

VISVESVARAYA TECHNOLOGICAL UNIVERSITY



BELAGAVI – 590018, Karnataka

INTERNSHIP REPORT

ON

“BLIND ASSIST USING ML”

Submitted in partial fulfilment for the award of degree(21INT68)

BACHELOR OF ENGINEERING IN YOUR BRANCH

Submitted by:

NAME: MAYA

USN: 1KS21CS060



Conducted at

Compsoft Technologies



KS INSTITUTE OF TECHNOLOGY BENGALURU-560062

KANAKAPURA ROAD RAGHUVANAHALLI, BANGALORE-560062

2023-2024

CSE (COMPUTER SCIENCE AND ENGINEERING)

**KS INSTITUTE OF TECHNOLOGY
BENGALURU-560062**

KANAKAPURA ROAD RAGHUVANAHALLI, BANGALORE-560062
2023-2024

CSE (COMPUTER SCIENCE AND ENGINEERING)



CERTIFICATE

This is to certify that the Internship titled “**BLIND ASSIST USING ML**” carried out by **Ms. MAYA**, a student at **KS INSTITUTE OF TECHNOLOGY**, in partial fulfillment for the award of **Bachelor of Engineering**, in **CSE (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, **Maya**, first/final year student of Branch: CSE, College Name: KSIT, declare that the Internship has been successfully completed, in **COMPSOFT TECHNOLOGY**. This report is submitted in partial fulfillment of the requirements for award of bachelor's degree in Branch name, during the academic year 2022-2023.

Date : _____ :

Place :

USN: 1KS21CS060

NAME: MAYA

OFFER LETTER



Date: 24th October, 2023

Name: **MAYA**
USN: **1KS21CS060**
Placement ID: **23OCTMLBONE**

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 **24th October, 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, for providing usadequate facilities to undertake this Internship.

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

We would like to thank our Software Services for guiding us during the period of internship.

We express our deep and profound gratitude to our guide, Guide name, 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: MAYA
USN: 1KS21CS060

ABSTRACT

This paper explores the application of machine learning (ML) in Blind Assist systems designed to enhance the autonomy of individuals with visual impairments. Leveraging computer vision and sensor fusion techniques, the system employs deep learning models, including convolutional and recurrent neural networks, to interpret real-time data from cameras and sensors. Through comprehensive training on diverse datasets, the ML algorithms facilitate object detection, obstacle avoidance, and adaptive route planning. The system utilizes audio feedback and haptic interfaces to provide intuitive information to users, promoting safe navigation in various environments.

User studies validate the system's efficacy, assessing usability and accuracy. Feedback from these studies informs ongoing refinements, ensuring the technology aligns with user preferences and needs. Overall, the integration of ML in Blind Assist systems represents a significant advancement in creating inclusive and accessible solutions. By empowering individuals with visual impairments to navigate unfamiliar spaces confidently, this technology contributes to fostering independence and improving the quality of life for the visually impaired.

Table of Contents

Sl no	Description	Page no
1	Company Profile	9-10
2	About the Company	11-14
3	Introduction	15-16
4	System Analysis	17-21
5	Requirement Analysis	22-23
6	Design Analysis	24-28
7	Implementation	29-30
8	Snapshots	31-33
9	Conclusion	34-35
10	References	38-39

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 (ML) is a branch of artificial intelligence that focuses on the development of algorithms and models that enable computers to learn from data. Instead of being explicitly programmed to perform a task, ML systems use statistical patterns and computational methods to improve their performance over time. The essence of ML lies in its ability to recognize patterns, make predictions, and adapt to new information, allowing it to handle complex tasks and scenarios. As a versatile technology, ML finds applications in various fields, from image and speech recognition to recommendation systems and autonomous vehicles. The fundamental goal of machine learning is to create systems that can generalize from past experiences, making them capable of making accurate predictions or decisions in novel situations.

Problem Statement

The visually impaired face significant challenges in navigating their surroundings independently, often relying on assistance from others. Traditional assistive technologies have limitations in providing real-time, context-aware support for dynamic environments. This project aims to address this gap by developing a Blind Assist system using Machine Learning (ML) techniques. The key problems to be addressed include:

1. Real-time Obstacle Detection and Avoidance:

Designing ML algorithms to enable the system to identify and interpret obstacles in real-time, facilitating immediate course corrections for users to navigate safely.

