Python Based Virtual Assistant App

6 Weeks Industrial Training Project Report submitted in partial fulfillment of the requirements for the award of degree of

Master of Technology

in

Computer Science and Engineering

Submitted By

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Semester: 7th

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Industrial Training Report

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This is to certify that **Mr/Ms. Gursimranjeet Singh** S/D/O **Mr. Harjeet Singh** pursuing **M.Tech** from Sri Guru Granth Sahib World University, Fatehgarh Sahib has successfully completed his/her internship in **Python** Department at Impinge Solutions from **June 2020 to July 2020.**

During the internship period **Mr/Ms. Gursimranjeet Singh** worked on project named **"Virtual Assistant"** and performed most of the task to our expectations.

We wish him/her all the best for his/her future endeavours.

If you have any query regarding training, please contact the HR Department at: 0172-5097801,802

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Declaration

I, Gursimranjeet Singh, hereby declare that the present report of Summer Training titled Python Programming is uniquely prepared by me after the completion of 6 weeks training at Impinge Solutions, Mohali.

I also confirmed that the report is only prepared for my academic requirements not for any other purpose. It might not be useful with the interest of opposite party of the corporation.

……

Gursimranjeet Singh

17015101

M.Tech. 5Yr. CSE 7th Sem.

Acknowledgement

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them.

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I would like to express my special gratitude and thanks to industry persons for giving me such attention and time.

My thanks and appreciations also go to my teachers for helping me in development of the project and people who have willingly helped me out with their abilities.

About Impinge Solutions, Mohali

Impinge Solutions is a global IT solution company providing full-cycle services in areas of custom web design, web development, mobile app development, SEO, hosting & support. Combining our solid business domain experience, technical expertise, profound knowledge of latest industry trends and quality-driven delivery model we offer progressive end-to-end solutions.

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Chapter 1-Introduction to Project

Our digital life is determined by innovations. Especially in recent years, more innovative technologies were developed to facilitate our professional and everyday life.

Intelligent personal assistants are an important achievement, which have become an indispensable part of the ubiquitous digitalization process.

These virtual assistants can be found in all gadgets such as smartphones, tablets and also smart watches now. The increasing competition in this area has led to many improvements. Big companies like Amazon, Google, Microsoft and Apple offer a complete digital infrastructure that can be controlled by voice assistants.

1.1 How does an intelligent personal assistant work?

A virtual assistant is a ***technology based on artificial intelligence***. The software uses a device's microphone to receive voice requests while the voice output takes place at the speaker. But the most exciting thing happens between these two actions.

It is a combination of several different technologies: voice recognition, voice analysis and language processing.

When a user asks a personal assistant to perform a task, the natural language audio signal is converted into digital data that can be analyzed by the software. Then this data is compared with a database of the software using an innovative algorithm to find a suitable answer. This database is located on distributed

servers in cloud networks. For this reason, most personal assistants cannot work without a reliable Internet connection.

With the increasing number of queries the software's database gets expanded and optimized, which improves voice recognition and increases the response time of the system.

1.2 Future trends concerning intelligent personal assistants

Developers of intelligent personal assistants extended their application systems with smart hubs. Those home automation systems enable a connection of all household appliances, thermostats, windows, security systems and much more. However, home objects must have a special format that is compatible with the respective system of Google, Amazon or Apple, for example.

Manufacturers of automobiles want to equip vehicles with intelligent personal assistants. They can receive real-time data and do many things that are normally done manually. For example, the technology can remind the driver of upcoming meetings and suggest departure times that take into account current road and traffic conditions.

My project is also based on virtual assistant on a small scale because my project does not include machine learning while rest of the assistant include machine learning which help them to learn with time and by interacting more and more with people.

The virtual assistant present in my project can perform only those tasks which I have programmed into it. If we try to ask those command to my assistant it

will reply in negative and say that I am not able to understand you at the moment.

My assistant can perform daily life task which we generally do in our computer system. I can automate some very boring stuff for you like opening software, typing anything, dictate anything, searching on google, telling horoscope, telling jokes, motivating you to work, and ay type of general question you want to ask from it, most probably my assistant can reply to your answer.

1.3 What this assistant is capable of doing

- It will wish you (Good Morning, Good Afternoon, Good Evening) on startup based upon time of the day.
- It can search anything in Wikipedia for you.
- It can search any word from the dictionary for you.
- It can tell multiple antonyms of any word you want.
- It can tell multiple synonyms of any word you want.
- It can motivate you by telling motivational quotes.
- It can tell your horoscope for a day, week, month, year.
- It can tell stats for coronavirus.
- It can answer any general question you ask from it related to mathematics, science and technology, society and culture, everyday life.
- It can directly open any website you want.
- It has an internal snake game which you can play on voice command.
- It can tell you the current date.
- It can tell you the current time.
- It can take screenshot for you and save it and it will also show it to you instantly if you want.
- It can search any video directly from YouTube.
- It can increase and decrease you laptop’s brightness.
- It can tell you the battery status, charging status, time left.
- It can also lock you pc when you are leaving you pc for some time.

