VOICE ASSISTANT-NORY IN PYTHON

A PROJECT REPORTSUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR

THE AWARD OF DEGREE OF

MASTERS OF COMPUTER APPLICATIONS

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INTRODUCTION

Introduction to the project

Voice bots are software powered by artificial intelligence (AI) that allow a caller to navigate an interactive voice response (IVR) system with their voice, generally using natural language. Callers don't have to listen to menus and press corresponding numbers on their keypads. They speak to the IVR in a simplified simulation of a call with a live operator.

Virtual assistants consists of individuals as well as companies who work remotely as an independent professional, providing a wide range of products and services both to businesses as well as consumers. Virtual assistants perform many different roles, including typical secretarial work, website editing, social media marketing, customer service, data entry, accounts (MYOB) and many other remote tasks. The virtual industry has changed substantially as it attracts others new to the field

This project that is a VIRTUAL VOICE ASSISTANT named "NORY" has been designed to make human work easier . This voice assistant has been programmed according to the user's needs . This virtual assistant can perform various tasks like greet the user according to the hours be it morning, afternoon or night , calculate , search user's input, find the current location, provide the latest news , user can play games as well with this , play music , open applications , send mails etc. The core purpose of designing this VOICE ASSISTANT is to manage the tasks and reduce the time of typing that occurs while trying and do some task online.

Apple's SIRI, Amazon's ALEXA , IBM's WATSON work similarly with advanced features that works on deep learning .This voice assistant has also been made on the same technique.

BACKGROUND KNOWLEDGE

Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem.

HOW IS AI USED?

Artificial intelligence generally falls under two broad categories:

- **Narrow AI:** Sometimes referred to as "Weak AI," this kind of artificial intelligence operates within a limited context and is a simulation of human intelligence. Narrow AI is often focused on performing a single task extremely well and while these machines may seem intelligent, they are operating under far more constraints and limitations than even the most basic human intelligence.

- **Artificial General Intelligence (AGI)**: AGI, sometimes referred to as "Strong AI," is the kind of artificial intelligence we see in the movies, like the robots from *Westworld* or Data from *Star Trek: The Next Generation*. AGI is a

machine with general intelligence and, much like a human being, it can apply that intelligence to solve any problem.

ARTIFICIAL INTELLIGENCE EXAMPLES

1.Smart assistants (like Siri and Alexa)
2.Disease mapping and prediction tools

3. Manufacturing and drone robot

4.Optimized, personalized healthcare treatment recommendation

5. Social media monitoring tools for dangerous content or false news 6. Song or TV show recommendations from Spotify and Netflix

Artificial intelligence is based on the principle that human intelligence can be defined in a way that a machine can easily mimic it and execute tasks, from the most simple to those that are even more complex. The goals of artificial intelligence include learning, reasoning, and perception.

As technology advances, previous benchmarks that defined artificial intelligence become outdated. For example, machines that calculate basic functions or recognize text through optimal character recognition are no longer considered to embody artificial intelligence, since this function is now taken for granted as an inherent computer function.AI is continuously evolving to benefit many different industries. Machines are wired using a cross-disciplinary approach based in mathematics, computer science, linguistics, psychology, and more.

PROBLEM IDENTIFICATION

Changing of requirements was a necessary step as a an industrial project to be build it is necessary to follow the requirements from the user. However, because the project goal is to be used by business teams it was important to identify the flaws and counteract them with best possible manner . In todays scenario bots are mainly used to make our life easier by providing fast results to the input query given by the user.

- **Lack of training data**: The quantity and quality of the training data is critical to the performance of an artificial intelligence model .As privacy also needs to be maintained while providing end results in an effective way .

- **Unstable API versions**: The API keys that I have used are being upgraded on a daily basis so we can make the necessary changes wherever possible . like in this project WOLFRAMALPHA app id is used for performing calculations .

- **New technology:** As artificial intelligence is a new hype in the IT sector therefore I decided to make a project on this but I did not knew very much about the technology when I started , moving ahead with each module on a daily basis helped me understand this technology to the core leading me to provide a set of modules that are being used in this project.

REQUIREMENT AND SPECIFICATION

- HARDWARE REQUIREMENT

Processor : Pentium IV(minimum)

Hard disk :10GB

RAM :256MB(minimum)

- SOFTWARE REQUIREMENT

Operating System : Windows 7 or Mac

Technology : Python , AI

IDE : Visual Studio Code

IMPLEMENTATION

- Modules used

1.Speech Recognition : Speech Recognition is an important feature in several applications used such as home automation, artificial intelligence, etc. This article aims to provide an introduction on how to make use of the SpeechRecognition and pyttsx3 library of Python.

