

VISVESVARAYA TECHNOLOGICAL UNIVERSITY



BELAGAVI – 590018, Karnataka

INTERNSHIP REPORT

ON

“Virtual Assistance for Visually Impaired”

*Submitted in partial fulfilment for the award of degree(21****)*

BACHELOR OF ENGINEERING IN COMPUTER SCIENCE AND ENGINEERING

Submitted by:

SANJAY G

1ST21IS049



Conducted at

COMPSOFT TECHNOLOGIES



EAST WEST COLLEGE OF ENGINEERING

Dept. Computer Science And Engineering

Accredited by NBA, New Delhi

CA Site-13, Sector A Yelahanka New Town, Bengaluru, Karnataka-560064

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CERTIFICATE

This is to certify that the Internship titled “**Virtual assistance for visually impaired**” carried out by **Mr. Sanjay G** , a bonafide student of East West College Of Engineering, in partial fulfillment for the award of **Bachelor of Engineering, in Computer Science And Engineering** under Visvesvaraya Technological University, Belagavi, during the year 2022-2023. It is certified that all corrections/suggestions indicated have been incorporated in the report.

The project report has been approved as it satisfies the academic requirements in respect of Internship prescribed for the course Internship / Professional Practice (21CSI85)

Signature of Guide

Signature of HOD

Signature of Principal

External Viva:

Name of the Examiner

Signature with Date

1) _____

2) _____

D E C L A R A T I O N

I, **Sanjay G**, Third year student of Computer Science And Engineering, from East West College Of Engineering - 560 062, declare that the Internship has been successfully completed, in **COMPSOFT TECHNOLOGIES**. This report is submitted in partial fulfillment of the requirements for award of Bachelor Degree in Computer Science And Engineering, during the academic year 2022-2023.

Date : 7/11/2023

:

Place : Bengaluru

USN : 1ST21IS049

NAME : Sanjay G

OFFER LETTER



Date: 6th November, 2023

Name: **Sanjay G**

USN: **1ST21IS049**

Placement ID: **0611MLWPBFOUR**

Dear Student,

We would like to congratulate you on being selected for the **Machine Learning with Python (Research Based)** Internship position with **Compsoft Technologies**, effective Start Date **6th November, 2023**. All of us are excited about this opportunity provided to you!

This internship is viewed as being an educational opportunity for you, rather than a part-time job. As such, your internship will include training/orientation and focus primarily on learning and developing new skills and gaining a deeper understanding of concepts of **Machine Learning with Python (Research Based)** through hands-on application of the knowledge you learn while you train with the senior developers. You will be bound to follow the rules and regulations of the company during your internship duration.

Again, congratulations and we look forward to working with you!.

Sincerely,

Nithin K. S

Project Manager

COMPSOFT TECHNOLOGIES

No. 363, 19th main road,

1st Block Rajajinagar

Bangalore - 560010

ACKNOWLEDGEMENT

This Internship is a result of accumulated guidance, direction and support of several important persons. We take this opportunity to express our gratitude to all who have helped us to complete the Internship.

We express our sincere thanks to our Principal Dr. Santhosh Kumar G, for providing us adequate facilities to undertake this Internship.

We would like to thank our Head of Dept Ms, for providing us an opportunity to carry out Internship and for his valuable guidance and support.

We express our deep and profound gratitude to our guide, Mrs.Vani Saphthasagar, Assistant/Associate Prof, for her keen interest and encouragement at every step in completing the Internship.

We would like to thank all the faculty members of our department for the support extended during the course of Internship.

We would like to thank the non-teaching members of our dept, for helping us during the Internship.

Last but not the least, we would like to thank our parents and friends without whose constant help, the completion of Internship would have not been possible.

