VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI – 590018, Karnataka

INTERNSHIP REPORT

ON

"Virtual Assistant for Visually Impaired"

Submitted in partial fulfilment for the award of degree(18CSI85)

BACHELOR OF ENGINEERING IN
INFORMATION SCIENCE ENGINEERING

Submitted By:
Mohammad Farhan Soharwardi
1CR19IS088

LOGO Ex:

Conducted at
Compsoft technologies

CMR INSTITUTE OF TECHNOLOGY & MANAGEMENT
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAAC Accredited Institution* (Recognized by Govt. of Karnataka, approved by AICTE, New Delhi & Affiliated to Visvesvaraya Technological University

#132, AECS Layout, ITPL Main Rd, Bangalore, Karnataka, India

CMR INSTITUTE OF TECHNOLOGY

DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

NAAC Accredited Institution* (Recognized by Govt. of Karnataka, approved by AICTE, New Delhi & Affiliated to Visvesvaraya Technological University

#132, AECS Layout, ITPL Main Rd, Bangalore, Karnataka, India

CERTIFICATE

This is to certify that the Internship titled **"**Virtual Assistant for Visually Impaired**"** carried out by **Mohammad Farhan Soharwardi,** a bonafide student of **CMR Institute of Technology & Management**, in partial fulfillment for the award of **Bachelor of Engineering** in **Information Science Engineering** under **Visvesvaraya Technological University,** 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 regarding the Internship prescribed for the course Internship / Professional Practice (18CSI85)

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, **Mohammad Farhan Soharwardi,** a final year student of Information Science Engineering, CMR Institute of Technology - 560037, declares 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 **Information Science Engineering**, during the academic year 2022-2023.

Date:

Place :

USN: 1CR19IS088

NAME: Mohammad Farhan Soharwardi

OFFER LETTER

INTERNSHIP OFFER LETTER

Date: 6th February, 2023

Name: **Mohammad Farhan Soharwardi**
USN: **1CR19IS088**

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 February, 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*

A C K N O W L E D G E M E N T

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 us adequate facilities to undertake this Internship.

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

We would like to thank our (Lab assistant name) 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.

MOHAMMAD FARHAN SOHARWARDI
1CR19IS088

ABSTRACT

The field of artificial intelligence has led to various virtual assistants such as Siri in iPhone, Google Assistant, 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 that will consist of numerous deep learning models that will help applications increase their 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.

Table of Contents

CHAPTER 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 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 the e-client and simple process are the key features that our clients desire from Technological Solutions they are looking 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 client's requirements.

Compsoft Technologies, strive to be the front runner in creativity and innovation in software development through its 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

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 web promotion and tailor-made software products, designing solutions best suiting client's requirements. The organization where they have a right mix of professionals as a stakeholder 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 is 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 markup 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

Introduction to ML

Intelligent Virtual Assistants (IVA) also known as Intelligent Personal Assistants (IPA) are AI-powered agents capable of generating personalized responses, pulling from contexts such as customer metadata, prior conversations, knowledge bases, geolocation, and other modular databases and plug-ins. The Intelligent Virtual Assistant market, experiencing rapid growth in the 2020s, is forecasted to reach USD 6.27 billion by 2026, according to Mordor Intelligence.

AI assistant technology is in many ways similar to a traditional chatbot but integrates next-generation analytics, machine learning, AR/VR and data science. While conventional chatbots can generate responses to inquiries based on Markov chains and other similar processes, their static responses pale in comparison to the dynamic insights generated by intelligent virtual assistants.

Problem Statement

To design and develop a Virtual Assistant for Visually Impaired that assists them in basic activities like calling, messaging, date/time accessibility.

CHAPTER 4

SYSTEM ANAYLISIS

1. Existing System

Some of the major difficulties faced by them include unable to use smartphones to perform basic functionalities like messaging or calling, navigation problems, recognizing different denominations which further lead to inaccessibility in getting involved in day-to-day chores. Therefore, visually impaired people thus need an assistive tool to help them cope with these difficulties and simplify them to an extent.

2. Proposed System

The proposed system is to build a customized application which acts as a voice assistant and can be used to help the visually impaired to access the most important features of their mobile phones. The app consists of four modules. These are:

1)**Messaging Inbox –** In this module the system will speak the new messages for the user and the user can also send messages through Speech Recognition API and text-to-speech API.

2)**Phone Manager –** In this module the user can either use the provided dialer or can speak recipient's phone number to make a call.

3)**Time/Date and Battery Status –** In this module the user can get the phone's current battery status and also know date and time.

