# VIRTUAL PERSONAL ASSISTANT

# A Mini Project Report submitted for the partial fulfilment of the requirement for the award of the degree of

**MASTER OF COMPUTER APPLICATIONS**

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#### DEPARTMENT OF COMPUTER APPLICATIONS MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE UGC-AUTONOMOUS

(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)

2020 – 2022

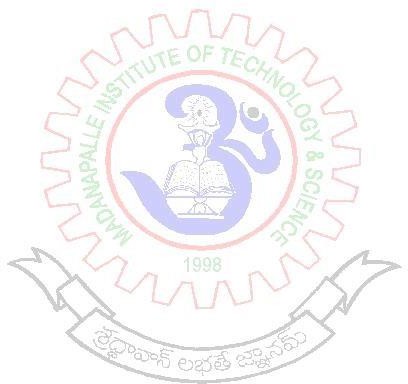
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# DEPARTMENT OF COMPUTER APPLICATIONS

**BONAFIDE CERTIFICATE**

This is to certify that the mini project work entitled “**VIRTUAL PERSONAL ASSISTANT”** is a bonafide work carried out by SWATHI.G(**Regd.No.20691F00I2),SUBRAMANYAM.A**(**Regd.No.20691F00H5),ARAVIND T S**

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## DECLARATION

We **SWATHI.G**(**Regd.No:20691F00I2*),*SUBRAMANYAM.A**(**Regd.No:20691F00H5)*,* ARAVIND T S**(**Regd.No:20691F00D1*),*** hereby declare that the mini project entitled **“VIRTUAL PERSONAL ASSISTANT*”*** is done by us under the guidance of **Dr.C.SIVARAJ, M.C.A, Ph.D.** submitted in partial fulfilment of the requirements for the award of degree of Master of Computer Applications at **MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE,** Madanapalle, affiliated to **Jawaharlal Nehru Technological University Ananthapuram** during the academic year 2020-2021. This work has not been submitted by anybody towards the award of any degree.

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We also wish to express my thanks to our Vice Principal(academics), **Dr. P. Ramanathan** for his continuous support throughout my MCA career.

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**ABSTRACT**

In this modern era, day to day life became smarter and interlinked with technology. We already know some voice assistance like google, Siri. etc. Now in our voice assistance system, it can act as a basic medical prescriber, daily schedule reminder, note writer, calculator and a search tool. This project works on voice input and give output through voice and displays the text on the screen. The main agenda of our voice assistance makes people smart and give instant and computed results.Natural Language Processing algorithm helps computer machines to engage in communication using natural human language in many forms

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**INTRODUCTION**

Today the development of artificial intelligence (AI) systems that can organize a natural human-machine interaction (through voice, communication, gestures, facial expressions, etc.) are gaining in popularity. One of the most studied and popular was the direction of interaction, based on the understanding of the machine by the machine of the natural human language. It is no longer a human who learns to communicate with a machine, but a machine learns to communicate with a human, exploring his actions, habits, behaviour and trying to become his personalized assistant

#### Existing System

**2. SYSTEM ANALYSIS**

❖ The term virtual assistant, or virtual personal assistant, is also commonly used to describe contract workers who work from home doing administrative tasks typically performed by executive assistants or secretaries. Virtual assistants are typically cloud-based programs that require internet-connected devices and/or applications to work.

❖ Three such applications are Siri on Apple devices, Cortana on Microsoft Devices and Google Assistant on Android devices. There are also devices dedicated to providing virtual assistance. The most popular ones are available from Amazon, Google and Microsoft. To use the Amazon Echo virtual assistant, called Alexa, users call out the wake word, "Alexa." A light on the device signals to the user it is ready to receive a command, which typically involves simple language requests, such as "what is the weather today," or "play pop music."