NAME: Sanjay G
USN: 1ST21IS049

ABSTRACT

The field of artificial intelligence has led to various virtual assistants such as Siri in iPhone, Google , Microsoft Cortana, and so on. Even after such progression, very little has been done to implement these technologies to assist the visually impaired community. Recognizing a person or distinguishing an object, these tasks are straightforward for common people but can be very difficult for people that are partly or completely blind. Their lives can be made smoother by assisting them to detect what is present in front of them at that instant. We aim to develop a system/assistant that will serve to guide a visually impaired person and will indicate the person by speaking through the earpiece. The system will help the person recognize people, add new faces and detect objects that are in their vicinity. We will have a mobile application which will consist of numerous deep learning models that will help applications increase its administration. The primary working of the system will consist of the camera continuously feeding images for inputs, the core system processing this input information and the earpiece acting as the output device to provide this output to the user.

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CHAPTER 1

COMPANY PROFILE

1. COMPANY PROFILE

A Brief History of Compsoft Technologies

Compsoft Technologies, was incorporated with a goal "To provide high quality and optimal Technological Solutions to business requirements of our clients". Every business is a different and has a unique business model and so are the technological requirements. They understand this and hence the solutions provided to these requirements are different as well. They focus on clients requirements and provide them with tailor made technological solutions. They also understand that Reach of their Product to its targeted market or the automation of the existing process into e-client and simple process are the key features that our clients desire from Technological Solution they are looking for and these are the features that we focus on while designing the solutions for their clients.

Sarvamoola Software Services. is a Technology Organization providing solutions for all web design and development, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Sarvamoola Software Services. specialize in ERP, Connectivity, SEO Services, Conference Management, effective web promotion and tailor-made software products, designing solutions best suiting clients requirements.

Compsoft Technologies, strive to be the front runner in creativity and innovation in software development through their well-researched expertise and establish it as an out of the box software development company in Bangalore, India. As a software development company, they translate this software development expertise into value for their customers through their professional solutions.

They understand that the best desired output can be achieved only by understanding the clients demand better. Compsoft Technologies work with their clients and help them to define their exact solution requirement. Sometimes even they wonder that they have completely redefined their solution or new application requirement during the brainstorming session, and here they position themselves as an IT solutions consulting group comprising of high caliber consultants.

They believe that Technology when used properly can help any business to scale and achieve new heights of success. It helps Improve its efficiency, profitability, reliability; to put it in one sentence "Technology helps you to Delight your Customers" and that is what we want to achieve.

CHAPTER 2

ABOUT THE COMPANY

2. ABOUT THE COMPANY



Compsoft Technologies is a Technology Organization providing solutions for all web design and development, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Compsoft Technologies specialize in ERP, Connectivity, SEO Services, Conference Management, effective webpromotion and tailor-made software products, designing solutions best suiting clients requirements. The organization where they have a right mix of professionals as a stakeholders to help us serve our clients with best of our capability and with at par industry standards. They have young, enthusiastic, passionate and creative Professionals to develop technological innovations in the field of Mobile technologies, Web applications as well as Business and Enterprise solution. Motto of our organization is to “Collaborate with our clients to provide them with best Technological solution hence creating Good Present and Better Future for our client which will bring a cascading a positive effect in their business shape as well”. Providing a Complete suite of technical solutions is not just our tag line, it is Our Vision for Our Clients and for Us, We strive hard to achieve it.

Products of Compsoft Technologies.

Android Apps

It is the process by which new applications are created for devices running the Android operating system. Applications are usually developed in Java (and/or Kotlin; or other such option) programming language using the Android software development kit (SDK), but other development environments are also available, some such as Kotlin support the exact same Android APIs (and bytecode), while others such as Go have restricted API access.

The Android software development kit includes a comprehensive set of development tools. These include a debugger, libraries, a handset emulator based on QEMU, documentation, sample code, and tutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, and Windows 7 or later. As of March 2015, the SDK is not available on Android itself, but software development is possible by using specialized Android applications.