4)**Camera –** This module will be used to identify Indian currency denomination and predict the notes scanned by the camera.

3. Objective of the System

1. Various techniques to implement the aforementioned system.
2. Applying various Deep Leaning Models for object detection and speech recognition.
3. Develop virtual assistant system using CDNN, kotlin API.

CHAPTER 5

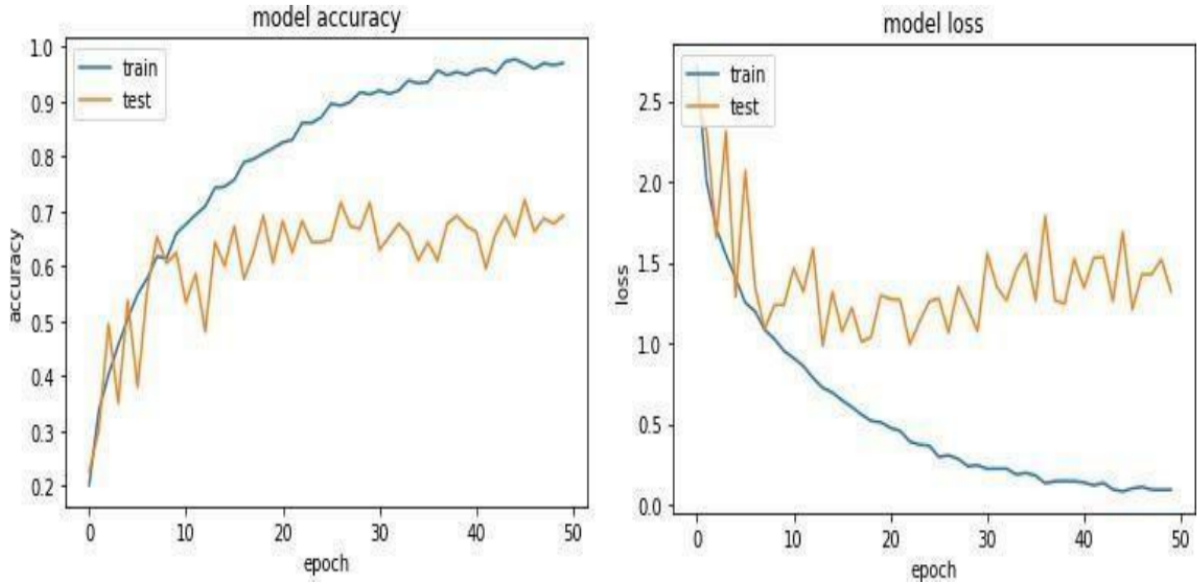
REQUIREMENT ANALYSIS

ALGORITHM	APPROACH 1	APPROACH 2	APPROACH 3
SVM	83%	77%	90%
Decision Tree	71%	65%	68%
KNN	80%	80%	87%
Logistic Regression	70%	77%	86%
Random Forest	76%	69%	72%
Gaussian Naïve Bayes	74%	73%	75%
Gradient Boosting Trees	77%	69%	75%

CHAPTER 6: DESIGN ANALYSIS

1D CNNs and 2D CNNs were implemented on 6 emotion class classification and 12 gender+emotionclass classification parallelly and it was observed that including gender gave better performance. Since CNNs are natural feature extractors, 1D CNN and 1D CNN-LSTM architectures were trained on the raw audio input.

2D CNNs were implemented on the engineered features such as MFCCs and Log-mel spectrogram. The training of 2D CNNs started with 2 convolu×tional layers with 3 3 filters and max pooling with 2 2 fi×lters with stride 2. They were tuned by adding more convolutional layers and increasing the filter sizes in the initial layers. It was found that increasing the depth beyond 4 layers did not improve performance. Also, the champion model on 14 class predictions was obtained with 12 × 12 filters and 7 × 7 filters in the first and second layers respectively. Also, the final 2 layers had 3 × 3 filters



CHAPTER 7

IMPLEMENTATAION

The android application is made using Kotlin programming language. Kotlin is a modern statically typed programming language that helps boost productivity, developer satisfaction, and code safety. Some of its features are – Expressive and concise, safer code, interoperable, and structured concurrency. The built in speech-to-text and text-to-speech APIs are used for voice assistant functionality. The speech-to-text API is an intent-based API, which launches Google's Speech Recognition service, and returns back the text result. The text-to-speech API, unlike Speech Recognition, is available without Google Services and can be found in android.speech.tts package.