❖ Those requests are processed and stored in Amazon's cloud. The technologies that power virtual assistants require massive amounts of data, which feeds artificial intelligence (AI) platforms, including machine learning, natural language processing and speech recognition platforms. As the end user interacts with a virtual assistant, the AI programming uses sophisticated algorithms to learn from data input and become better at predicting the end user's needs.

#### Proposed System:

❖ To design a device that acts as a digital organizer to provide variety of services to its master. It will look at examples of intelligent programs with natural language processing that are currently available, with different categories of support, and examine the potential usefulness of one specific piece of software as a VPA.

❖ It continues to expand its digital abilities in organizing events, ordering food, playing music, guiding services for travelling, game prediction etc. It is suggested that new technologies may soon make the idea of virtual personal assistants a reality. Experiments conducted on this system, combined with user testing, have provided evidence that a basic program with machine learning algorithms in the form of a digital personal assistant.

❖ Using machine learning algorithms to iteratively learn user’s preference for each theme based on quality feedback given by the user. The concept of a virtual assistant which is a digital service looking after a range of our needs is fast becoming a reality.

❖ As artificial intelligence and machine learning progress at pace, digital assistants are set to become our gateway to the internet and know more about us than we do ourselves. Siri and Google now are just the beginning. The device accepts voice input processes it through various machine learning algorithms to provide desired output to user

## HARDWARE AND SOFTWARE SPECIFICATIONS

**HARDWARE SPECIFICATIONS**

❖ Pentium-pro processor or later

❖ RAM 512MB or more

#### SOFTWARE SPECIFICATIONS

❖ Windows 7(32-bit) or above

❖ Python 2.7 or later

❖ Chrome Driver

❖ Selenium Web Automation

#### 2.5 Advantages

❖These applications make small and smart hand held devices to combined multiple features

❖Store various information

❖Recognizes voice commands

❖Controls various applications of device

## FEASIBILITY STUDY

The feasibility of the project and the possibility that the system will be valuable to the organisation are examined during the preliminary investigation. The feasibility study's major goal is to determine the technical, operational, and financial viability of adding new modules and troubleshooting an existing system. If you give any system unlimited resources and endless time, it will work. There are some components of the preliminary investigation's feasibility study

* Technical Feasibility
* Operational Feasibility
* Economic Feasibility

#### Technical Feasibility:

During the feasibility stage of a study, the following technical issues are frequently raised:

It includes finding out technologies for the project, both hardware and software. For virtual assistant, user must have microphone to convey their message and a speaker to listen when system speaks. These are very cheap now adays and everyone generally possess them. Besides, system needs internet connection. While using JIA, make sure you have a steady internet connection. It is also not an issue in this era where almost every home or office has Wi-Fi

#### Economical Feasibility:

Here, we find the total cost and benefit of the proposed system over current system. For this project, the main cost is documentation cost. User also would have to pay for microphone and speakers. Again, they are cheap and available. As far as maintenance is concerned, JIA won’t cost too much

#### Operational Feasibility:

It is the ease and simplicity of operation of proposed system. System does not require any special skill set for users to operate it. In fact, it is designed to be used by almost everyone. Kids who still don’t know to write can readout problems for system and get answers

#### Module Description:

1. **SYSTEM DESIGN**

The following are some of the modules present in the virtual personal assistant

* + SPEECH RECOGNITION
  + TEXT TO SPEECH
  + WIKIPEDIA
  + PYTTSX3
  + WEB BROWSER

#### Speech Recognition:

#### The system uses Google’s online speech recognition system for converting speech input to text.

#### The speech input Users can obtain texts from the special corpora organized on the computer network server at the information center from the microphone is temporarily stored in the system which is then sent to Google cloud for speech recognition.

#### The equivalent text is then received and fed to the central processor

#### Text to speech:

Text-to-Speech (TTS) refers to the ability of computers to read text aloud.

A TTS Engine converts written text to a phonemic representation, then converts the phonemic representation to waveforms that can be output as sound.