Web Application

It is a client–server computer program in which the client (including the user interface and client- side logic) runs in a web browser. Common web applications include web mail, online

retail sales, online auctions, wikis, instant messaging services and many other functions. web applications use web documents written in a standard format such as HTML and JavaScript, which are supported by a variety of web browsers. Web applications can be considered as a specific variant of client-server software where the client software is downloaded to the client machine when visiting the relevant web page, using standard procedures such as HTTP. The Client web software updates may happen each time the web page is visited. During the session, the web browser interprets and displays the pages, and acts as the universal client for any web application. The use of web application frameworks can often reduce the number of errors in a program, both by making the code simpler, and by allowing one team to concentrate on the framework while another focuses on a specified use case. In applications which are exposed to constant hacking attempts on the Internet, security-related problems can be caused by errors in the program.

Frameworks can also promote the use of best practices such as GET after POST. There are some who view a web application as a two-tier architecture. This can be a “smart” client that performs all the work and queries a “dumb” server, or a “dumb” client that relies on a “smart” server. The client would handle the presentation tier, the server would have the database (storage tier), and the business logic (application tier) would be on one of them or on both. While this increases the scalability of the applications and separates the display and the database, it still doesn’t allow for true specialization of layers, so most applications will outgrow this model. An emerging strategy for application software companies is to provide web access to software previously distributed as local applications. Depending on the type of application, it may require the development of an entirely different browser-based interface, or merely adapting an existing application to use different presentation technology. These programs allow the user to pay a monthly or yearly fee for use of a software application without having to install it on a local hard drive. A company which follows this strategy is known as an application service provider (ASP), and ASPs are currently receiving much attention in the software industry.

Security breaches on these kinds of applications are a major concern because it can involve both enterprise information and private customer data. Protecting these assets is an important part of any web application and there are some key operational areas that must be included in the development process. This includes processes for authentication, authorization, asset handling, input, and logging and auditing. Building security into the applications from the beginning can be more effective and less disruptive in the long run.

Web design

It encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphic design; interface design; authoring, including standardized code and proprietary software; user experience design; and

search engine optimization. The term web design is normally used to describe the design process relating to the front-end (client side) design of a website including writing mark up. Web design partially overlaps web engineering in the broader scope of web development. Web designers are expected to have an awareness of usability and if their role involves creating mark up then they are also expected to be up to date with web accessibility guidelines. Web design partially overlaps web engineering in the broader scope of web development.

Departments and services offered

Compsoft Technologies plays an essential role as an institute, the level of education, development of student's skills are based on their trainers. If you do not have a good mentor then you may lag in many things from others and that is why we at Compsoft Technologies gives you the facility of skilled employees so that you do not feel unsecured about the academics. Personality development and academic status are some of those things which lie on mentor's hands. If you are trained well then you can do well in your future and knowing its importance of Compsoft Technologies always tries to give you the best.

They have a great team of skilled mentors who are always ready to direct their trainees in the best possible way they can and to ensure the skills of mentors we held many skill development programs as well so that each and every mentor can develop their own skills with the demands of the companies so that they can prepare a complete packaged trainee.

Services provided by Compsoft Technologies.

- Core Java and Advanced Java
- Web services and development
- Dot Net Framework
- Python
- Selenium Testing
- Conference / Event Management Service
- Academic Project Guidance
- On The Job Training
- Software Training

CHAPTER 3

INTRODUCTION

3. INTRODUCTION

Introduction to ML

Machine learning is a field of artificial intelligence (AI) that focuses on developing algorithms and models that enable computers to learn and make predictions or decisions without being explicitly programmed. The core idea behind machine learning is to enable computers to learn from data, identify patterns, and improve their performance over time.

Machine learning is the study of algorithms and statistical models that computers use to perform a specific task without using explicit instructions. Instead, these algorithms learn from data and experiences. Machine learning is applied in a wide range of fields, including healthcare (diagnosis and treatment planning), finance (fraud detection and stock market analysis), marketing (customer segmentation and recommendation systems), and natural language processing (speech recognition and language translation).