Implicit intents are used to make a phone call after receiving the recipient's phone number. The ACTION_CALL action is used to trigger built-in phone call functionality available in Android devices. Implicit intents send the user to another app or service based on an action the user would like to perform. For example, here we have a phone number and we want to make a call. For this instead of building our own activity, we create a request to make the phone call using Implicit Intent.

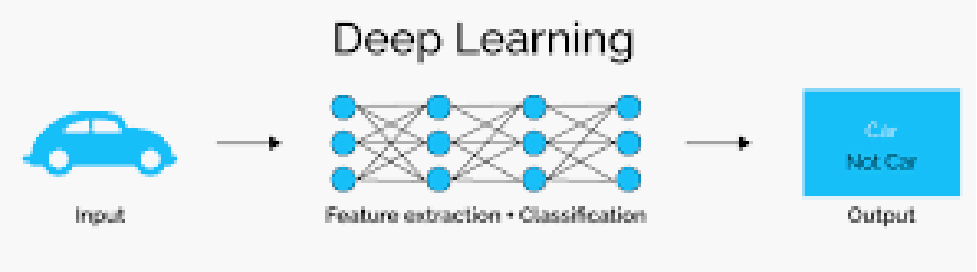
Next we have features such as sending and receiving messages and getting the current battery status and battery percentage. These functionalities are implemented using broadcast receivers. Apps can register specific broadcasts. When a broadcast is sent, the system automatically routes broadcasts to apps that have subscribed to receive that particular type of broadcast. The BatteryManager class is used to broadcast all battery and charging details and the onReceive() method of the BroadcasrReceiver class is used to receive messages.

The currency detection model uses Deep Learning techniques to recognize any Indian Currency using image as an input feed. Deep Learning is a machine learning

technique that teaches computer to do what comes naturally to humans. A computer model learns to perform classification tasks directly from images, text or sound.

The image detection is done through a Convolutional Neural Network model built using Tensorflow and Keras Library of python.

Convolutional neural network (CNNs) are one of the most popular technique used to improve images classification accuracy.



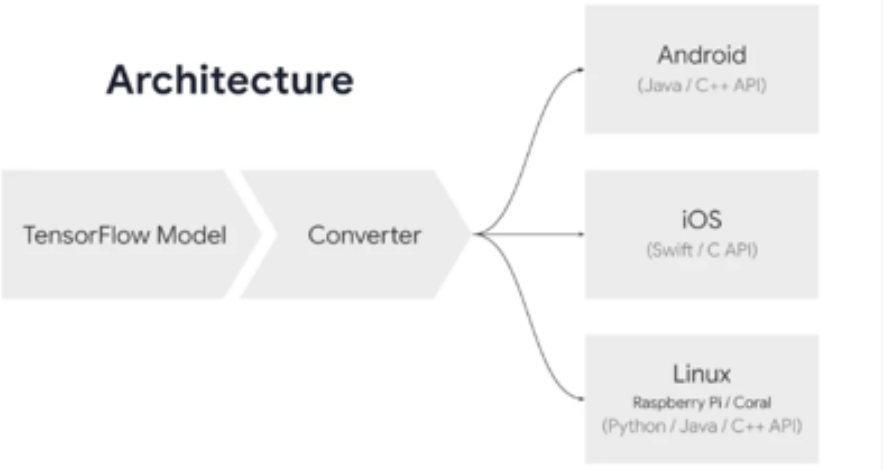
The steps involved are:

1.Training the model

2.Converting the model

3.Deploy to device

4.Optimize the model



The model classifies currency images into 10 different categories comprising of valid old and new currencies. I have used a simple sequential model for classification purposes.

The steps followed in building the model are:

1)**Dataset collection** – The official IEEE dataset of Indian and Thai currency is used which comprises of 2000 different images.

2)**Splitting dataset** – The dataset is partitioned into training and testing directory.

3)**Building the model** – Building a sequential model using MaxPooling and convolutional layers.

4)**Using Image augmentation** – Image augmentation is used to expand the dataset by rotation, flipping, zooming, shifting, etc. and improve the performance of the model.

5)**Training and Testing** - The model is trained on images in the training directory and is tested with images, which the model hasn't seen previously.

Next, the model needs to be converted. Therefore, to convert a trained TensorFlow model to run on mobile devices, the TensorFlow Lite converter Python API is used. This reduces the model into a Flat Buffer, reducing model size and modifying it to be used on TensorFlow Lite operations.