2. Adaptive Route Planning:

Developing an intelligent system that can analyze the environment, consider user preferences, and dynamically plan optimal routes, considering factors like obstacles, terrain changes, and potential hazards.

3. User-Friendly Interface:

Creating an intuitive user interface that provides non-intrusive audio feedback and haptic cues, ensuring effective communication of environmental information without overwhelming the user.

4. Robust Performance in Various Environments:

Ensuring the ML model's adaptability and accuracy across diverse settings, encompassing both indoor and outdoor scenarios, to guarantee reliable assistance in different contexts.

5. User Feedback Integration:

Implementing a mechanism to collect user feedback for continuous improvement, allowing the system to learn and adapt to individual preferences and refine its performance over time. By addressing these challenges, the project aims to develop an innovative Blind Assist system that leverages ML to empower individuals with visual impairments, fostering greater independence and enhancing their overall quality of life.

CHAPTER 4

SYSTEM ANALYSIS

4. SYSTEM ANALYSIS

1. Existing System

As of my last knowledge update in January 2022, several existing systems and projects have employed machine learning to assist individuals with visual impairments. However, please note that technological advancements may have occurred since then. Here are a few examples of existing systems:

1. Microsoft's Seeing AI:

Microsoft's Seeing AI is an app that utilizes computer vision and machine learning to assist the visually impaired. It can recognize and describe people, objects, and text in the user's surroundings, providing real-time audio feedback.

2. BlindSquare:

BlindSquare is a popular navigation app that uses a combination of GPS and data from FourSquare to provide information about the user's surroundings. While not exclusively based on machine learning, it incorporates advanced algorithms to enhance location-based information.

3. Aira:

Aira is a service that connects blind and visually impaired users with sighted agents who assist them in real-time through a mobile app or smart glasses. Though not entirely machine learning-driven, it employs advanced technologies to provide real-time visual information.

4. Smart Glasses Solutions:

Several companies have developed smart glasses with built-in cameras and machine learning algorithms to assist visually impaired users. These systems can recognize and describe objects, people, and text, providing auditory feedback to the user.

5. Sound of Vision:

Sound of Vision is an application that uses machine learning to recognize objects in the environment. It translates visual information into sounds, allowing users to understand their surroundings through audio cues.

When researching existing systems, it's crucial to look for the most recent

developments and user feedback to understand their effectiveness and user satisfaction. Additionally, keep in mind that technology in this field is rapidly evolving, and new solutions may have emerged since my last update.

2. Proposed System

The design aims to replace existing technologies of eyeless navigation systems based on detectors and buzzers with a simpler yet effective way of creating an eyeless backing system based on machine literacy, where we can descry an object while receiving real-time voice feedback and depth estimation with the required delicacy. The proposed system is more efficient and reliable. The system is set up to record real-time frames and execute all calculations. The object's class will be turned into dereliction voice notes after speech module testing, and will also be sent to the eyeless victims for assistance. We've employed an alert mechanism in addition to the item finding, where an approximate will be calculated. If that Eyeless Person is truly close to the frame or is far down at a safer area, nevertheless, it will induce voice-grounded labor's as well as distance units. The discipline of computer vision is concerned with detecting meaningful things in photos and movies (by creating rectangle boxes around them in our case). We can also offer accurate distances and convert labeled texts into voice answers. Our strategy is trustworthy, cost-effective, feasible, and practical. This allows the blind to be self-sufficient in society and to avoid the societal barriers that still exist. An Integrated Machine Learning System that allows eyeless sufferers to recognize and classify common everyday items in real time, generate verbal feedback, and calculate distance, producing alerts whether they're veritably close or veritably far down from the object was one such endeavor on our side. Handicap Research The same approach can be used to enforce medium. Now that the world is changing the design aims to replace existing technologies of eyeless navigation systems based on detectors and buzzers with a simpler yet effective way of creating an eyeless backing system based on machine literacy, where we can descry an object while receiving real-time voice feedback and depth estimation with the required delicacy. The proposed system is more efficient and reliable. The system is set up to record real-time frames and execute all calculations. The object's class will be turned into dereliction voice notes after speech module testing and will also be sent to the eyeless victims for assistance. We've employed an alert mechanism in addition to the item finding, where an approximate will be calculated. If that Eyeless Person is truly close to the frame or is far down at a safer area, nevertheless, it will induce voice-grounded labor's as well as distance units. The discipline of computer vision is concerned with detecting meaningful things in photos and movies (by creating rectangle boxes around them in our case). We can also offer accurate distances and convert labeled texts into voice answers. Our strategy is trustworthy, cost-effective, feasible, and practical. This allows the blind to be self-sufficient in society and to avoid the societal barriers that still exist. An Integrated Machine Learning System that allows eyeless sufferers to recognize and classify common everyday items in real time, generate verbal feedback, and calculate