Machine learning is a dynamic and rapidly evolving field with ongoing research and development. It has the potential to revolutionize various industries by automating tasks, making predictions, and uncovering insights from large datasets.

Problem Statement

Virtual Assistant for Visually Impaired

The models employed for our project are - Face Detection and Object Detection. The system comprises a camera that acquires images and sends them to the application, where a powerful processor derives information from them and explains them to the user through a distinct audible message. The device will continuously detect all the faces in front of the person and verify them against all the faces of the people who have been previously taught to the device.

CHAPTER 4

SYSTEM ANALYSIS

4. SYSTEM ANALYSIS

1. Existing System

This project describes one of the most efficient ways for voice recognition. It overcomes many of the drawbacks in the existing solutions to make the virtual Assistant more effective. It uses natural language processing to carry out the specified tasks. IT has various functionalities like network connection and managing activities by just voice commands. It reduces the utilization of input devices like keyboard.

This project describes the method to implement a virtual assistant for desktop using the APIs. In this module, the voice commands are converted to text through Google Speech API. Text input is just stored in the database for further process. It is recognized and matched with the commands available in database. Once the command is found, its respective task is executed as voice, text or through user interface as output.

2. Proposed System

1) Text to speech:

This module comprises text and speech processing. The main purpose of this module is to take into consideration all the text provided and convert these into the appropriate audio output using speech processing. We have implemented a dynamic system that makes use of Google API (Gttx) for the conversion of Text to Speech dynamically provided that good internet connectivity is present.

2) Object Recognition:

Object Recognition is a process in which Real-world objects are identified using Image processing. It is an important operation that will aid visually impaired to locate their frequently used day to day objects. The system that we have developed provides support in visual aid by assisting to dynamically locate and identify the objects in an image and providing the text output for the same.

3) Face Recognition:

Some face recognition algorithms identify countenance by extracting landmarks, or features, from a picture of the subject's face that includes the features shape of the jaw, nose, cheek, facial hair and other such characteristics. The features of the image in consideration are then compared with other images having similar features. The algorithm normalizes a dataset of face embeddings then compresses these embeddings, only saving the information within the image that's useful for face recognition. Eventually what we will be obtaining is a bounding box surrounding the face in the live monitoring having the name of the person and the confidence attached to the bounding box.

3. Objective of the System

The development of the technology allows introducing more advanced solutions in everyday life. This makes work less exhausting for employees, and also increases at work safety. As the technology is developing day by day people are becoming more dependent on it, one of the mostly used platforms is computer. We all want to make the use of these computers more comfortable, traditional way to give a command through voice. Giving input voice is not only beneficial for normal people but also for those who are visually impaired who are not able to give input by keyboard. For this purpose, there is a need of a virtual assistant which can not only take command through voice but also execute the desired instructions and give output either in the form of voice or any other means.

A virtual assistant is the software that can perform task and provide different services to the individual as per the individual's dictated commands. This is done through a synchronous process involving recognition of speech patterns and then, responding via synthetic speech. The technologies that power virtual assistance are machine learning, natural language processing and speech recognition platforms. It uses sophisticated algorithms to learn from data input and become better at predicting the end user's needs.

CHAPTER 5

REQUIREMENT ANALYSIS

5. REQUIREMENT ANALYSIS

Hardware Requirement Specification

- **Processor - Intel Pentium4**
- **RAM – 512MB**
- **Hardware capacity:80gb**
- **Mouse**
- **Microphone**
- **Personal Computer/Laptop**
- **CD-Drive type – 52xmax**

Software Requirement Specification

- **Operating System – Windows**
- **Simulation Tools – visual Studio Code**
- **Python – Version 3.9.6**
- **Packages –**
 - 1. Pyttsx3**
 - 2. Speech Recognition**
 - 3. Wikipedia**
 - 4. Pyaudio**
 - 5. Web browser**

CHAPTER 6

DESIGN ANALYSIS

6. DESIGN & ANALYSIS

The system developed is deployed on the web as a website. The website is built on the backbone of flask, which serves the purpose of providing connectivity between the python code and the HTML.

