

# VIRTUAL ASSISTANT USING PYTHON

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## ABSTRACT

The development of technology in our digital age makes daily life wiser and simpler. This also includes the assistance that merely serves to instruct people. In Virtual Assistant, a voice command is used as the input, and it output desired result—which may also be visually appealing like delivered as a voice or/and a visual display on the screen. An input device is a microphone (Bluetooth Wired or already assembled). There are numerous well-known virtual assistants.

They help human in many ways to solve their daily routine problems like sending messages, setting alarm, providing latest news, schedule tasks, schedule remainder, play video or music from the internet or local disks etc. The creation of natural conversation between humans and robots is the primary objective of the virtual assistant.

**Keywords:** - Virtual assistant, Speech-to-Text, Text-To-Speech, Python, Modules, Neural Network, Dataset, NLP, NLTK

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## 1. INTRODUCTION

A software agent known as an intelligent virtual assistant (IVA) or intelligent personal assistant (IPA) can carry out tasks or provide services on behalf of a user in response to orders and inquiries. Virtual assistants that may be accessed through online chat are occasionally referred to as "chatbots." Online chat systems can occasionally only be used for amusement. Future-oriented technologies are reshaping digital experiences and altering how people interact with the world, including virtual reality, augmented reality, voice interaction, and IoT. One of the significant achievements in human-machine interface, made possible by advances in artificial intelligence, is voice control. With the use of modern technologies, we can teach machines to complete their work independently of human assessment or to think like humans.

The majority of text searches are now voice searches. Just recently mobile device web searches surpassed text-based ones, and by 2020, 50% of all searches will likely be voice-based, according to estimates. It appears that virtual assistants are now more intelligent than before. It takes input in text, voice or image.

### 1.1 Basic tasks that Virtual assistants can performs are -

- Voice based web browsing
- Play music or video on Internet or Local disk
- Set any reminder and alarm and create notes
- Run any App
- Desktop related tasks like take screenshot, minimize window etc.
- Getting weather and News updates

- Sending messages and emails and more

## 2. RELATED WORK

Virtual assistants have a long going history and have achieved some significant functional advancements throughout the years. In order to give general information (theory and concepts) concerning voice control, virtual assistants, sectors of application, and other issues, this study is based on an insufficient assessment of the literature. Currently available intelligent software is employed in many facets of daily life and is capable of handling natural language in a variety of ways.

A Python-based Voice-Activated Desktop Assistant was proposed by (Dhiraj Pratap Singh). Python imports the Google Speech Recognition API. This module is used to identify the voice that the user provides as input. The speech recognition module initially converts the voice that is provided as input into text. The text is subsequently processed to produce the answer to the user's query. The result of the processed query is converted to speech as the last stage, which is the final output suggested by an AI-based voice assistant. The primary tenet guiding the operation of AI-based voice assistants is automatic speech recognition, or ASR. The voice assistant speaks like a human thanks to TTS engine.

(Ankush Yadav et al) provided a voice assistant for persons who are blind or visually impaired who want to browse the internet or complete a basic task on their PC. The basic idea is that voice assistants make it possible for persons who are partially or completely blind to live independently in ways that were before unthinkable. They propose a voice assistant that runs on the cloud, which would satisfy any concerns about privacy in general. Any worries the user may have about his or her data being misused are allayed by the fact that employees and various contractors can use the data gathered by the voice assistant. Additionally, the user can send and reply to emails, SMS, etc. via accepting voice input.

## 3. SYSTEM ARCHITECTURE

It consists of following components-

**1-Dataset**-It is in this form-

```
{"intents": [ {"tag": "", "patterns":["Hi"],"responses": "Hello!"}]}
```

Where pattern is input and tag is corresponding output given as dataset in Neural Network.

**2-NLP**-Dataset is preprocessed by NLP like tokenize, stemming and represented using bag of word.

**3-Neural Network**-It is implemented by using torch module of python. It consists of three type of node –input, hidden and output node. It generates a trained model.

**3-Trained Model**-It is generated by using Neural Network and dataset and after training it can predict the intent of a user query.

