

**IMAGE BASED AUTOMATIC PRICE CALCULATION OF PACKAGED  
PRODUCT TO GUIDE VISUALLY IMPAIRED PEOPLE**

**BY**

**Zobayer Mahmud**

**ID: 172-15-10067**

**AND**

**Rakibuzzaman**

**ID: 172-15-9635**

**AND**

**Md. Misbah Uddin Muib**

**ID: 172-15-10057**

This Report Presented in Partial Fulfillment of the Requirements for the  
Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

**Ms. Rubaiya Hafiz**

Senior Lecturer

Department of CSE

Daffodil International University

Co-Supervised By

**Warda Ruheen Bristi**

Lecturer

Department of CSE

Daffodil International University



**DAFFODIL INTERNATIONAL UNIVERSITY**

**DHAKA, BANGLADESH**

**11 SEPTEMBER 2021**

## APPROVAL

This Project titled “**Image based automatic price calculation of packaged product to guide visually impaired people**”, submitted by Zobayer Mahmud ID: 172-15-10067, Rakibuzzaman ID: 172-15-9635 and Md. Misbah Uddin Muib ID: 172-15-10057 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 11th September, 2021.

### BOARD OF EXAMINERS

**Chairman**



---

**Dr. Touhid Bhuiyan**  
**Professor and Head**

Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Internal Examiner**



---

**Md. Sadekur Rahman**  
**Assistant Professor**

Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Internal Examiner**



---

**Moushumi Zaman Bonny**  
**Assistant Professor**

Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**External Examiner**



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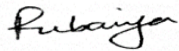
**Shah Md. Imran**  
**Industry Promotion Expert**

LICT Project, ICT Division, Bangladesh

## DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Ms. Rubaiya Hafiz, Senior Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

### Supervised by:



**Ms. Rubaiya Hafiz**  
Senior Lecturer  
Department of CSE  
Daffodil International University

### Co-Supervised by:



**Warda Ruheen Bristi**  
Lecturer  
Department of CSE  
Daffodil International University

### Submitted by:



**Zobayer Mahmud**  
ID: 172-15-10067  
Department of CSE  
Daffodil International University



**Rakibuzzaman**  
ID: 172-15-9635  
Department of CSE  
Daffodil International University



**Md. Misbah Uddin Muib**  
ID: 172-15-10057  
Department of CSE

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Finally, we must acknowledge with due respect the constant support and patients of our parents.

## **ABSTRACT**

Blindness is a term used for the condition of a person who experiences a disorder or obstacle in his sense of vision. Blind people are divided into two groups. They are: Total blind and low vision. There have been many supports for disables. Blind people are categorized as vision impairment. One of the supports that should be implemented is easy shopping for blind people. It is a brutal truth that, “We are not born equal”. Most of time, blind people require support from others. In this era of technology, it is an opportunity for the blind people to be self-dependent with the help of technology. The main objective of this paper is to make the lives of the blind easier so through this research we are going to build an android application named “See in Me” which can help the blind people to shop easily specially in Bangladesh which facilities are currently not available in our country. This system listens to user’s voice command then open camera from our application. Then user can scan any package product which will be identified through our system and its criteria such as product name and price will be passed to the user via voice mode. If users agree to shop scanned product one will be able to add this product in the cart just by shaking the phone or giving a voice command “ok”. User can add multiple products in cart through this process. After having his shopping, user can find total price and added products in the cart by giving “check” command.

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# Chapter 1

## Introduction

### 1.1 Introduction

With advances in technologies, smartphone devices have become one of the most used devices. They have become our daily necessities. We need to call or text someone from anywhere at any moment. For the blind people, this issue is more obvious. “See in Me” is an android application which supports voice commands and responds through voice and sensors. This application is developed for the blind people. It helps visually impaired people to shop easily without depending on others. By using voice command, the application is opened and the camera will detect the object and responds to the user that what actually the product is and its price through voice. This application is easily accessible on mobile phones at anytime and anywhere.