distance, producing alerts whether they're veritably close or veritably far down from the object was one such endeavor on our side. Handicap Research The same approach can be used to enforce medium. Now that the world is changing dramatically and new discoveries in medical science are occurring, it is necessary to improve the status of the visually bloodied as well. To make them more independent in all aspects of their daily lives, as well as from a business one, a change like this was more vital to bring about and implement

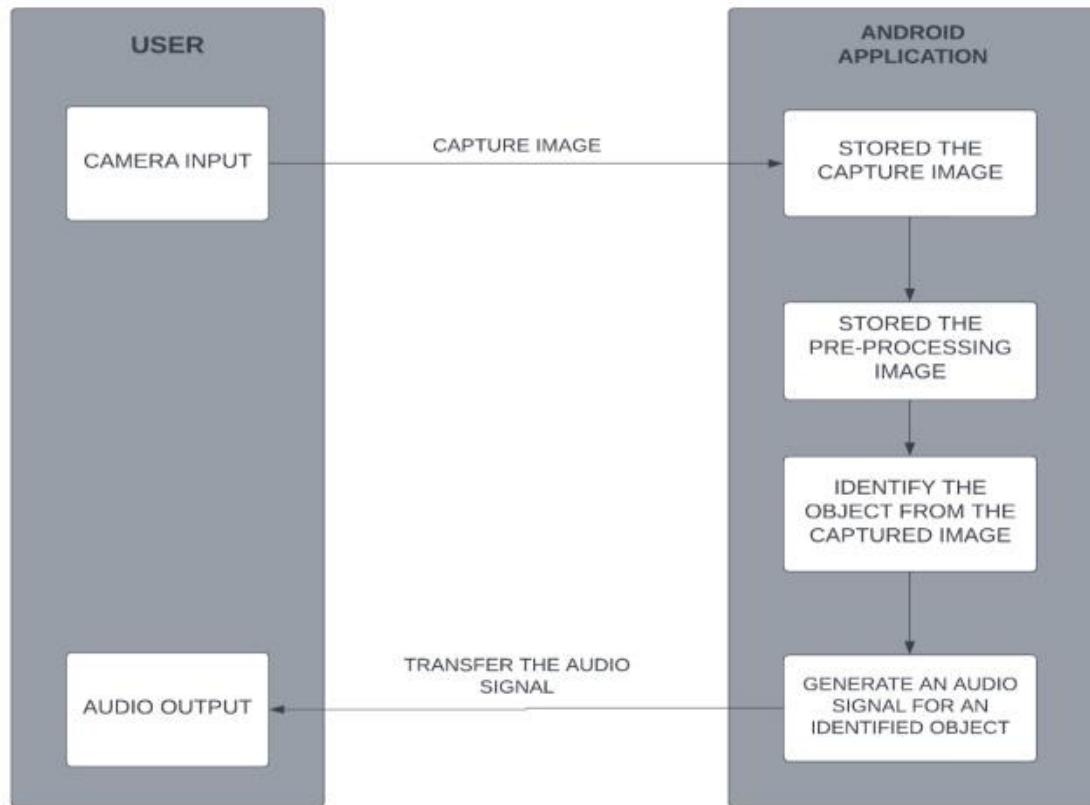


Fig 1: Block Diagram of the system

3. Objective of the System

Our current application has the following design flow. It basically consists of three modules.