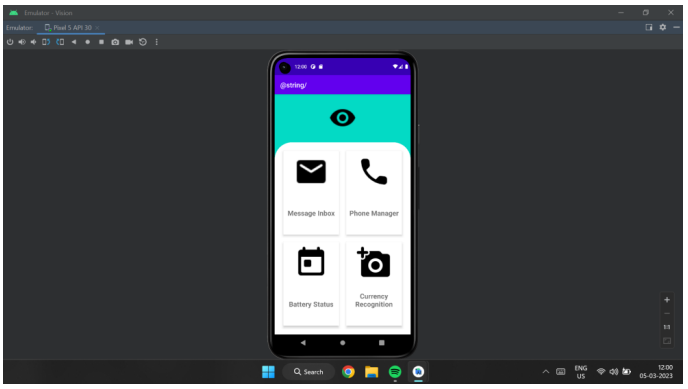
The next important step is deploying the model into the android application. When deploying a model for use on mobile devices, it is important to consider the model size, workload and the operations that are used.

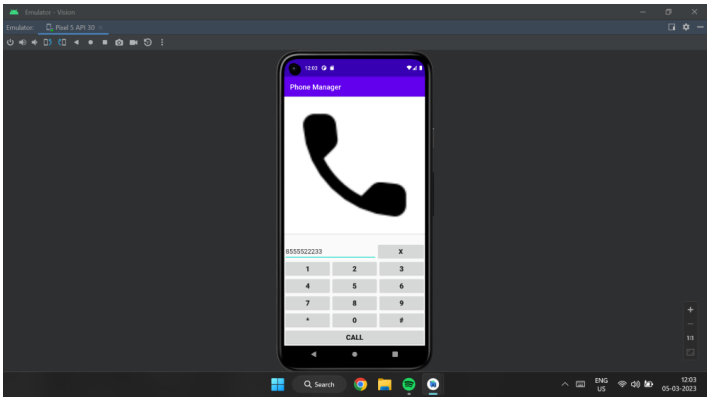
- **Model Size –** A model must be small enough to fit within your target device's memory.
- **Workload –** The size and complexity of the model has an impact on workload. Large, complex models might result in a higher duty cycle, which will increase power consumption and heat output.

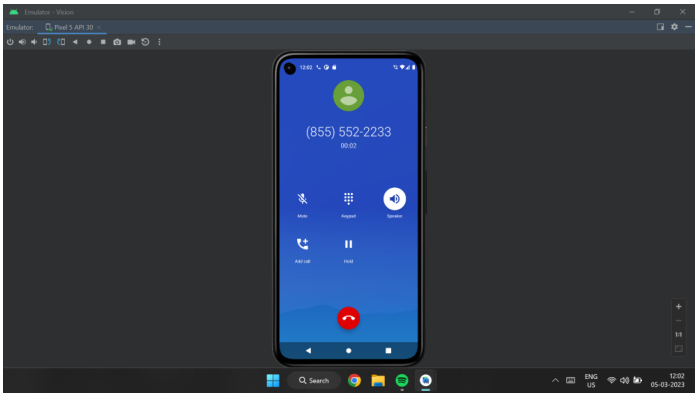
The TensorFlow Lite interpreter, runs optimized models on edge devices such as mobile phones and microcontrollers.