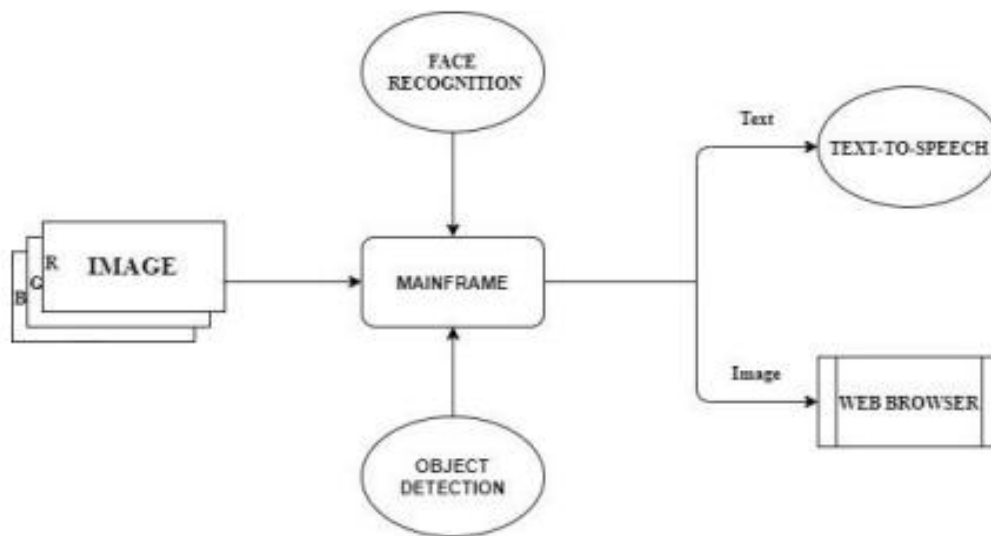


Fig. Implementation flow

When the website is loaded, the object detection module starts its processing and the objects detected by this module are displayed on the page as well as delivered to the user via an earpiece/speaker. Along with this, we also have two buttons ('Switch to Face' and 'Stop') on the landing page that are well separated to be easily accessible. Clicking on 'Stop' results in pausing the Livestream until the 'Start' button is clicked. The 'Switch to Face' button on click will switch to the page where the Face Recognition processing begins. We have also included the buffer which can only contain a maximum of five entities (objects/people) at a time. Each entity will be converted to speech in every 20 seconds if it still exists in the frame. The 'Face Detection' module is implemented similarly as the 'Object Detection' module using the same layout for the buttons. Here, the clicking of the 'Stop' button will have the same function as mentioned above whereas a click on the 'Add Face' button will capture the current frame and prompt the user to speak out the name of the person whose face is being added. The name is spoken into the microphone by the user and the speech-to-text model converts this audio into the text and stores the text with the captured frame into the database. All the processing is carried out in the python engine and is displayed using HTML to the user. Thus implementing all these, we obtain a system that is more relevant and more assitive to the user.

CHAPTER 7

IMPLEMENTATION

7. IMPLEMENTATION

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage in achieving a new successful system and in giving confidence on the new system for the users that it will work efficiently and effectively.

The system can be implemented only after thorough testing is done and if it is found to work according to the specification. It involves careful planning, investigation of the current system and its constraints on implementation, design of methods to achieve the change over and an evaluation of change over methods as a part from planning.

Two major tasks of preparing the implementation are education and training of the users and testing of the system. The more complex the system being implemented, the more involved will be the system analysis and design effort required just for implementation.