TTS engines with different languages, dialects and specialized vocabularies are available through third-party publishers

#### Rows & Columns

* Rows and columns are what they sound like.
* The image is an extract of the data used to produce the cross-tabulation .
* These data are from the Integrated Postsecondary Education Data System

#### UTILS:

* Python Utils is a collection of small Python functions and classes which make common patterns shorter and easier.
* It is by no means a complete collection but it has served me quite a bit in the past and I will keep extending it.
* One of the libraries using Python Utils is Django Utils

#### WIKIPEDIA:

It is used to fetch a variety of information from the Wikipedia website. To install this module type the below command in the terminal

* + 1. **PYTTSX3:**

 pyttsx is a cross-platform text to speech library which is platform independent. The major advantage of using this library for text-to-speech conversion is that it works offline. To install this module type the below command in the terminal

**3.1.6 WEB BROWSER:**

Itprovides a high-level interface which allows displaying Web-based documents to users. To install this module type the below command in the terminal 5

#### UML Diagrams

UML stands for Unified Modelling Language. UML is a standardized general-purpose modelling language in the field of object-oriented software engineering. The main aim of the UML diagrams is for creating models of object oriented computer software. The Unified Modelling Language is a standard language for specifying, Visualization, Constructing and documenting the software system, as well as for business modelling and other non-software systems. The UML represents a collection of best engineering practices that have proven successful in the modelling of large and complex systems. The Unified Modelling Language uses mostly graphical notations to express the design of software projects and their flow. Various UML diagrams are used in this project to understand the flow of the system easily. The system flow is depicted using Class diagram, Use case diagram, Sequence diagram, Data Flow Diagram etc. which are shown below.

## LIST OF UML DIAGRAM TYPES:

* Use Case Diagram
* Class Diagrams

#### 3.3.1. Use Case Diagram:

* A use case Diagram can be regarded as good starting point for discussing project key actors and processes without going into too many implementation details.
* This UML diagrams is also the most popular type of the Behavioral UML diagram category, and is used to analyze the functionality (the use cases) and the interactions with different types of agents (actors) of a system.
* For business cases, enterprises may use such diagrams to check out the customer order system by monitoring the stock, product quality and so on.
* For daily life cases, Use Case diagrams are similar to the Hot Sale product list of your local supermarket. You know the product name and its prices according to the list when making your purchasing decision.

Diagram

Description automatically generated

#### Class Diagram:

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of diagram that describes the structure of the system by showing the system's classes, their attributes, operations or methods and the relationships among the classes. Here in the secure software project, the class diagram shows the different classes used in this system, and their relationship among them Following figure shows the class diagram of secure software system process.

* + - * It is the most widely used UML diagram sub-category.
      * The class diagram is the building block of all object-oriented software systems. Users can depict the static structure and identify classes relationship of a system by checking system's classes and attributes.
      * Each class has three basic elements: the class name at the top, the class attributes in the middle, and the class behaviors at the bottom.
      * In reality, you can create classes such as "Sales Account" or "Online User" in business systems, or "Teacher" and "Student" in academic systems.

Diagram

Description automatically generated

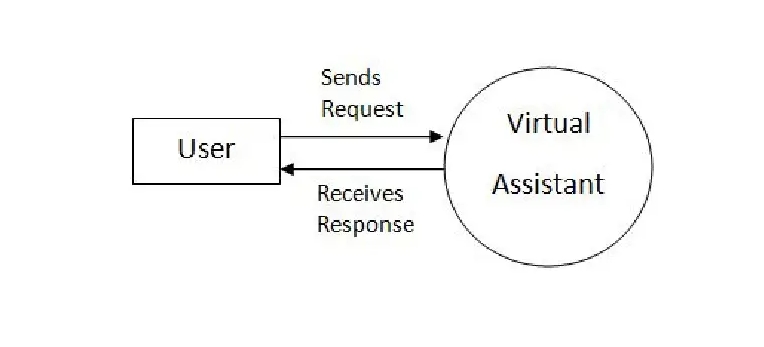
#### 3.3.3 ER DIAGRAM:

Diagram

Description automatically generated

#### 3.3.4 DATA FLOW DIAGRAM:

* Data Flow diagram shows the flow of the project at different levels.
* Data flow diagrams are used by information technology professionals and systems analysts to document and show users how data moves between different processes in a system.
* Analysts generally start with an overall picture and then move on to the finer details of each process.