### 1.2 Problem statement

A very recent estimation which was done by the World Health Organization (WHO) has found about 285 million people in the world are visually impaired and low vision. Among them, the numbers of blind people is 39 million are blind and other 246 million have impaired vision. In the absence of every other alternatives, by the year 2020, these figures are expected to already have expanded dramatically. According to the speakers' estimates, 750,000 inhabitants in Bangladesh are blind, with such a total population of 6.0 million partially sighted.

Visually impaired people lead a very traumatic life as they can't do whatever they want. Most of the time they have to depend on other people for their daily activities such that their necessary product purchasing, there way to lead life. Purchasing is a great issue in the life of visually impaired people while many time they are being cheated intentionally or unintentionally as most of grocery shop calculation in Bangladesh held by manual calculation due to poor number of superstore existence.

### **1.3 Motivation.**

Man is God's most magnificent creation It is our duty to help those who are inferior compared to us. There are some available systems like - Be My Eyes, Seeing AI, Tap Tap See, Digit-Eyes, that have made some promise but they cannot handle automatic price calculation of packaged product to guide visually impaired people. For example, Be My Eyes is for individuals who are blind or have eyesight problems. Through a live video call, the system helps blind and low-vision users with sighted volunteers and companies from all across the globe. Volunteers have stepped in to help blind and low-vision individuals via video call. But unfortunately this service is not comfortable for our country for lack of internet service and our mother tongue.

On the other hand, TapTapSee will be able to read the label and identify the product by its brand name. Keep in mind, however, that TapTapSee can indeed distinguish objects that are in focus and within the camera range. But a big limitation is that it is very hard for blind users to find the position of the bar code and to correctly point the bar code reader at the bar code.

So to support them, to make them more self-dependent we thought about this issues to how to address these societal issues to make their things simpler. Then we came about this idea to show our support to them in shopping according to their necessities and make them believe that they are not less than us in any term and they have the rights to live as everyone in the world.

### **1.4 Objective**

The world's nature is being changed and people are becoming helpless day by day. We hope that our project will provide support those who are blind and help them to shop. Our main objective is to build an image based packaged product classification & recognition system for automatic price calculation to help visually impaired people in their daily shopping. Through our project outcome, visually impaired people will be able to detect the product, know the price and will able to add them to the cart. Above all, we hope to provide a smart and intelligent system.

## **1.5 Expected Outcome**

Through the application, blind people can purchase their daily necessity very easily. We hope, by using this application, consumers will be able to take services in a convenient way.

## **1.6 Report Layout**

### **Chapter 1: Introduction**

This chapter describes work inspiration, motivation, project objective and outcome of the program.

### **Chapter 2: Background**

The background is important and this chapter discusses the background related work such as comparison with other projects and finds out the problem of the project, the challenges which are face to do the project.

### **Chapter 3: Requirement Specification**

This chapter defines many important things of the project are requirements such as the use case model, business process modeling and the logical database.

### **Chapter 4: Design Specification**

The project's conception is the focus of this section. Two types of design which are front-end design and back-end design for this project. The proper implementation of the design is very important which describes this chapter in detail.

### **Chapter 5: Implementation and Testing**

This chapter shows the implementation and testing system of the project by the project screenshot. After completion of any project, testing data and its success tell is the project ready to live.

### **Chapter 6: Result Analysis**

In this chapter has been discussed about result analysis of the application, and also shows program output data stats & result accuracy.

## Chapter 7: Impact on Society, Environment and Sustainability

Through this project we build a mobile application named “See in Me”. This chapter describes how this application eliminate our social problem, how this application will very beneficial to the blind people and finally what we have achieved.

## Chapter 8: Conclusion and Future Scope

Every project has some limitation and how it can be overcome. The future implementation scope is discussed in this chapter.

## CHAPTER 2

### Background

#### 2.1 Introduction

Mostly, smartphones came to us as a blessing. We are pretty much dependent on mobile phones in this modern era. We rely on them for each and everything in life. Blind people face challenges daily in communicating with the world around them. We made an application that will help them to purchase the necessities of their life.