The implementation phase comprises of several activities. The required hardware and software acquisition is carried out. The system may require some software to be developed. For this, programs are written and tested. The user then changes over to his new fully tested system and the old system is discontinued.

TESTING

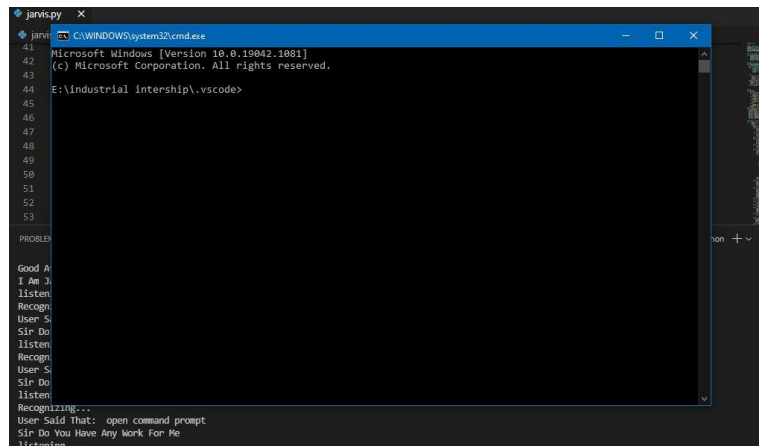
The testing phase is an important part of software development. It is the Information zed system will help in automate process of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied. Software testing is carried out in three steps:

1. The first includes unit testing, where in each module is tested to provide its correctness, validity and also determine any missing operations and to verify whether the objectives have been met. Errors are noted down and corrected immediately.
2. Unit testing is the important and major part of the project. So errors are rectified easily in particular module and program clarity is increased. In this project entire system is divided into several modules and is developed individually. So unit testing is conducted to individual modules.
3. The second step includes Integration testing. It need not be the case, the software whose modules when run individually and showing perfect results, will also show perfect results when run as a whole.