They are:

- 1.Object Detection
- 2.Converting the detected object into Speech
- 3.Depth Estimation

1. Object Detection :

The foundational module of our project is object detection, which is of paramount importance. This module is primarily focused on identifying objects in close proximity as well as at a distance, utilizing datasets specifically tailored for model training. Given that our application is designed for individuals with visual impairments, the accuracy of object detection becomes a critical aspect of the system's functionality.

2. Converting the detected object into text

This component involves converting text into speech, a crucial functionality that assists individuals with visual impairments in recognizing and comprehending their immediate surroundings. It plays a vital role in aiding blind individuals to identify people and objects in proximity, offering support to children in navigating and comprehending their environment.

3. Depth Estimation

The techniques and computations employed to generate a representation of the spatial layout of a scene are termed depth evaluation or extraction feature. In simpler terms, this process is utilized to determine the distance between two objects. Our model is designed to aid individuals with visual impairments, aiming to provide advance notice of potential challenges. To achieve this, the system assesses the distance between the obstacle and the person in a given scenario. Once identified, the system creates a rectangular box around the object.

CHAPTER 5

REQUIREMENT ANALYSIS

5. REQUIREMENT ANALYSIS

Software Requirement Specification

- **Python 3.9**
- **Protobuf 3.0.0**
- **Python-TK**
- **Pillow 1.0**
- **LXML**
- **Matplotlib**
- **TensorFlow (1.15.0)**
- **contextlib2**
- **coco-API**

Technology's Used

In this project we are using Tensor Flow-API, SSD algorithm python and coco dataset. Tensor Flow API is used for preprocessing the captured image with the coco data set and SSD algorithm is used to create the anchor boxes around the object and the anchor box is used to calculate the depth from the user.

CHAPTER 6

DESIGN ANALYSIS

6. DESIGN & ANALYSIS

Modules

Our current application has the following design flow.

It basically consists of three modules.

They are:

1. Object Detection
2. Converting the detected object into Speech
3. Depth Estimation

Object detection

The initial module in our project is object detection, serving as the foundational element. Its primary function involves identifying objects in close and distant proximity using datasets tailored for model training. Given that our application caters to visually challenged users, accurate detection is of utmost importance. Following the object's detection, it undergoes comparison with the pre-trained dataset to ascertain its identity, subsequently presented to the user. For our project, we have opted for the COCO dataset, housing images where Optical Character Recognition (OCR) may be employed for character recognition. When an object is in the camera's view, system outputs are obtained using these pre-trained datasets.

The object detection occurs through the system's webcam, utilizing predefined boundary boxes with specific dimensions to represent the scale and ratios of object classes. The SSD algorithm employs a single layer of a convolutional network for single-shot multi-box detection, utilizing a multi-layer convolutional neural network for box classification into predefined classes. The identification of the object's class relies on the anchor box with the highest similarity to the object. Once trained, this property is used to predict the detected object. Following object detection, a comparison is made between the detected object and the pre-defined COCO dataset.

Algorithm:

Step 1: declare and define a backbone map of 7X7 grid;

Step 2: declare anchor box for each grid //49 anchor boxes in this case; for each anchor box: get the shape and size for each anchor box; declare object class and location;

Step 3: for each anchor box: if the overlapping degree of the anchor box is maximum: define object class and location; permute and extract object class and location from the anchor box details; detect the object from anchor box array, location, object class, lighting etc. for each element from anchor box array: get its shape, size, pixel pattern, aspect ratio and lighting;

Step 4: test_cases: if aspect ratio is like $m:n$ where $m > n$ then object has larger length else object has larger height

Step 5: if pixel pattern has soft edges object is of complex structure and has curved edges 15 if the object is in dark lighting object is in bedroom //inclines mostly to the bedside objects

Step 6: return the object class and its location;

Converting the Detected Object into Text

This component involves the conversion of text to speech, a crucial functionality that supports individuals with visual impairments in identifying and comprehending their surroundings. It aids the visually challenged in navigating and gaining insights into their immediate environment.