#### 2.2 Related Works

There are some applications in the world which have some similar features of See in Me like identify the object for the blind people by utilizing the camera. Some of the examples of similar applications of See in Me are: Be My Eyes, Seeing AI, TapTapSee. In Bangladesh, there is no other app like See in Me.

#### 2.3 Comparative Studies

Usually, an application is made to fulfill a certain objective. Most comparison able applications like See in Me are described below:

Table 2.3.1: Comparative Studies.

Name	Their Work Principle	Our Work Principle
Be My Eyes	Connects blind people with volunteers through with a live video conference for visual assistance.	See in Me detects products through camera and responds the name and price to the user. If the user shakes his phone, the product will be added to the cart.
Seeing AI	Reads text, identify products, recognizes friends, identifies currency etc.	Identify products.
TapTapSee	Identify objects.	Identify products, can add them to cart.

## **2.4 Scope of the Problem**

According to the world bank, Bangladesh has made remarkable progress in poverty reduction. Still there are a lot of people who still lives below the poverty line.. Those who doesn't have a smart phone and those who are not educated it would be difficult to them to take service from our application as See In Me requires an android phone and we have used Speak Now English. Moreover most of the service provider such as shopkeepers especially in village are too able enough to cope up with this service.

## **2.5 Challenges**

As our project is ML based android application, it was new to us and during the development of this project, we have faced some challenges and tried our best to overcome them. Some of the main challenges are described below:

1. We had to collect 130-160 images of product and then train the model.
2. Export all the models as TensorFlow Lite and implement them in android application.
3. Generating voice if the image matches with our product model (90% match).
4. Working with Accelerometer sensor and measure the distance.

## Chapter 3 Requirement Specification

### 3.1 Business Process Modeling

In this section, we will discuss the main structure of See in Me by the business process model which defines the workflow of the application.