- It can also translate text from English into any language you want.
- It can search directly into google.
- It can tell jokes for you and will make you happy.
- It can locate any city, state and country you want and will show its location on the maps.
- It can read any text you want to hear from it.
- It can also play music for you.
- It can also change its gender which in result change its default men voice to women voice if you want.
- It can close any window which is open in front of you.
- It can also do typing for you. It will type the whole text which you will speak to it.
- It can tell you weather report of any city.
- It can also perform editing actions on text like selecting the whole text, copying anything, pasting anything, and undo-redo operations on voice command.
- It can also close itself if you say good bye to it.
- It can send emails to anyone you want.
- And it perform all these task on voice command, you don’t need to type anything or click anything for it to perform.

Chapter 2 Tools and Technology Used

This project is entirely made in python. I have used PyCharm. Community edition as an IDE for my project to write the code in it and run the project. Python is developed by Guido van Rossum. Guido van Rossum started implementing Python in 1989. Python is a very simple programming language so even if you are new to programming, you can learn python without facing any issues.

1. Readable: Python is a very readable language.

2. Easy to Learn: Learning python is easy as this is a expressive and high level programming language, which means it is easy to understand the language and thus easy to learn.

3. Cross platform: Python is available and can run on various operating systems such as Mac, Windows, Linux, Unix etc. This makes it a cross platform and portable language.

4. Open Source: Python is a open source programming language.

5. Large standard library: Python comes with a large standard library that has some handy codes and functions which we can use while writing code in Python.

6. Free: Python is free to download and use. This means you can download it for free and use it in your application. See: Open Source Python License. Python is an example of a FLOSS (Free/Libre Open Source Software), which means you can freely distribute copies of this software, read its source code and modify it.

7. Supports exception handling: If you are new, you may wonder what is an exception? An exception is an event that can occur during program exception and can disrupt the normal flow of program. Python supports exception handling which means we can write less error prone code and can test various scenarios that can cause an exception later on.

8. Advanced features: Supports generators and list comprehensions. We will cover these features later.

9. Automatic memory management: Python supports automatic memory management which means the memory is cleared and freed automatically. You do not have to bother clearing the memory.

2.1 What Can You Do with Python?

You may be wondering what all are the applications of Python. There are so many applications of Python, here are some of the them.

1. Web development – Web framework like Django and Flask are based on Python. They help you write server-side code which helps you manage database, write backend programming logic, mapping URLs etc.

2. Machine learning – There are many machine learning applications written in Python. Machine learning is a way to write a logic so that a machine can learn and solve a particular problem on its own. For example, products recommendation in websites like Amazon, Flipkart, eBay etc. is a machine learning algorithm that recognizes user's interest. Face recognition and Voice recognition in your phone is another example of machine learning.

3. Data Analysis – Data analysis and data visualization in form of charts can also be developed using Python.

4. Scripting – Scripting is writing small programs to automate simple tasks such as sending automated response emails etc. Such type of applications can also be written in Python programming language.

5. Game development – You can develop games using Python.

6. You can develop Embedded applications in Python.

7. Desktop applications – You can develop desktop application in Python using library like TKinter or QT.

I have used TKinter library in this project for making the UI of the software.

2.2 Third Party Libraries Used

Third party Libraries are those libraries which are not present in python out of the box. We need to install these types of libraries/modules using pip module. Pip helps to install third party modules very easily.

pyttsx3: It is a text-to-speech conversion library in Python. Unlike alternative libraries, it works offline, and is compatible with both Python 2 and 3.

Speech Recognition 3.8.1: It is a Library for performing speech recognition, with support for several engines and APIs, online and offline.

Speech recognition engine/API support:

- CMU Sphinx (works offline)

- Google Speech Recognition
- Google Cloud Speech API
- Wit.ai
- Microsoft Bing Voice Recognition
- Houndify API
- IBM Speech to Text
- Snowboy Hotword Detection (works offline)

Translate 3.5.0: Translate is a simple but powerful translation tool written in python with support for multiple translation providers. By now we are integrated with Microsoft Translation API and Translated My Memory API

Keyboard 0.13.5: Take full control of your keyboard with this small Python library. Hook global events, register hotkeys, simulate key presses and much more.