Following object detection, the identified object undergoes comparison with a pre-trained dataset to recognize its name, and the information is then presented to the user. In our project, we have opted for the COCO dataset to store images, enabling character recognition using Optical Character Recognition (OCR). When an object is in front of the camera, system outputs are obtained through this pre-trained dataset.

For the voice generation aspect, the pyttsx3 library plays a pivotal role. Pyttsx3 is a Python conversion library that transforms text into speech, supporting both Python 2 and 3. In the voice generation module, pyttsx3's `pyttsx.init()` function is utilized as a factory function to obtain a reference to a `pyttsx.Engine` instance. Pyttsx3 serves as an effective tool for seamless text-to-speech conversion.

Depth Estimation

The procedures and computations employed to represent the spatial configuration of a scene are termed as depth evaluation or extraction features. In simpler terms, this process is utilized to ascertain the distance between two objects. Our model serves the purpose of aiding individuals with visual impairments, with the aim of providing them advance notification of potential

challenges. To achieve this, the system assesses the distance between the obstacle and the individual in a given scenario. Following the identification of the object, a rectangular box is generated around it. The system then calculates the distance to determine if the person is at a safe distance or otherwise. This enhancement aims to make the proposed system more dependable, user-friendly, and capable of accomplishing tasks seamlessly.

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

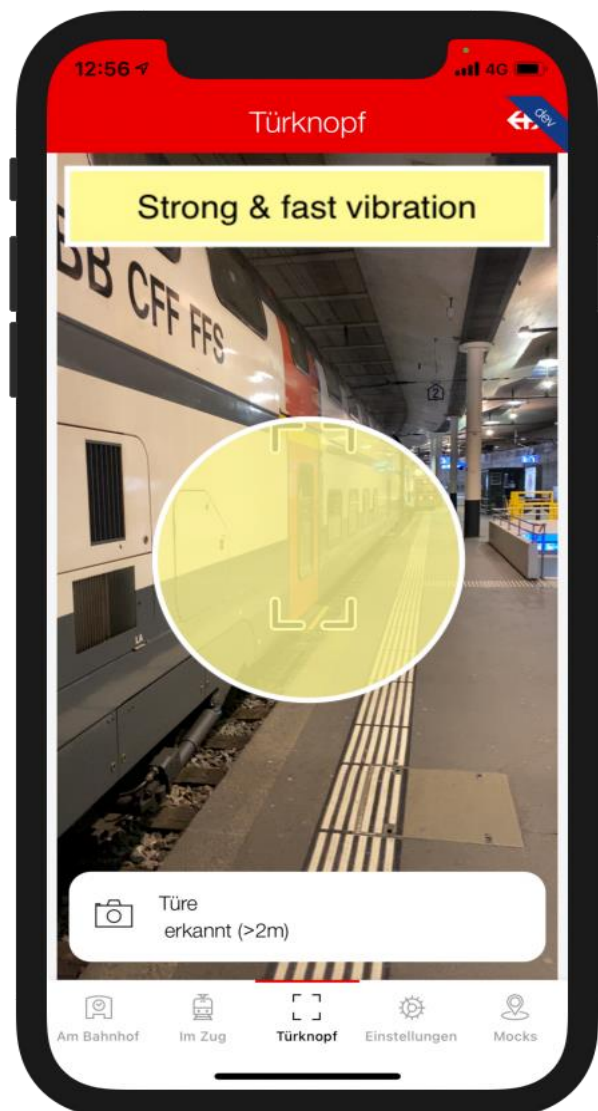
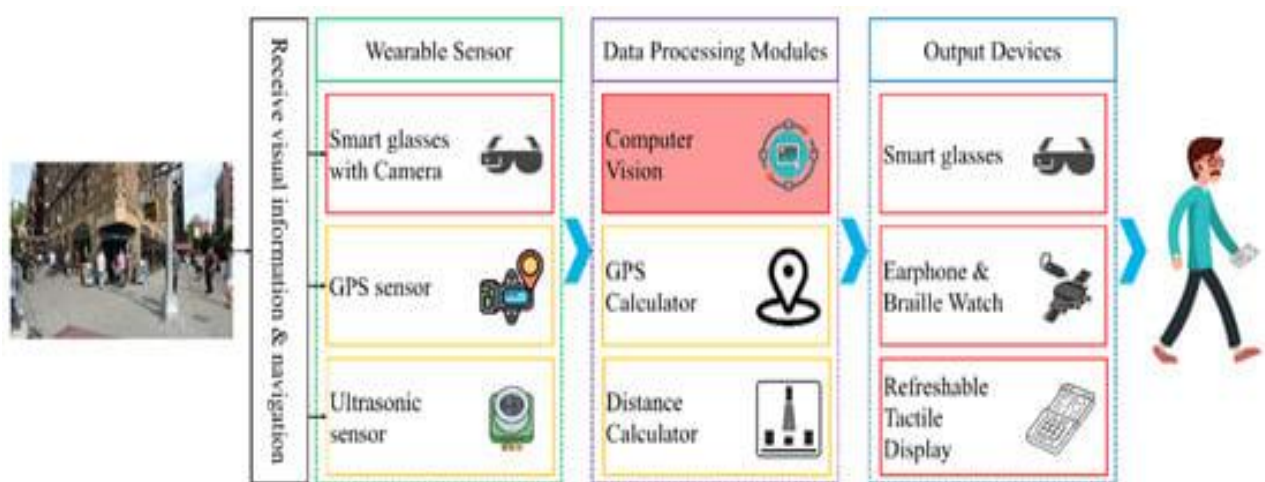
The testing phase is an important part of software development. It is the Information zed system will help in automate process of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied. Software testing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