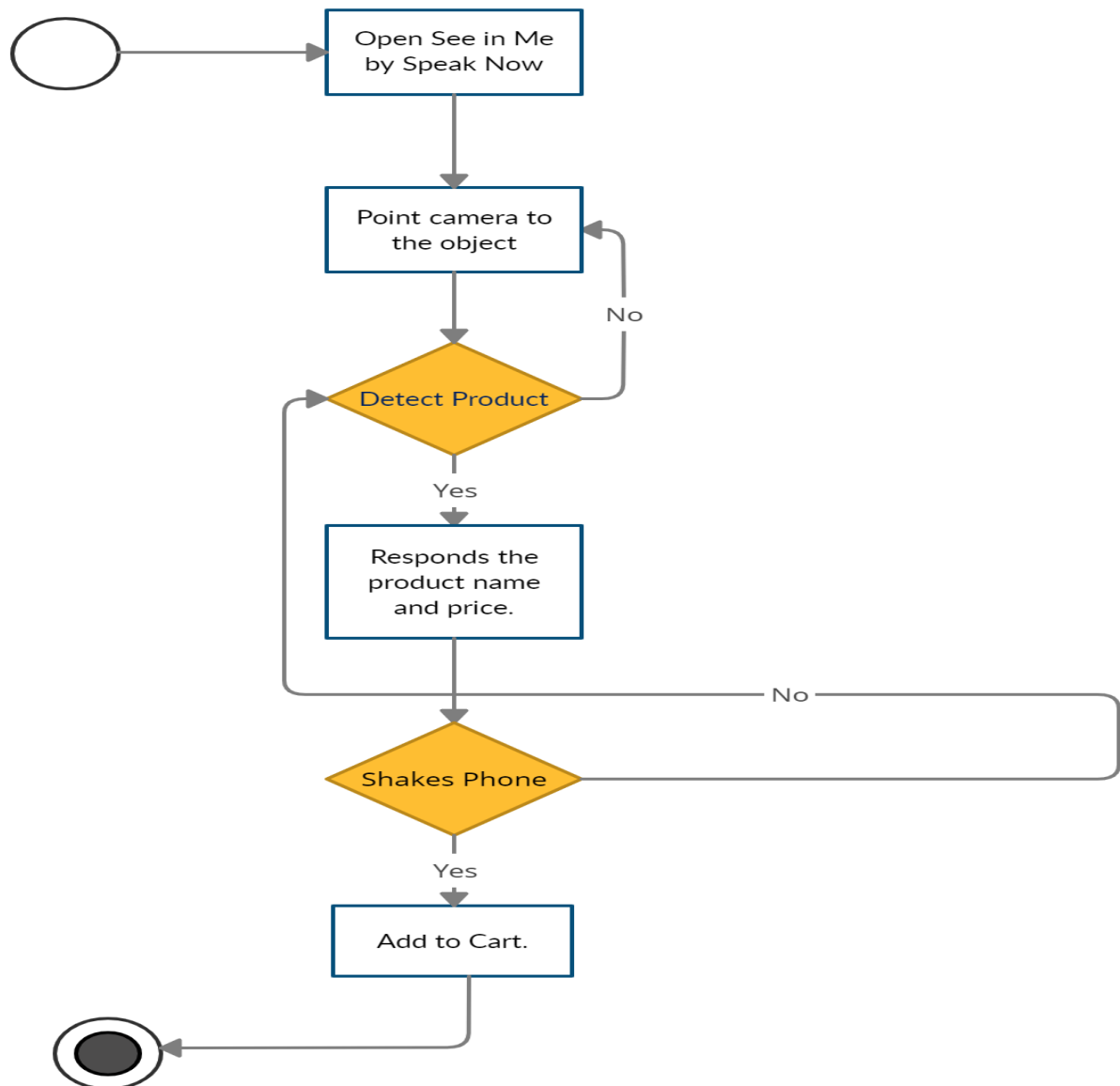


Figure 3.1.1: Business Process Model of See in Me.



### 3.2 Requirement Collection Analysis

The developer collects images, refine them, trains the model and export it as tensorflowlite and use it on android application. The user opens up the application, points the camera to an object. The application takes the input and try to match with the models specified in the app. If any model matches (90%) with the image, the app responds with voice.

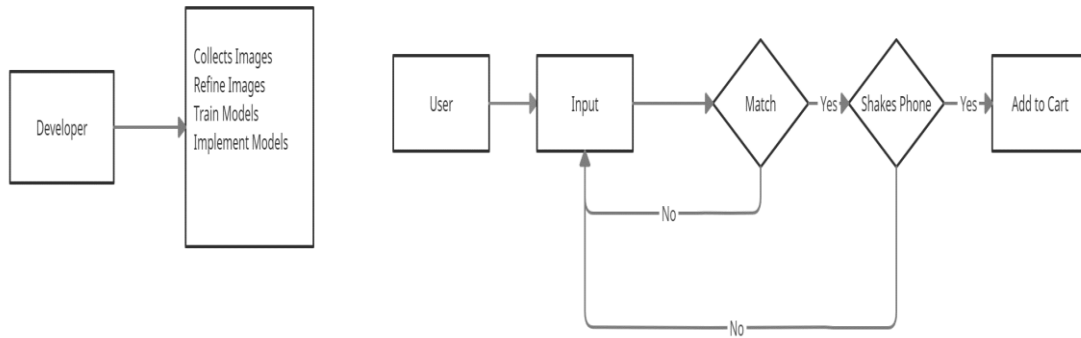


Figure 3.2.1: Requirement Collection and Analysis.

### 3.3 Use Case Modeling and Description

The Use-Case model in the form of how a consumer would interact with a program. First, the user has to open up the application by using voice command. Then he can scan the product. If the product matches with any product, it will respond in voice with id name and price of the product. If the user shakes his phone or give command “ok”, it will be added to the cart.



Figure 3.3.1: Use Case Modeling and Description.