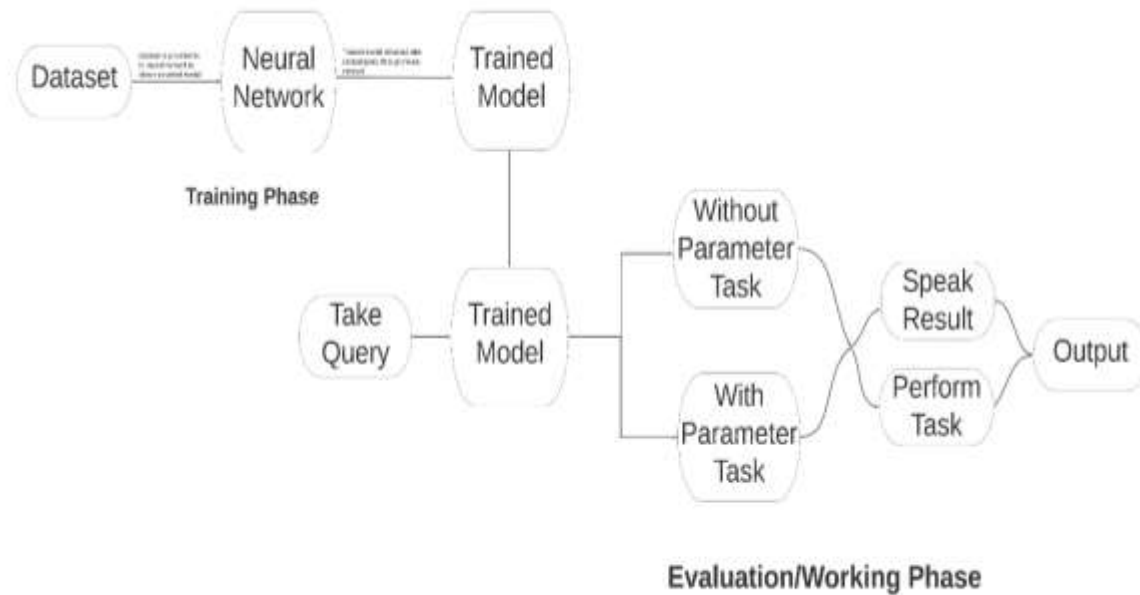
**4-Take Query**-It take user input/query in the form text or speech and pass it to trained model to get the intent.

**5-Task**-After intent is obtained then corresponding task is executed. It is of two type –

i-With parameter

ii-without parameter

**6-Output-**It output the result of the user query in the form of task and also speech using speak component.



**Fig -1:** Architecture of Virtual Assistant

### 3.1. PROBLEM DEFINITION

The pattern recognition techniques now used by voice assistants are unreliable, context-free, and prone to errors. It costs more, involves more time, and calls for the internet. The complexity of time and space is increased by the fact that they also need database servers to store data. Additionally, the existing system creates a risk to everyone's privacy since when we give commands, they are recording to the users, such as his sleep patterns, financial information, address, and contacts. It is not possible to add a custom command and result, such as "what is my friend's name, results, your friend's name is Ram," because commands are prebuilt.

### 3.2. PROPOSED SYSTEM

In our envisioned virtual assistant system, which will fix some issues with the existing system while also introducing some new features, we are utilising machine learning's neural network and incorporating NLP. NLP is a significant step in addressing many flaws with the current system, such as the failure of pattern recognition to understand unfamiliar commands to some extent by our intended system. Our model will work in both an online and offline format (with some restrictions). No database server will be used; instead, the data will be stored locally and processed later. Privacy concerns will also be alleviated as data is stored locally. This project will also offer customised commands and results so that we may add our own commands and their results. As a result, the user can add their own commands and responses, making it completely useable and configurable.

## 4. METHODOLOGY

The virtual assistant was developed using Python programming language and VS Code as the primary development environment. The PyQT5 GUI framework was utilized to build the user interface, while the neural network was

implemented using the PyTorch library. The dataset was collected and preprocessed using various NLP techniques such as tokenization, stemming, and bag of words and implement by NLTK library.

The development process involved several stages, including requirement gathering, data collection, model training, and testing. The requirement gathering phase involved identifying the functionalities that the virtual assistant should perform, such as answering questions, setting reminders, and playing music.

The data collection phase involved collecting a diverse set of real-world user queries related to the identified functionalities.

The model training phase involved firstly data collected were pre-processed using NLP techniques such as tokenization and stemming to generate a clean dataset. The bag of words approach was used to represent the input text, and the model then trained using the backpropagation algorithm in neural network and optimized using the stochastic gradient descent method.

Finally, the testing phase involved evaluating the performance of the virtual assistant by providing it with test queries and measuring its accuracy and response time. Any issues or bugs identified during testing were fixed.

## 5. CONCLUSION

Virtual assistants are helpful for daily tasks including setting an alarm, taking notes, calling, sending messages, knowing information, and many other things. There are numerous virtual assistants available for a wide range of device platforms and applications. Since they are more portable and available at all times, they are more dependable than a human personal assistant. As they are connected to the internet, they have access to a wealth of information. Virtual assistants automate all processes on desktops and smartphones by handling each command independently without requiring user input. We go over the structure of the virtual assistant, how it functions, and which technologies were employed to construct it. Future upgrades to this virtual assistant will include new technologies and features.

## 6. REFERENCES

- [1]. Cortana Intelligence, Google Assistant, Apple Siri
- [2]. <https://www.upgrad.com/blog/top-artificial-intelligence-project-ideas-topics-for-beginners/>
- [3]. <https://www.activestate.com/blog/how-to-build-a-digital-virtual-assistant-in-python/>
- [4]. <https://machinelearning.org.in/build-a-virtual-assistant-using-python/>
- [5]. <https://pythongeeks.org/python-voice-assistant-project>
- [6]. [https://en.m.wikipedia.org/wiki/Virtual\\_assistant](https://en.m.wikipedia.org/wiki/Virtual_assistant)
- [7]. <https://data-flair.training/blogs/artificial-intelligence-project-ideas/>
- [8]. pypi.org