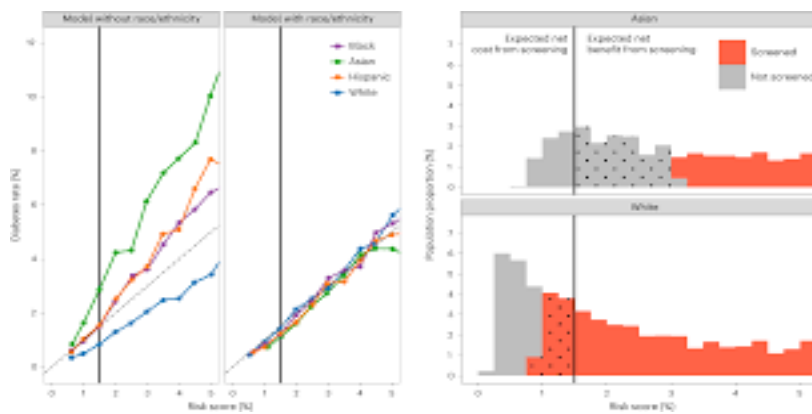
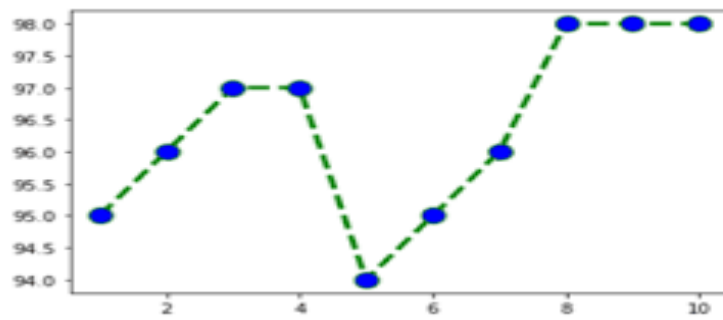
CHAPTER 8

SNAPSHOTS

8. SNAPSHOTS



[<matplotlib.lines.Line2D at 0x2b7d1c158d0>]



By this graph we can expect 78% accuracy.

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.