### 3.4 Logical Data Model

While implementing a TensorFlow neural-network model for on-device ML applications, the TensorFlow Lite Model Maker package accelerates the process of altering and switching the model to precise dataset.

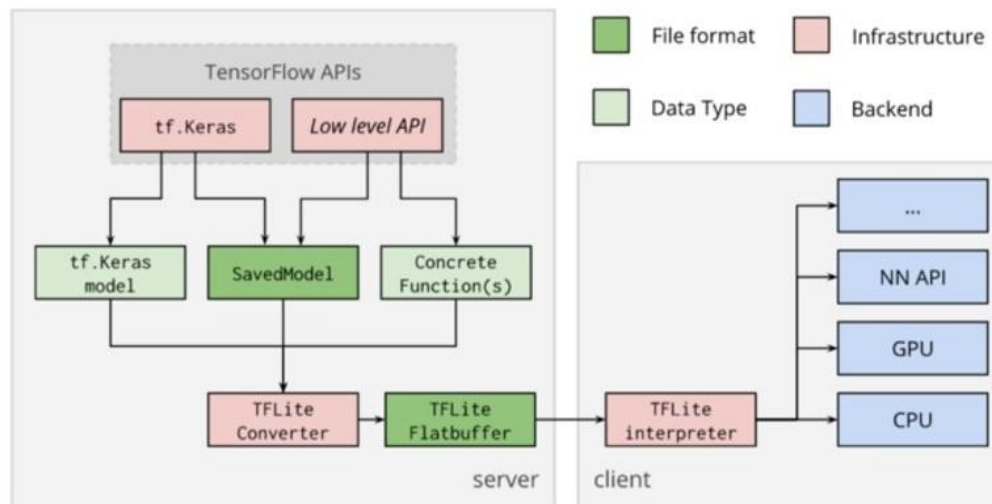


Figure 3.4.1: Logical Data Model

### 3.5 Design Requirements

The application is dedicated for the blind people. But design requirements are very important for android application. Some of our might be the ones with low vision. That is how have we sought to make the User Experience as good as possible. To complete the design, mobile application design skills were necessary. For this, we had to know some of the computer programming languages and design tools like adobeXd, google material design. We had to give proper attention to train the model so that it works appropriately and easily.

# CHAPTER 4

## Design Specification

### 4.1 Front-End Design

Front-End is the point of interaction for the user. So, considering this factor, we have created a user friendly and smooth design. Every user can easily use this application. Though our consumers will be the blind people, it will be very unethical if we design our application poorly. So, we did our very best to provide a good user experience.



Figure 4.1.1: Front-End Design.

## 4.2 Model Design

For testing purpose, we have selected five items: Harpic, Lux, Vim, Pepsodent, Pepsodent Tooth Powder and Pepsodent pest. We took a lot of photos of them from different angles and finally selected 130-200 photos for each product so that we can get better accuracy. Then we refined the photos and trained them in TensorFlow. Then we exported it as TensorFlow Lite. Our model conversion type was Quantized. Here, we successfully achieved the model file and the text file for the class names.