## SYSTEM IMPLEMENTATION

#### Language Selection PYTHON

* + - Python is a[n interpreted](https://en.wikipedia.org/wiki/Interpreted_language) [high-level](https://en.wikipedia.org/wiki/High-level_programming_language) [general-purpose programming language](https://en.wikipedia.org/wiki/General-purpose_programming_language). Its design philosophy emphasizes [code readability](https://en.wikipedia.org/wiki/Code_readability) with its use of [significant indentation](https://en.wikipedia.org/wiki/Off-side_rule).
    - Its [language constructs](https://en.wikipedia.org/wiki/Language_construct) as well as its [object-oriented](https://en.wikipedia.org/wiki/Object-oriented_programming) approach aim to help [programmers](https://en.wikipedia.org/wiki/Programmers) write clear, logical code for small and large-scale projects.
    - Python is [dynamically-typed](https://en.wikipedia.org/wiki/Type_system#DYNAMIC) and collected. It supports multiple [programming paradigms](https://en.wikipedia.org/wiki/Programming_paradigm), including [structured](https://en.wikipedia.org/wiki/Structured_programming) (particularly, [procedural](https://en.wikipedia.org/wiki/Procedural_programming)), object-oriented and [functional programming](https://en.wikipedia.org/wiki/Functional_programming). It is often described as a "batteries included" language due to its comprehensive [standard library](https://en.wikipedia.org/wiki/Standard_library).

#### Advantages of PYTHON

**Versatile, easy to use and fast to develop**

Python programming language focuses on code readability. It’s versatile, neat, easy to use and learn, readable, and well-structured.

#### Open source with a vibrant Python community

You can download Python for free and write asynchronous code in a matter of minutes. [Developing](https://www.netguru.com/services/python-development) [with python](https://www.netguru.com/services/python-development) is hassle-free.

What’s more, the Python programmers community is one of the best in the world - it’s very large and active. Some of the best IT minds in the world are contributing to both the language itself and its support forums.

#### Has all the libraries you can imagine

You can find a library for basically anything you can think of: from web and mobile development, through game development, to machine learning - and if there isn’t one available already, you can easily create your own.

This makes it perfect for all of the use cases we mentioned above, such as mobile app development, machine learning & AI models and video games

#### Great for prototypes - you can do more with less code

As it was mentioned before, Python is easy to learn and fast to develop with and offers asynchronous coding.

You can do more with less code, which means you can build prototypes, such as graphical user interfaces, and test out ideas much quicker in Python than in other languages.

This means that using it not only saves a lot of time, but also reduces your company’s costs.

#### Productivity

Another advantage of Python is that this powerful programming language can increase productivity. Its integration features and control capabilities can enhance the productivity of enterprise software applications.

In comparison to other coding languages, Python is more a very productive language, more so than Java because it is dynamically typed and more concise

# Sample code

import pyttsx3

import speech\_recognition as sr

import webbrowser

import datetime

import wikipedia

def takeCommand():

r = sr.Recognizer()

with sr.Microphone() as source:

print('Listening')

r.pause\_threshold = 0.7

audio = r.listen(source)

try:

print("Recognizing")