CHAPTER 8

SNAPSHOTS

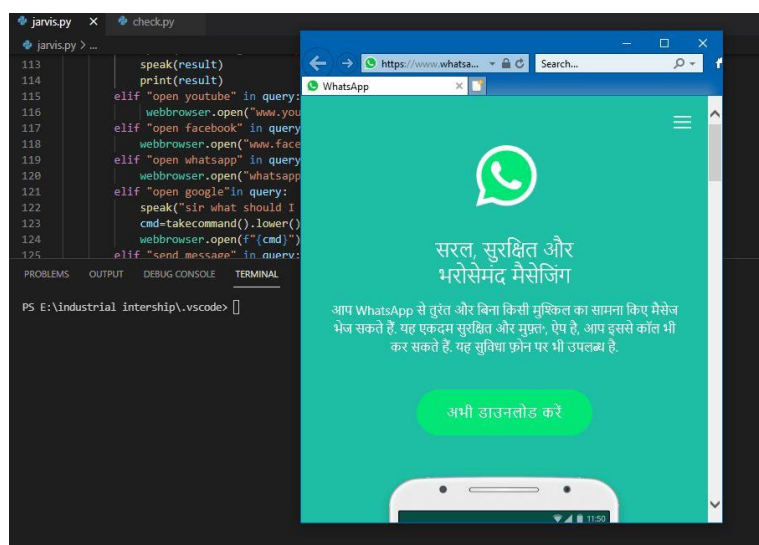
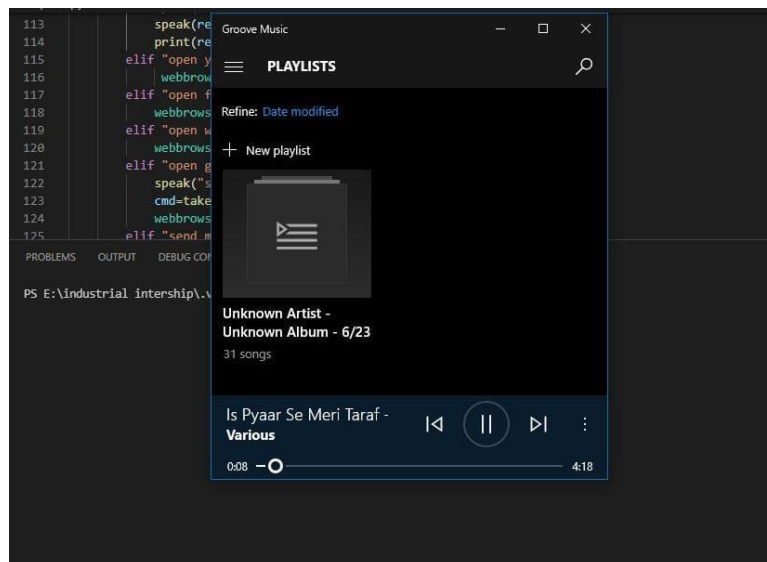
8. SNAPSHOTS OUTPUT



```
jarvis.py
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.19042.1081]
(c) Microsoft Corporation. All rights reserved.

E:\industrial intership\.vscode>

Good Afternoon Sir
I Am Jarvis
Listening...
Recognizing...
User Said That: open command prompt
Sir Do You Have Any Work For Me
Listening...
```



```

134         sender_email=input(speak("Enter your EmailId "))
135         sender_password=input(speak("Enter your password "))
136         emailto=input(speak("write the email to whom you want to send the message "))
137         speak("what should I send")
138         contentcmd=takecommand().lower()
139         send_email(sender_email,sender_password,emailto,contentcmd)
140         speak(f"Email has been sent to {emailto}")
141     except Exception as e:
142         print(e)
143         speak(f"Sorry Sir I am not able to send email to {emailto}")
144     elif "no thanks jarvis" in query:
145         speak("Thanks For Using Me Have a Nice Day")
146         sys.exit()
147     speak("Sir Do You Have Any Work For Me")
148

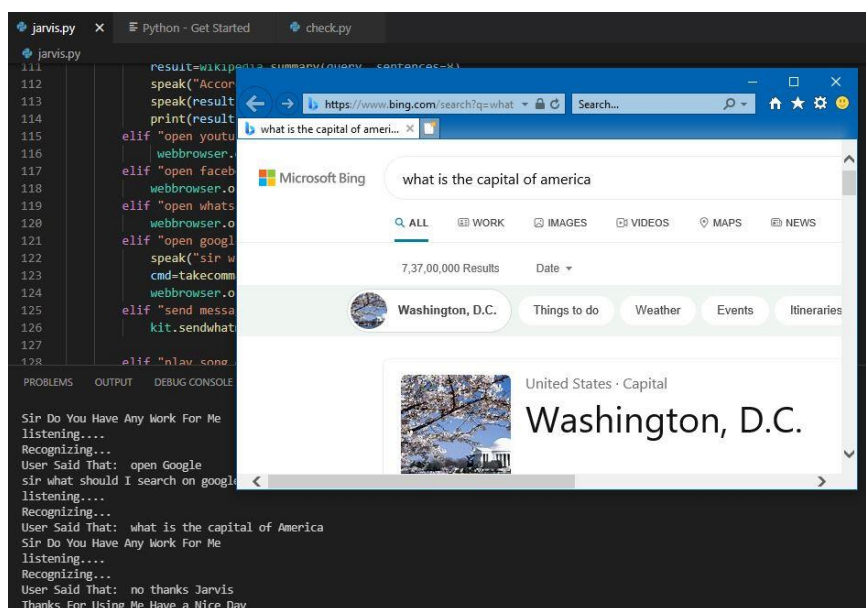
```