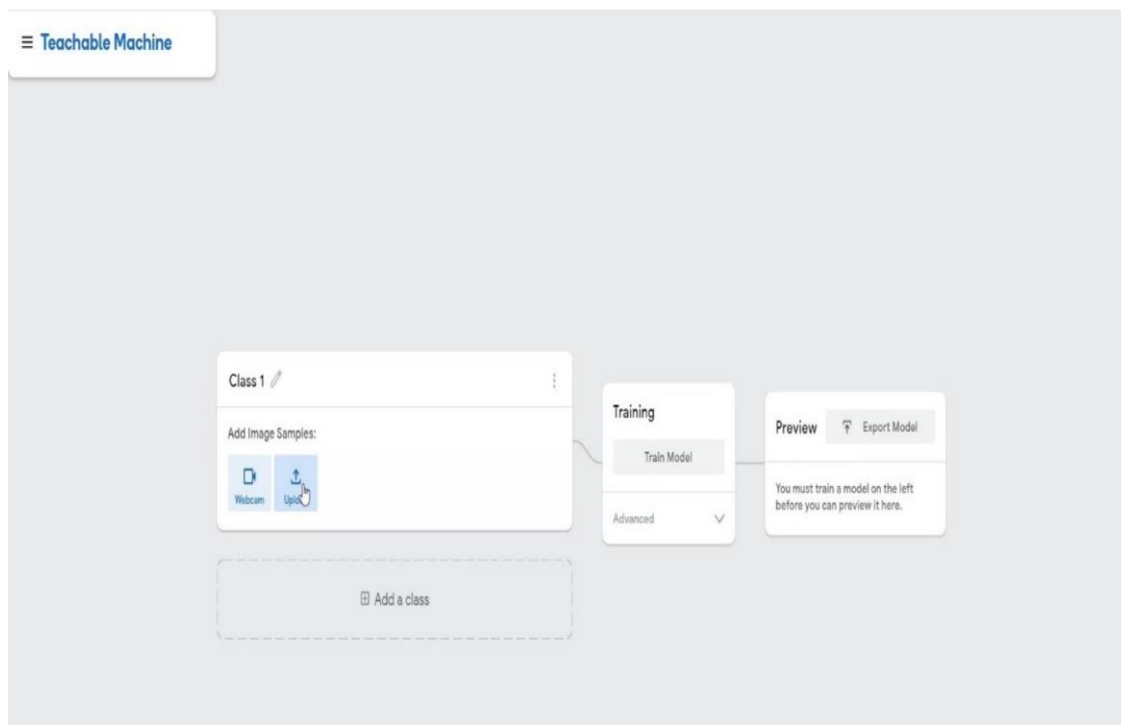


Figure 4.2.1: Model Training.

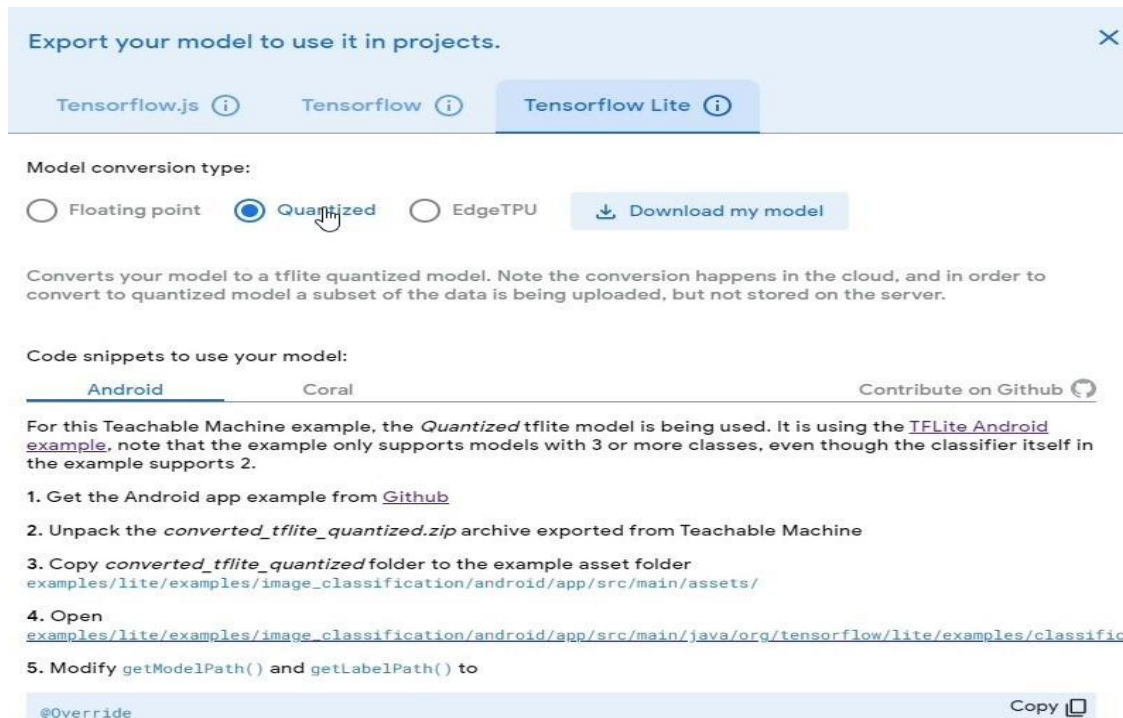


Figure 4.2.2: Model Exporting.