SAMPLE CODE

```
declare backbone_map [7][7] feature_map (256); //ResNet34
declare grid[49];
declare anchor_box[49] holds [shape][size];
for i in 1 to 49:
anchor_box[i] ([shape][size]) = grid(shape,size);
declare obj_class;
declare location;
for i in 1 to 49:
if (degree(overlap) from anchor_box[i] equals max(degree))
define obj_class;
define location;
obj_class = permute_from(anchor_box,class);
location = permute_from(anchor_box,loc);
permute_from(anc_box_array,class(optional),loc(optional));
for each element from anc_box_array:
get shape; //this parameter is to determine the shape of the anchor box
get size; //parameter to determine the size
get lighting; //parameter to determine the lighting
get pixel_pattern; //parameter to determine the visible vs dark pixels
get aspect_ratio; //parameter to determine the aspect ratio of the pixels
test_cases:
-> if aspect_ratio is like m:n where m > n then
```

```

obj has larger length
else
obj has larger height
-> if pixel_pattern in ('soft_edge')
obj is of complex structure and has curved edges
-> if lighting in ('dark_area') then
obj is in bedroom - inclines mostly to the bedside objects
return 'class_of_the_object'
return 'location_of_the_object'

// object class is to determine the type of object (stationery, cutlery, smartdevices etc.)
// location gives insights on the scope of the object (bedroom objects, living room furniture
etc.)

depth_estimation:

depth = obj_in_frame(obj);

if (obj_in_frame(obj) == 1) then // if the obj fits in frame detect_object(boxes, scores,
classes, num_detections);

for i,b in enumerate(boxes[0]):

eval boxes[0][i][0] // y axis upper boundary coordinates eval boxes[0][i][1] // x axis left
boundary coordinates

eval boxes[0][i][2] // y axis lower boundary coordinates eval boxes[0][i][3] // x axis right
boundary coordinates

mid_x = (boxes[0][i][1] + boxes[0][i][3])/2;

mid_y = (boxes[0][i][0] + boxes[0][i][2])/2;

```

10. REFERENCE

- [1] C. K. Lakde and P. S. Prasad, "Navigation system for visually impaired people," in Proceedings of 2015 International Conference on Computation of Power, Energy, Information and Communication (ICCPEIC), pp. 0093-0098, doi: 10.1109/ICCPEIC.2015.7259447, 2015.
- [2] A. Aladrén, G. López-Nicolás, L. Puig and J. J. Guerrero, "Navigation Assistance for the Visually Impaired Using RGB-D Sensor With Range Expansion," in IEEE Systems Journal, vol. 10, no. 3, pp. 922-932, Sept. 2016, doi: 10.1109/JSYST.2014.2320639.
- [3] Akhila, S., Disha, M.R., Divyashree, D. and Varshini, S.S. (2016) Smart Stick for Blind using Raspberry Pi. ICACT—2016 Conference Proceedings. International Journal of Engineering Research & Technology (IJERT), 4, 1-3.
- [4] Deepak Gaikwad¹, Chaitalee Baje², Vaishnavi Kapale³, Tejas Ladage⁴ "Blind Assist System", International Journal of Advanced Research in Computer and Communication Engineering, Vol.6 Page No- 2278-1021, march 2017.
- [5] P. Bose, A. Malphthak, U. Bansal and A. Harsola, "Digital assistant for the blind," in Proceedings of 2017 2nd International Conference for Convergence in Technology (I2CT), pp. 1250-1253, doi: 10.1109/I2CT.2017.8226327, 2017.
- [6] B.Deepthi Jain, S. M. Thakur and K. V. Suresh, "Visual Assistance for Blind Using Image Processing," in Proceedings of 2018 International Conference on Communication and Signal Processing (ICCSP), pp. 0499-0503, doi: 10.1109/ICCSP.2018.8524251, 2018
- [7] M. Awad, J. E. Haddad, E. Khneisser, T. Mahmoud, E. Yaacoub and M. Malli, "Intelligent eye: A mobile application for assisting blind people," in Proceedings of 2018 IEEE Middle East and North Africa Communications Conference (MENACOMM), pp. 1-6, doi: 10.1109/MENACOMM.2018.8371005, 2018.
- [8] S. M. Felix, S. Kumar and A. Veeramuthu, "A Smart Personal AI Assistant for Visually Impaired People," in Proceedings of 2018 2nd International Conference on Trends in Electronics and Informatics (ICOEI), pp. 1245-1250, doi: 10.1109/ICOEI.2018.8553750, 2018.
- [9] Kiruba, G.P.J., Kumar, T.M., Kavithrashree, S. and Kumar, G.A. (2018) Smart Electronic Walking Stick for Blind People. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, 7, 1194-1200.
- [10] Sathya, D., Nithyaroopa, S., Betty, P., Santhoshni, G., Sabharinath, S. and Ahanaa, M.J. (2018) Smart Walking Stick for Blind Person. International Journal of Pure and Applied Mathematics, 118, 4531-4536.
- [11] A. Khan, A. Khan and M. Waleed, "Wearable Navigation Assistance System for the Blind and Visually Impaired," in Proceedings of 2018 International Conference on Innovation and Intelligence for Informatics, Computing, and Technologies (3ICT), pp. 1-6, doi: 10.1109/3ICT.2018.8855778, 2018.
- [12] Joe Louis Paul, S. Sasirekha, S. Mohanavalli, C. Jayashree, P. Moohana Priya and K. Monika, "Smart Eye for Visually Impaired-An aid to help the blind people," in Proceedings of 2019 International