2.Tkinter: Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit. Tkinter provides various controls, such as buttons, labels and text boxes used in a GUI application. These controls are commonly called widgets.

3.Pyaudio : PyAudio provides Python bindings for PortAudio, the crossplatform audio I/O library. With PyAudio, you can easily use Python to play and record audio on a variety of platforms, such as GNU/Linux, Microsoft Windows, and Apple Mac OS X / macOS.

4.BeautifulSoup: Beautiful Soup is a Python package for parsing HTML and XML documents (including having malformed markup, i.e. non-closed tags, so named after tag soup). It creates a parse tree for parsed

pages that can be used to extract data from HTML, which is useful for web scraping.

It is available for Python 2.7 and Python 3.

5.Web browser : The web browser module provides a high-level interface to allow displaying Web-based documents to users. Under most circumstances, simply calling the open() function from this module will do the right thing.

6.Wolframapha : The Wolfram Alpha Full Results API can be accessed from any language that supports web requests and XML/JSON. Use these language bindings to get a quick start in many popular languages. Built on the same technology as the Full Results API, the Simple API generates full Wolfram Alpha output in a universally viewable image format. This API makes it easy to translate free-form linguistic queries into in-depth, formatted results for users with little coding effort. It is implemented in a standard REST protocol using HTTP GET requests.

7.pyjokes: This is a Python module for one-line programmer jokes. pip install pyjokes and run pyjokes . Pyjokes was founded at PySS1

8.OpenCV: OpenCV (Open Source Computer Vision Library) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez (which was later acquired by Intel). The library is cross platform and free for use under the open-source BSD license.

9:Pillow: Python Imaging Library (abbreviated as PIL) (in newer versions known as Pillow) is a free and open-source additional library for the Python programming language that adds support for opening, manipulating, and saving many different image file formats. It is available for Windows, Mac OS X and Linux. The latest version of PIL is 1.1.7, was released in September 2009 and supports Python 1.5.2–2.7, with Python 3 support to be released "later".

10.requests: Requests is a Python HTTP library, released under the Apache License 2.0. The goal of the project is to make HTTP requests simpler and more human-friendly. The current version is 2.23.0

Requests is one of the most popular python libraries that is not included with python, it has been proposed that requests be distributed with python by default.

11.random: Functions in the random module depend on a pseudo-random number generator function random(), which generates a random float number between 0.0 and 1.0.

random.randint(): Returns a random integer between the specified integers.

12.ctime: This function takes seconds passed since epoch as an argument and returns a string representing local time.

13.os: The OS module in python provides functions for interacting with the operating system. OS, comes under Python's standard utility modules. This module provides a portable way of using operating system dependent functionality

TESTING AND INSTALLATION

Software Testing is evaluation of the software against requirements gathered from users and system specifications. Testing is conducted at the phase level in software development life cycle or at module level in program code. Software testing comprises of Validation and Verification.

Testing Levels

Testing itself may be defined at various levels of SDLC. The testing process runs parallel to software development. Before jumping on the next stage, a stage is tested, validated and verified.

Testing separately is done just to make sure that there are no hidden bugs or issues left in the software. Software is tested on various levels -

- Unit Testing

While coding, the programmer performs some tests on that unit of program to know if it is error free. Testing is performed under white-box testing approach. Unit testing helps developers decide that individual units of the program are working as per requirement and are error free.

- Integration Testing

Even if the units of software are working fine individually, there is a need to find out if the units if integrated together would also work without errors. For example, argument passing and data updation etc.

- System Testing

The software is compiled as product and then it is tested as a whole. This can be accomplished using one or more of the following tests:

- Functionality testing - Tests all functionalities of the software against the requirement.

- Performance testing - This test proves how efficient the software is. It tests the effectiveness and average time taken by the software to do desired task. Performance testing is done by means of load testing and stress testing where the software is put under high user and data load under various environment conditions.

- Security & Portability - These tests are done when the software is meant to work on various platforms and accessed by number of persons.

✞ Acceptance Testing

When the software is ready to hand over to the customer it has to go through last phase of testing where it is tested for user-interaction and response. This is important because even if the software matches all user requirements and if user does not like the way it appears or works, it may be rejected.

✞ Alpha testing - The team of developer themselves perform alpha testing by using the system as if it is being used in work environment. They try to find out how user would react to some action in software and how the system should respond to inputs.