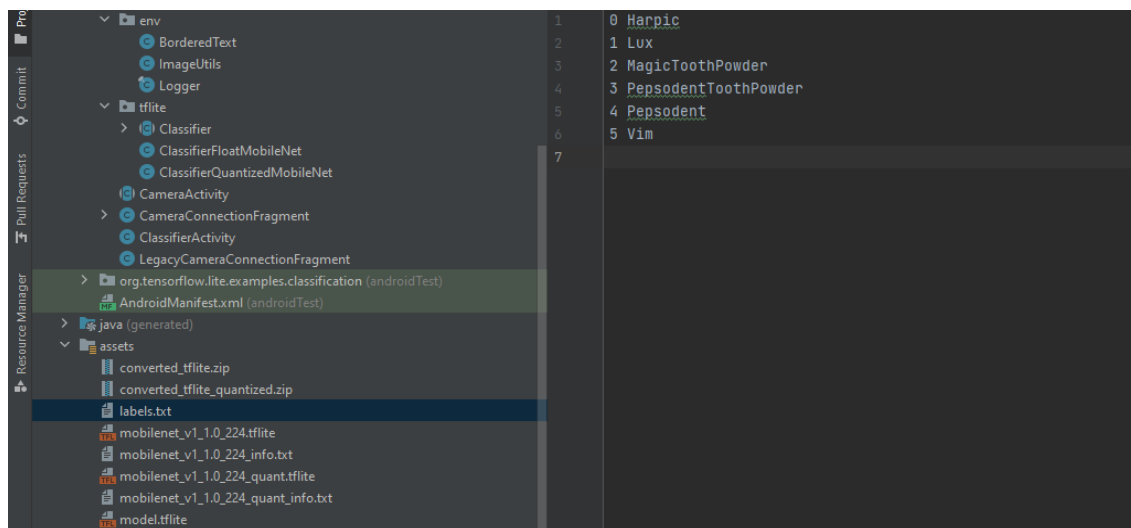


Figure 4.2.3: Class Label.

### 4.3 Interaction Design and UX

UX design of See in Me is very simple and user friendly. We researched on the internet and visited various site, saw various android applications. Then we made the UX design of our application and tried our best to make it user-friendly.



Figure 4.3.1: Interaction Design and UX.

## **4.4 Implementation Requirements**

It was our very first ML based project work. So, we had to learn a lot of new technologies and spent a huge time to fulfill all the requirements.



## **Chapter 5**

### **Implementation and Testing**

#### **5.1 Implementation of Model**

Design and implementation of the model are fundamentals for any kind of ML based software application. In this project, Quantized Tflite Model was used. We exported it as TensorFlow Lite and obtained the models and classes.

#### **5.2 Implementation of Front-end Design**

For any application, GUI (Graphical User Interface) is very essential because of its visualization to the users. Developing a design for an application, we have to consider user friendly and smooth front end. It is very difficult to make the perfect design that attracts all.

In Android Studio, we created the project and added all the xml files, java classes and dependencies. Then we added the trained model (tensorflowlite file extension) and text file. We had to use TensorFlow lite library for android. Then used Image capture which is an android media action. Then by using Lens facing external, we read the image and compare with models.

### 5.3 Testing Implementation Harpic

Whenever the camera detects Harpic (90% match), the application responds in voice that it is Harpic and tell the price.



Figure 5.3.1: Product Detection (Harpic).