Query = r.recognize\_google(audio, language='en-in')

print("the command is printed=", Query)

except Exception as e:

print(e)

print("Say that again sir")

return "None"

return Query

def speak(audio):

engine = pyttsx3.init()

voices = engine.getProperty('voices')

engine.setProperty('voice', voices[0].id)

engine.say(audio)

engine.runAndWait()

def tellDay():

day = datetime.datetime.today().weekday() + 1

Day\_dict = {1: 'Monday', 2: 'Tuesday',

3: 'Wednesday', 4: 'Thursday',

5: 'Friday', 6: 'Saturday',

7: 'Sunday'}

if day in Day\_dict.keys():

day\_of\_the\_week = Day\_dict[day]

print(day\_of\_the\_week)

speak("The day is " + day\_of\_the\_week)

def tellTime():

time = str(datetime.datetime.now())

print(time)

hour = time[11:13]

min = time[14:16]

speak(self, "The time is sir" + hour + "Hours and" + min + "Minutes")

def Hello():

speak("hello sir I am your desktop assistant. /

Tell me how may I help you")

def Take\_query():

Hello()

while(True):

query = takeCommand().lower()

if "open pythonprogramming" in query:

speak("Opening pythonprogramming ")

webbrowser.open("www.pythonprogramming.com")

continue

elif "open google" in query:

speak("Opening Google ")

webbrowser.open("www.google.com")

continue

elif "which day it is" in query:

tellDay()

continue

elif "tell me the time" in query:

tellTime()

continue

elif "bye" in query:

speak("Bye. Check Out GFG for more exicting things")

exit()

elif "from wikipedia" in query:

speak("Checking the wikipedia ")

query = query.replace("wikipedia", "")

result = wikipedia.summary(query, sentences=4)

speak("According to wikipedia")

speak(result)

elif "tell me your name" in query:

speak("I am Jarvis. Your desktop Assistant")

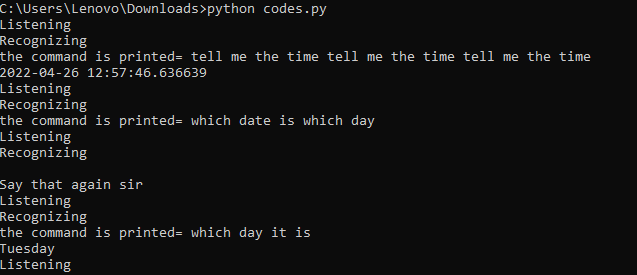
if \_\_name\_\_ == '\_\_main\_\_’:

Take\_query()

**SCREEN SHOTS:**

A picture containing graphical user interface

Description automatically generated



**6.SYSTEM TESTING**

#### INTRODUCTION TO TESTING

Testing is a process, which reveals errors in the program. It is the major quality measure employed during software development. During software development. During testing, the program is executed with a set of test cases and the output of the program for the test cases is evaluated to determine if the program is performing as it is expected to perform.

#### TESTING STRATEGIES

In order to make sure that the system does not have errors, the different levels of testing strategies that are applied at differing phases of software development are:

#### UNIT TESTING

Unit Testing is done on individual modules as they are completed and become executable. It is confined only to the designer's requirements. Each module can be tested using the following two strategies:

#### Black Box Testing

In this strategy some test cases are generated as input conditions that fully execute all functional requirements for the program. This testing has been uses to find errors in the following categories:

* + Incorrect or missing functions
  + Interface errors
  + Performance errors
  + Initialization and termination errors.

#### White Box Testing

In this the test cases are generated on the logic of each module by drawing flow graphs of that module and logical decisions are tested on all the cases. It has been uses to generate the test cases in the following cases

* + Guarantee that all independent paths have been Executed.
  + Execute all logical decisions on their true and false Sides.