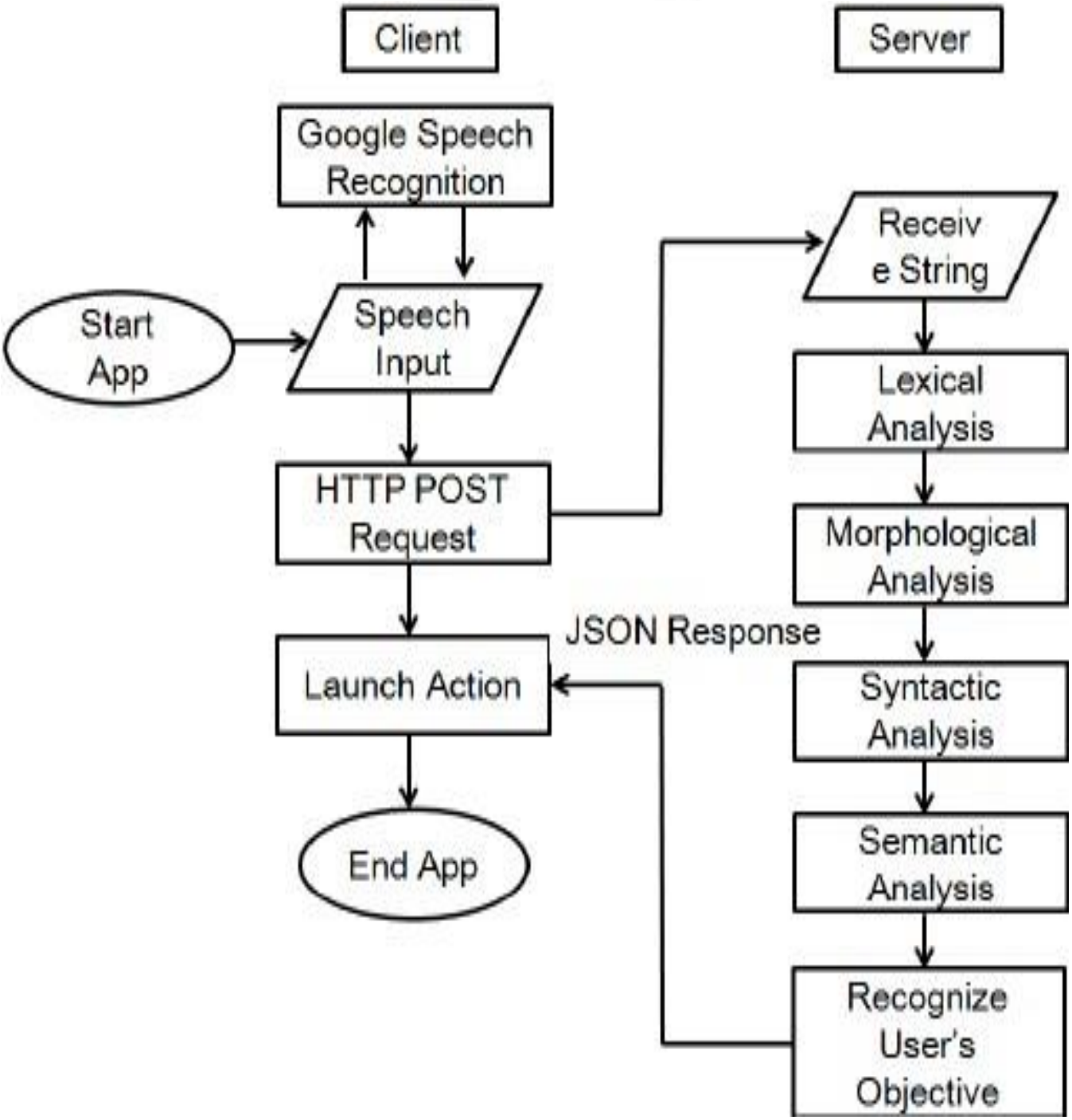
✞ Beta testing - After the software is tested internally, it is handed over to the users to use it under their production environment only for testing purpose. This is not as yet the delivered product. Developers expect that users at this stage will bring minute problems, which were skipped to attend.

