a core part of the Virtual Voice Assistant application, which is capable to understand the voice command given by the user, and at that same time operating system generate the user's input feedback and revert back to the user. Basically the word speech recognition is defines as the performing any operation by machine by only the verbally command of user. To get the command and work accordingly to that without showing any error. We should consider that the speech recognition system contains a whole process in which a user gives the some input to the application and then system will direct the generation according to that input. Voice signal to text data and some important meanings, forms of speech. So we can see clearly the work of it in figure 3.

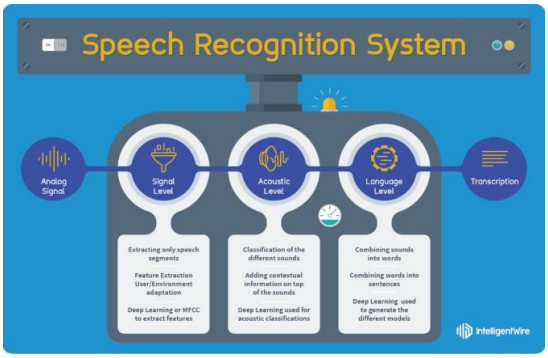



Figure 3 : Speech Recognition System

**OpenAI Artificial Intelligence**

The ELLA is a artificial intelligence bases application. For AI features we need an API (Application Programming Interface) for asking response from the Application and make machine to perform that specified operation. For this firstly we need an openaitest python file and an API_KEY for performing these operations like email, messaging and other texting operations. So, we are create an secret key of API and then a config. File is needed for this. After this share some attributes from the config file and openaitest file in main file.

```
import openai
from config import apikey
```

by the above code we can access the API_KEY from config file into openaitest file and also in Main file.

**3. Virtual Assistant System Architecture**

In this section we are know about the whole process of ELLA by a FlowChart. How's a Voice assistant works.

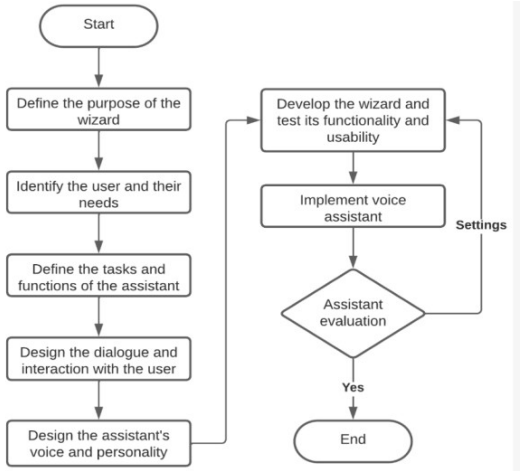



Figure 4 : Voice Assistant Architecture

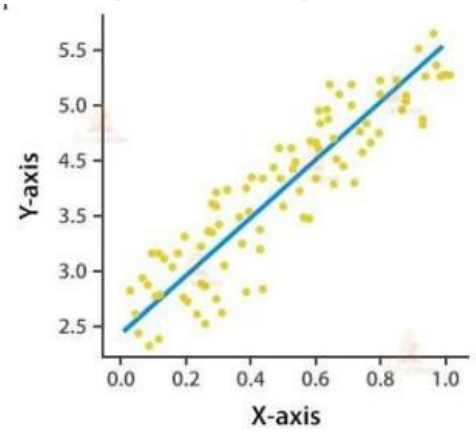
In above figure as we see here clearly the Voice assistant have many stages of working, this is a type of

flow chart of how an virtual voice assistant works taking input from user and try to follow that command for performing the right operation.

**Linear Regression Concept**

This algorithm is a method of finding a linear relationship between a dependent variable and an independent variable by minimizing the distance. This is a supervised algorithm. Here, we use a machine learning supervised algorithmic approach to categorize individual categories. Using this algorithm, we created a voice

assistant model that allows users to predict relationships between dependent and independent entities.[3]




Use Case Diagram

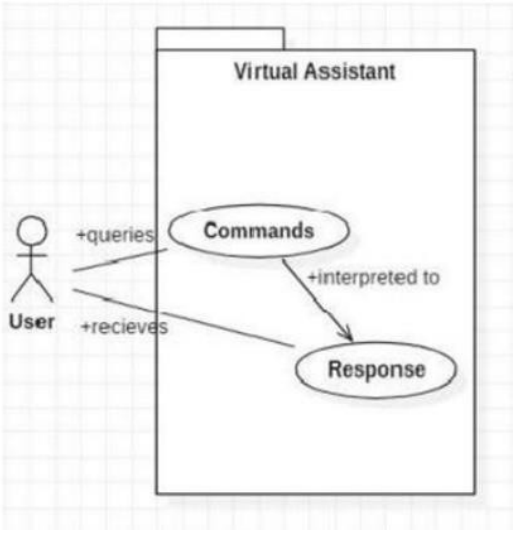



Figure 5 : Use Case Diagram

The above figure is taken only to illustrate the things, that how an normal voice assistant taking the command from the user and then further processing that command by the help of interpreter and provide response by machine as quick as possible (approx. 0.2 -0.4sec).