Features:

- Global event hook on all keyboards (captures keys regardless of focus).
- Listen and send keyboard events.
- Works with Windows and Linux (requires sudo), with experimental OS X support (thanks @glitchassassin!).
- Pure Python, no C modules to be compiled.
- Zero dependencies. Trivial to install and deploy, just copy the files.
- Python 2 and 3.
- Complex hotkey support (e.g. ctrl+shift+m, ctrl+space) with controllable timeout.
- Includes high level API (e.g. record and play, add_abbreviation).
- Maps keys as they actually are in your layout, with full internationalization support (e.g. Ctrl+ç).
- Events automatically captured in separate thread, doesn't block main program.
- Tested and documented.
- Doesn't break accented dead keys (I'm looking at you, pyHook).

- Mouse support available via project mouse (pip install mouse).

Clipboard 0.0.4: A cross platform clipboard operation library of Python. Works for Windows, Mac and Linux.

Requests 2.24.0: Requests allows you to send HTTP/1.1 requests extremely easily. There's no need to manually add query strings to your URLs, or to form-encode your PUT & POST data — but nowadays, just use the json method!

WMI 1.5.1: Windows Management Instrumentation (WMI) is Microsoft's implementation of Web-Based Enterprise Management (WBEM), an industry initiative to provide a Common Information Model (CIM) for pretty much any information about a computer system. The Python WMI module is a lightweight wrapper on top of the pywin32 extensions, and hides some of the messy plumbing needed to get Python to talk to the WMI API. It's pure Python and has been tested against all versions of Python from 2.5 to 3.4. It should work with any recent version of pywin32.

psutil 5.7.2: psutil (process and system utilities) is a cross-platform library for retrieving information on running processes and system utilization (CPU, memory, disks, network, sensors) in Python. It is useful mainly for system monitoring, profiling and limiting process resources and management of running processes. It implements many functionalities offered by classic UNIX command line tools such as ps, top, iotop, lsof, netstat, ifconfig, free and others. psutil currently supports the following platforms:

- Linux
- Windows
- macOS
- FreeBSD, OpenBSD, NetBSD
- Sun Solaris

- AIX

…both 32-bit and 64-bit architectures. Supported Python versions are 2.6, 2.7 and 3.4+, PyPy 2.7 and 3.X.

Wikiquote 0.1.14: The wikiquote Python 3 module allows you to search and retrieve quotes from any Wikiquote article, and also retrieve the quote of the day. Please keep in mind that due to Wikiquote's varying article layouts, some quotes may not be retrieved correctly.

Ctypes: ctypes is a foreign function library for Python. It provides C compatible data types, and allows calling functions in DLLs or shared libraries. It can be used to wrap these libraries in pure Python**.**

PyAutoGUI 0.9.50: PyAutoGUI is a cross-platform GUI automation Python module for human beings. Used to programmatically control the mouse & keyboard.

Wikipedia: Wikipedia is a Python library that makes it easy to access and parse data from Wikipedia. Search Wikipedia, get article summaries, get data like links and images from a page, and more. Wikipedia wraps the MediaWiki API so you can focus on using Wikipedia data, not getting it.

pygame 1.9.6: Pygame is a Python wrapper module for the SDL multimedia library. It contains python functions and classes that will allow you to use SDL's support for playing cdroms, audio and video output, and keyboard, mouse and joystick input.

Wolframalpha API: Alpha defined a fundamentally new paradigm for getting knowledge and answers—not by searching the web, but by doing dynamic

computations based on a vast collection of built-in data, algorithms and methods. Bringing broad, deep, expert-level knowledge to everyone… anytime, anywhere.

PyDictionary 2.0.1: PyDictionary is a Dictionary Module for Python 2/3 to get meanings, translations, synonyms and Antonyms of words. It uses WordNet for getting meanings, Google for translations, and synonym.com for getting synonyms and antonyms. This module uses Python Requests, BeautifulSoup4 and goslate as dependencies.

Chapter 3 Project Snapshots

This project does not have any interface that's why there are no snapshots available. This project works entirely on your voice commands. It will keep heedfully discerning you all the time and when it will heedfully discern any command from you it will expeditiously respond to you by replying back through voice and will perform your task.

The only UI element present in my project is assistant's mic. When you open it first time you will have to click on the mic button which will let assistant to aurally perceive you.

Chapter 4 Conclusion and Future scope

This was the whole project. I have described all its capabilities and task which it can perform. These tasks could be very less as compared to other voice assistants in the market like google assistant, Microsoft cortana, amazon alexa, apple siri. But those are developed by astronomically immense teams and with a plethora of efforts and time.

I am sufficiently certain that my assistant can additionally be homogeneous to those auxiliaries in future with lots of strenuous exertion and time. I will be utilizing latest technologies and latest updates to develop my assistant so that it can perform the best. I will be working on natural language processing so that user can verbalize anything to the assistant and assistant should reply to it accordingly. I will be including a chatbot which will chat with the user on arbitrary topics and will keep the conversation going no matters user get out of conceptions to verbalize.