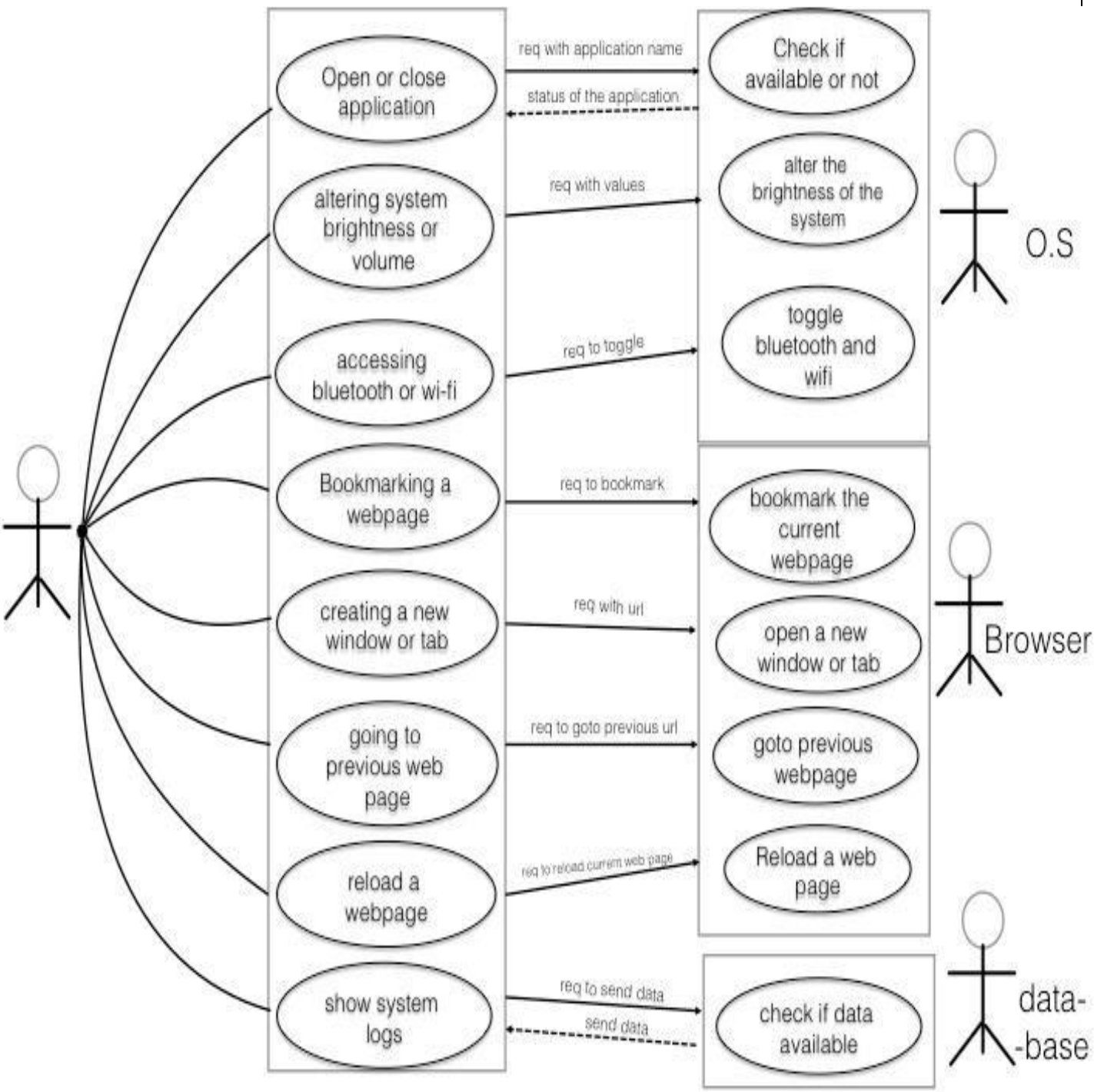
✞ Regression Testing

Whenever a software product is updated with new code, feature or functionality, it is tested thoroughly to detect if there is any negative impact of the added code. This is known as regression testing.

DFD DIAGRAM

(DATA FLOW DIAGRAM)




Open or close application
altering system brightness or volume
accessing bluetooth or wi-fi
Bookmarking a webpage
creating a new window or tab
going to previous web page
reload a webpage
show system logs
req with application name
status of the application
req with values
req to toggle
req to bookmark
req with url
req to goto previous url
req to reload curren web page
req to send data
send data
Check if available or not
alter the brightness of the system
toggle bluetooth and wifi
bookmark the current webpage
open a new window or tab
goto previous webpage
Reload a web page
check if data available
O.S
Browser
data--base

ADVANTAGES AND DISADVANTAGES

- ADVANTAGES

1.Reduced costs- If you hire another full-time employee, you'll not only have to pay his salary but also look up for his needs but with an assistant it is not required

2.Increased productivity

3.Increased flexibility

4.Improved work quality

5.Reduced risk in scaling operations

6.Skills your business needs

- DISADVANTAGES

1.Virtual assistants rely almost solely on electronic communication. A client that is not tech savvy would find the reliance on technology to be challenging.

2.A virtual assistant is not going to be in the same physical location. For clients who need an assistant to "run out of the office for a few things", that's going to be difficult.

There are solutions to both of these disadvantages. A benefit of a virtual assistant is that they tend to be tech savvy, and can make useful recommendations and write procedures on how to use electronic communication.