**Proposed System**

- The voice assistant initiates voice mode and prompts the user to provide input in voice/text format for best results. It means when an user wants to give command to machine by voice then the machine taking the input along with displays the inputted text over the screen and when it will try to response the voice assistant words also displays on the screen at the time of execution the process on commanding prompt or in terminal.

- Using this application, which is Wikipedia's search engine. When an user asking something from ELLA then it will try to search the solution of that problem or related article to that specific topic and will respond in audible format, with a limited number of lines.

- Getting Current Time is the function in which when you ask the time from Voice assistant then it will greet the user by hour cycle of day like in the time period of morning it will greet the user by good morning and in evening by good evening automatically calculating the hours cycle of a day and will tell exact the time in hour and min format.

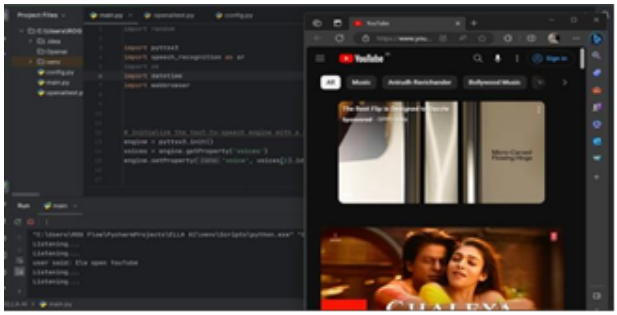
- Open Different Website by a single command like YouTube, Wikipedia, News Website system applications with the help of web browser python library and os for opening system applications(like, notepad, chrome, etc.).

## 4. Conclusion

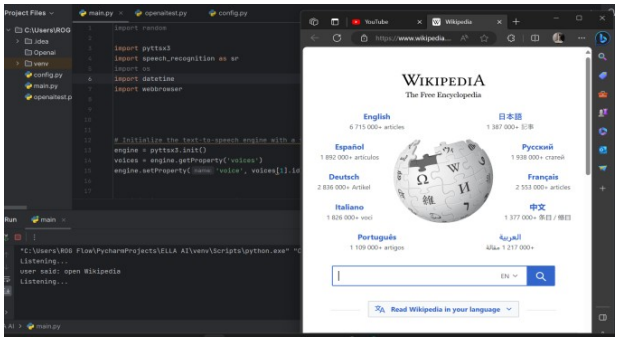
ELLA - An AI Voice Assistant System uses the speech recognition, API and any other AI techniques along with the neural networks and Natural Language Processing with for a smart responsive system according to the problem statement and conditions. This is a small try to develop a type of smart system that can be trying to reduce to the basic human workload like daily routine works that are so basic but needed. So, those type of works can be done by only a single command to machine. Its like a personal assistant for a human and can replace some human posts like secretaries employed for scheduling a person's per day time table.

The system will consist of the following phases: the input phase, during which data or a question are provided in written or spoken form. Text to voice interpretation, processing and preserving data, resulting in speech output from the processed to ELLA console through text. The data generated at each phase afterwards used to find patterns and assess them for used afterwards. This may serve as the major inspiration for artificial intelligence tools to discover and identify trends for people. In light of this literature review and analysis, enduring systems, the inference is made that our The offered technology will simplify communication with people better organized while also using systems and modules.

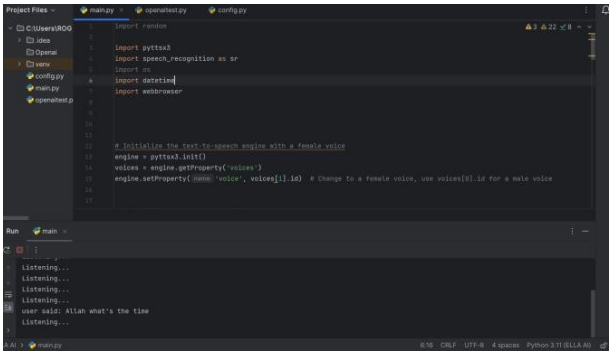
## 5. Result of the system



When we are command the assistant it opens the web browser and redirect to the Youtube page




As we are commanding the machine same thing as like upper thing



after all the above things when we are trying to perform any other operations it also responds according to the command. Like asking the current time in format of hours and minutes.

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