#### INTEGRATION TESTING

Integration testing ensures that software and subsystems work together a whole. It tests the interface of all the modules to make sure that the modules behave properly when integrated together. Integration testing (sometimes called integration and testing, abbreviated I&T) is the phase in [software testing](https://en.wikipedia.org/wiki/Software_testing) in which individual software modules are combined and tested as a group. It occurs after [unit testing](https://en.wikipedia.org/wiki/Unit_testing) and before [validation testing](https://en.wikipedia.org/wiki/Software_verification_and_validation). Integration testing takes as its input [modules](https://en.wikipedia.org/wiki/Module_(programming)) that have been unit tested, groups them in larger aggregates, applies tests defined in an integration [test](https://en.wikipedia.org/wiki/Test_plan) [plan](https://en.wikipedia.org/wiki/Test_plan) to those aggregates, and delivers as its output the integrated system ready for [system testing.](https://en.wikipedia.org/wiki/System_testing)

#### SYSTEM TESTING

It Involves in house testing of the entire system before delivery to the user. It's aim is to satisfy the user the system meets all requirements of the client's specifications. System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified [requirements.](https://en.wikipedia.org/wiki/Requirements) System testing falls within the scope of [black-box testing,](https://en.wikipedia.org/wiki/Black-box_testing) and as such, should require no knowledge of the inner design of the code or logic.

As a rule, system testing takes, as its input, all of the "integrated" software components that have passed [integration testing](https://en.wikipedia.org/wiki/Integration_testing) and also the software system itself integrated with any applicable hardware system(s). The purpose of integration testing is to detect any inconsistencies between the software units that are integrated together (called assemblages) or between any of the assemblages and the hardware. System testing is a more limited type of testing; it seeks to detect defects both within the "inter-assemblages" and also within the system as a whole.

#### ACCEPTANCE TESTING

It is a pre-delivery testing in which entire system is tested at client's site on real world data to find errors. Acceptance testing is a test conducted to determine if the requirements of a [specification](https://en.wikipedia.org/wiki/Specification) or [contract](https://en.wikipedia.org/wiki/Contract) are met. It may involve [chemical tests](https://en.wikipedia.org/wiki/Chemical_test), [physical tests](https://en.wikipedia.org/wiki/Physical_test), or [performance](https://en.wikipedia.org/wiki/Performance_test_(assessment)) [tests](https://en.wikipedia.org/wiki/Performance_test_(assessment)). In [systems engineering](https://en.wikipedia.org/wiki/Systems_engineering) it may involve [black-box testing](https://en.wikipedia.org/wiki/Black-box_testing) performed on a [system](https://en.wikipedia.org/wiki/System) (for example: a piece of [software,](https://en.wikipedia.org/wiki/Software_system) lots of manufactured mechanical parts, or batches of chemical products) prior to its delivery.

In [software testing](https://en.wikipedia.org/wiki/Software_testing) the [ISTQB](https://en.wikipedia.org/wiki/International_Software_Testing_Qualifications_Board) defines acceptance as: formal testing with respect to user needs, requirements, and business processes conducted to determine whether a system satisfies the acceptance criteria and to enable the user, customers or other authorized entity to determine

whether or not to accept the system. Acceptance testing is also known as user acceptance testing (UAT), end-user testing, [operational acceptance testing](https://en.wikipedia.org/wiki/Operational_acceptance_testing) (OAT) or field (acceptance) testing.

Testing Can Be Done In Two Ways

* + - * Bottom up approach
      * Top down approach

**Bottom Up Approach:** Testing can be performed starting from smallest and lowest level modules and proceeding one at a time. For each module in bottom up testing a short program executes the module and provides the needed data so that the module is asked to perform the way it will when embedded within the larger system. When bottom level modules are tested attention turns to those on the next level that use the lower level ones they are tested individually and then linked with the previously examined lower level modules.

**Top Down Approach:** This type of testing starts from upper level modules. Since the detailed activities usually performed in the lower level routines are not provided stubs are written. A stub is a module shell called by upper level module and that when reached properly will return a message to the calling module indicating that proper interaction occurred. No attempt is made to verify the correctness of the lower level module.

## Conclusion

We Successfully implemented Virtual Personal Assistant using python, and it has well specified to save time and money by doing the small tasks based on voice commands and doing them accurately with high quality.

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