PROBLEMS OUTPUT DEBUG CONSOLE **TERMINAL**

```

Noneajayguptabl5096@gmail.com
what should I send
listening....
Recognizing...
User Said That: hello how are you Ajay
Email has been sent to ajayguptabl5096@gmail.com
Sir Do You Have Any Work For Me
listening....
Recognizing...
User Said That: no thanks Jarvis
Thanks For Using Me Have a Nice Day
PS E:\industrial intership\vscode>

```



CODE

```

1  def __init__(self):
2      self.video_capture = cv2.VideoCapture(0)
3
4  def __del__(self):
5      self.video_capture.release()
6
7  #to add new face
8  def AddNewFace(self):
9      if "camera" in self.all_faces:
10         newadd_frame = self.new_frame[1, 1, 1:1]
11         newadd_frame = cv2.resize(newadd_frame, (0, 0), fx=5, fy=5)
12         cv2.imwrite("newpicture.jpg", newadd_frame)
13
14         engine = pyttsx3.init()
15         engine.say("Adding new face..")
16         engine.runAndWait()
17
18         new = self.speech()
19         global dst
20         dst=new
21         for file in os.listdir():
22             if src== "newpicture.jpg":
23                 optional_dst=
24                 dst=os.path.splitext(dst)[0]+".jpg"
25                 os.rename(src,dst)
26
27         new_image = face_recognition.load_image_file(dst)
28         new_face_encoding = face_recognition.face_encodings(new_image)[0]
29         self.all_faces.append(new_face_encoding)
30         self.known_faces.append(new)
31
32         engine = pyttsx3.init()
33         engine.say("The face has been added successfully.")
34         engine.runAndWait()

```


CHAPTER 9

CONCLUSION

9. CONCLUSION

The package was designed in such a way that future modifications can be done easily. The following conclusions can be deduced from the development of the project:

- ❖ Automation of the entire system improves the efficiency
- ❖ It provides a friendly graphical user interface which proves to be better when compared to the existing system.
- ❖ It gives appropriate access to the authorized users depending on their permissions.
- ❖ It effectively overcomes the delay in communications.
- ❖ Updating of information becomes so easier
- ❖ System security, data security and reliability are the striking features.
- ❖ The System has adequate scope for modification in future if it is necessary.

10. REFERENCE

1. Marcos Barata, Afan Galih Salman, Ikhtiar Faahakhododo, Bayu Kanigoro, "Android based voice assistant for blind people", Library Hi Tech News, Vol. 35 Issue: 6, pp.9-11 (2018).
2. Md. Siddiqur Rahman Tanveer, M.M.A. Hashem and Md. Kowsar Hossain , “Android Assistant EyeMate for Blind and Blind Tracker” (2018).
3. Joseph Redmon, Ali Farhadi, “An Incremental Improvement”, Pjreddie (2018).
4. Vincent Gaudissart, Silvio Ferreira, Céline Thillou, Bernard Gosselin, “Mobile Reading Assistant for Blind People” (2018).
5. DR. Kavitha C, MR. Nithin V Gopal, MS. Nidhi Amarnath, MR. Prajwal G, MS. Supreetha R.R., “VIRTUAL ASSISTANT FOR BLIND PEOPLE” (2018).
6. Prof. Priya U. Thakare, Kote Shubham, Pawale Ankit, Rajguru Ajinkya, Shelke Om, “Smart Assistance System for the Visually Impaired” International Journal of Scientific and Research Publications, Volume 7, Issue 12, December 2017 378 ISSN 2250-3153 (2017).
7. Faizan Ahmad ,Aaima Najamand Zeeshan Ahmed, “ Image-based Face Detection and Recognition” ,Arxiv (2015).
8. R. Velázquez, Wearable Assistive Devices for the Blind. Chapter 17 in A. Lay-Ekuakille & S.C. Mukhopadhyay (Eds.), Wearable and Autonomous Biomedical Devices and Systems for Smart Environment: Issues and Characterization, LNEE 75, Springer, pp 331-349 (2010).