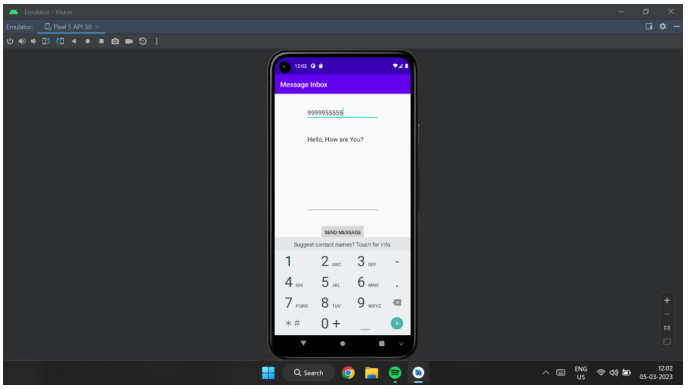
CHAPTER 8

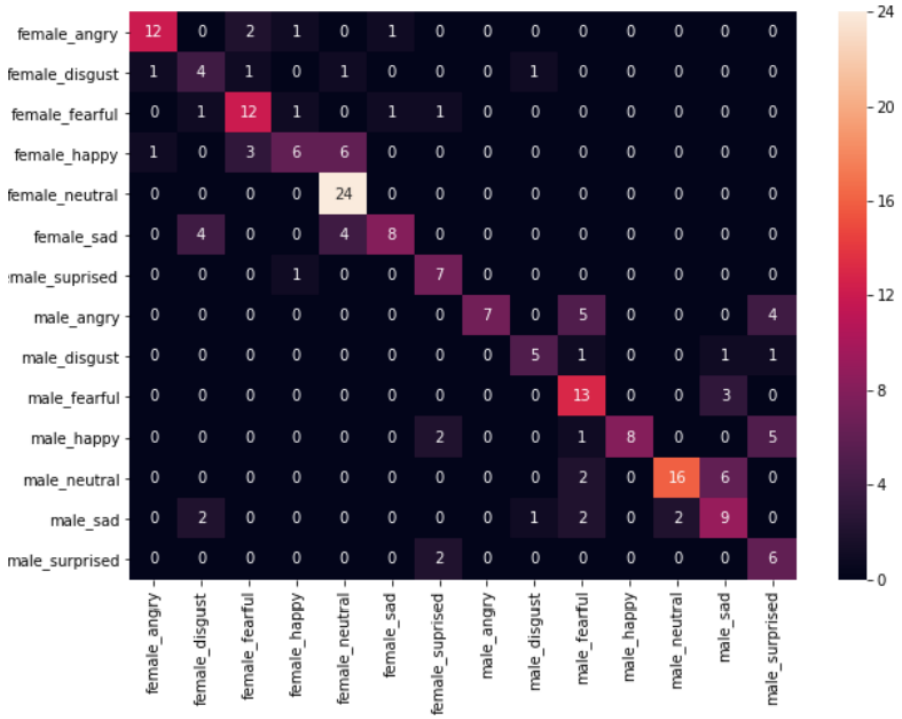
SNAPSHOTS










female_angry 12 0 2 1 0 1 0 0 0 0 0 0 0 0
female_disgust 1 4 1 0 1 0 0 0 1 0 0 0 0 0
female_fearful 0 1 12 1 0 1 1 0 0 0 0 0 0 0
female_happy 1 0 3 6 6 0 0 0 0 0 0 0 0 0
female_neutral 0 0 0 0 24 0 0 0 0 0 0 0 0 0
female_sad 0 4 0 0 4 8 0 0 0 0 0 0 0 0
male_suprised 0 0 0 1 0 0 7 0 0 0 0 0 0 0
male_angry 0 0 0 0 0 0 0 7 0 5 0 0 0 4
male_disgust 0 0 0 0 0 0 0 0 5 1 0 0 1 1
male_fearful 0 0 0 0 0 0 0 0 0 13 0 0 3 0
male_happy 0 0 0 0 0 0 2 0 0 1 8 0 0 5
male_neutral 0 0 0 0 0 0 0 0 0 2 0 16 6 0
male_sad 0 2 0 0 0 0 0 0 1 2 0 2 9 0
male_surprised 0 0 0 0 0 0 2 0 0 0 0 0 0 6
female_angry
female_disgust
female_fearful
female_happy
female_neutral
female_sad
female_suprised
male_angry
male_disgust
male_fearful
male_happy
male_neutral
male_sad
male_surprised
24
20
16
12
8
4
0

CONCLUSION

This paper proposes a much helpful voice assistant app for visually impaired people. This system will be very easy to use and will run on the Android operating system. The voice recognition API and text-to-speech (TTS) makes it very easy for users to navigate around different functionalities of the app. The application with its deep learning-based technique to recognize and classify Indian currencies provides a reasonable accuracy and will help visually impaired people to be able to improve their quality of life by reducing their dependency and aiding them in their day-to-day life.

REFERENCES

- **Cyrill Aatisha, Melvin Shubham, L. Felix and Gladence Mary, "Text Reader for Blind: Text-To-Speech", *International Journal of Pure and Applied Mathematics*, vol. 117, no. 21, pp. 119-125, 2017.**

- **Md. Rafique Bagwan Shagufta and L.J. Sankpal, "VisualPal: A Mobile App for Oject Recognition for the Visually Impaired", *IEEE International Conference on Computer Communication and Control*, pp. 4-2015.**

- **Anzarus Shahed, Md. Sabab and Ashmafee Hamjajul, "Blind Reader: An IntelligentAssistant for Blind", *19th International Conference on Computer and Information Technology*, December 18-20, 2016.**

- **Nada N. Saeed, A.-M. Mohammed Salem and Alaa Khamis, "Android-Based Obect Recognition for the Visually Impaired", *German University in Cairo Ain Shams University*.**