Also, the use of devices such as Alexa or other task services nearby the client can be coordinated by their virtual assistant - so if they need errands a virtual assistant can do this remotely.

TECHNOLOGY

Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

Python was conceived in the late 1980s as a successor to the ABC language. Python 2.0, released in 2000, introduced features

like list comprehensions and a garbage collection system with reference counting.

Python 3.0, released in 2008, was a major revision of the language that is not completely backward-compatible, and much Python 2 code does not run unmodified on Python 3.

The Python 2 language was officially discontinued in 2020 (first planned for 2015), and "Python 2.7.18 is the last Python 2.7 release and therefore the last Python 2 release" .No more security patches or other improvements will be released for it. With Python 2's end-of-life, only Python 3.5.x and later are supported.

Python interpreters are available for many operating systems. A global community of programmers develops and maintains CPython, an open source reference implementation. A non-profit organization, the Python Software Foundation, manages and directs resources for Python and CPython development.

ARTIFICIAL INTELLIGENCE

In computer science, artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans and animals. Leading AI textbooks define the field as the study of "intelligent

agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals. Colloquially, the term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving".

As machines become increasingly capable, tasks considered to require "intelligence" are often removed from the definition of AI, a phenomenon known as the AI effect. A quip in Tesler Theorem says "AI is whatever hasn't been done yet." For instance, optical character recognition is frequently excluded from things considered to be AI, having become a routine technology.[6] Modern machine capabilities generally classified as AI include successfully understanding human speech, competing at the highest level in strategic game systems (such as chess),autonomously operating cars, intelligent routing in content delivery networks, and military simulations.

Artificial intelligence was founded as an academic discipline in 1955, and in the years since has experienced several waves of optimism, followed by disappointment and the loss of funding (known as an "AI winter"), followed by new approaches, success and renewed funding. For most of its history, AI research has been divided into sub-fields that often fail to communicate with each other. These sub-fields are based on technical considerations, such as particular goals (e.g. "robotics" or "machine learning"), the use of particular tools ("logic" or artificial neural networks), or deep philosophical differences. Sub-fields have also been based on social factors (particular institutions or the work of particular researchers).

FEASIBILITY STUDY

After doing the project virtual personal assistant , study and analyzing all the existing functionalities of the system, the next task is to do the feasibility study for the project . All projects are feasible- given unlimited resources and infinite time. Feasibility study includes consideration of all the possible ways to provide a solution to the given problem .The proposed solution should satisfy all the user requirements and should be flexible enough so that future changes can be easily done based on the future upcoming requirements.

- Economical feasibility: This is a very important aspect to be considered while developing a project. I decided the technology based on the minimum possible factor .

  1.All hardware and software cost has to be borne by the organization.

  2.Overall I have estimated that the benefits the organizations is going to receive from the proposed system will surely overcome the initial costs and later on running cost for the system.

- Technical feasibility: This includes the study of function, performance and constraints that may affect the ability to achieve an acceptable virtual assistant that is in good working condition. For this feasibility study I have described the system requirement specifications and checked if everything was possible with different frontend and backend platforms.
- Operational feasibility: No doubt the proposed system is fully GUI based that is very user friendly and all inputs to be taken all selfexploratory even to a layman . Besides, a proper training has been conducted to let know the essence of the system to the users so that

they feel comfortable with new system . As far as our study is concerned the clients are comfortable and happy as the project has cut down their loads and doing.

⏱ FUTURE SCOPE

✞ FUTURE DEVELOPMENT OF THE PROJECT

In a nutshell, it can be summarized that the future scope of the project circles around maintaining information regarding :

- We can give more advanced technology to this virtual assistant like MACHINE LEARNING that will help in predicting models with the help of this virtual assistant .
- Integrate multiple load balancers to distribute the loads of the system .
- Implement the backup mechanism for taking backups of code base and the query provided on regular basis on different web browsers.
- I will provide this project on a virtual platform like GITHUB from where it would be accessible worldwide.

The above mentioned points are the enhancements which can be done to increase the applicability and usage of this project .Here I can perform many operations like searching , getting news, calculations , playing music etc. It is a versatile AI build platform that makes human work less

BIBLIOGRAPHY

I would like to thank each and everyone who has helped me reach out to my goal of accomplishing this project . I would like to share the references from which I had taken some ideas and the modules that are being used in this project:

- For search api: https://www.google.com/
- For getting detailed knowledge of python:
  https://www.w3schools.com/python/
  https://www.javatpoint.com/python-tutorial
- For problem that I incurred during the project:
  https://stackoverflow.com/