Conference on Computational Intelligence in Data Science (ICCIDS), pp. 1- 5, doi: 10.1109/ICCIDS.2019.8862066, 2019.

[13] S. Divya, S. Raj, M. Praveen Shai, A. Jawahar Akash and V. Nisha, "Smart Assistance Navigational System for Visually Impaired Individuals," in Proceedings of 2019 IEEE International Conference on Intelligent Techniques in Control, Optimization and Signal Processing (INCOS), pp. 1-5, doi: 10.1109/INCOS45849.2019.8951333, 2019.

[14] V. V. Meshram, K. Patil, V. A. Meshram and F. C. Shu, "An Astute Assistive Device for Mobility and Object Recognition for Visually Impaired People," in IEEE Transactions on Human-Machine Systems, vol. 49, no. 5, pp. 449-460, Oct. 2019, doi: 10.1109/THMS.2019.2931745.

[15] F. Al-Muqbal, N. Al-Tourshi, K. Al-Kiyumi and F. Hajmohideen, "Smart Technologies for Visually Impaired: Assisting and conquering infirmity of blind people using AI Technologies," in Proceedings of 2020 12th Annual Undergraduate Research Conference on Applied Computing (URC), pp. 1-4, doi: 10.1109/URC49805.2020.9099184, 2020.

[16] S. S. Mohith, S. Vijay, S. V and N. Krupa, "Visual World to an Audible Experience: Visual Assistance for the Blind And Visually Impaired," in Proceedings of 2020 IEEE 17th India Council International Conference (INDICON), pp. 1-6, doi: 10.1109/INDICON49873.2020.9342481, 2020.

[17] Ashraf, A., Noor, S., Farooq, M.A., Ali, A. and Hasham, A. (2020) IoT Empowered Smart Stick Assistance for Visually Impaired People. International Journal of Scientific & Technology Research, 9, 356-360.

[18] Hussein Abdel-Jaber, Hussein Albazar, Ahmed Abdel-Wahab, Malak El Amir, Areej Alqahtani, Mohammed Alobaid” Mobile Based IoT Solution for Helping Visual Impairment Users”, in scrip ord journals, Vol.11 No.4, October 2021.

[19] S. Khan, S. Nazir and H. U. Khan, "Analysis of Navigation Assistants for Blind and Visually Impaired People: A Systematic Review," in IEEE Access, vol. 9, pp. 26712-26734, 2021, doi: 10.1109/ACCESS.2021.3052415.

[20] Javaid, M. and Khan, I.H. (2021) Internet of Things (IoT) Enabled Healthcare Helps to Take the Challenges of COVID-19 Pandemic. Journal of Oral Biology and Craniofacial Research, 11, 209-214.

[21] X. Hu, A. Song, H. Zeng and D. Chen, "Intuitive Environmental Perception Assistance for Blind Amputees Using Spatial Audio Rendering," in IEEE Transactions on Medical Robotics and Bionics, vol. 4, no. 1, pp. 274-284, Feb. 2022, doi: 10.1109/TMRB.2022.314