## Lux

Whenever the camera detects Lux (90% match), the application responds in voice that it is Lux and tell the price.



Figure 5.3.2: Product Detection (Lux).

## Vim

Whenever the camera detects Vim (90% match), the application responds in voice that it is Vim and tell the price.



Figure 5.3.3: Product Detection (Vim).

## Pepsodent

Whenever the camera detects Pepsodent (90% match), the application responds in voice that it is Pepsodent and tell the price.



Figure 5.3.4: Product Detection (Pepsodent).

## Pepsodent Tooth Powder

Whenever the camera detects Pepsodent Tooth Powder (90% match), the application responds in voice that it is Pepsodent Tooth Powder and tell the price.

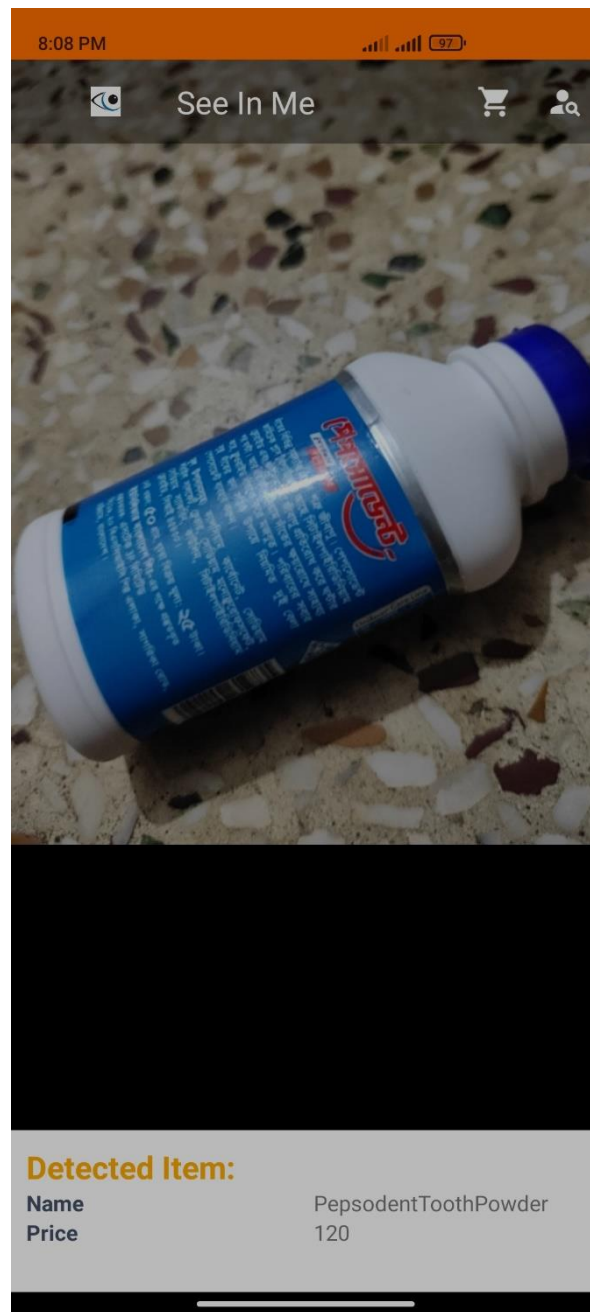



Figure 5.3.5: Product Detection (Pepsodent Tooth Powder).

## Product cart

In this section consumer will be able to add his desire products in cart after being confirmed by our application which uses camera to detect product and give its output through voice. If user satisfied to have the product after detection then the user have to add it in the cart just by shaking or giving voice command “OK”. Then product will be added in cart and user will able to know about carted products and calculated total price just by having a command “Check”.



Items	Price
Harpic	80 tk
Vim	50 tk
PepsodentToothPowder	120 tk
<b>Total Price</b>	<b>250 tk</b>

Figure 5.3.6 Product Cart (Total price calculation)

## About Us

About view contains the information of the honorable supervisor and the students who developed this application.

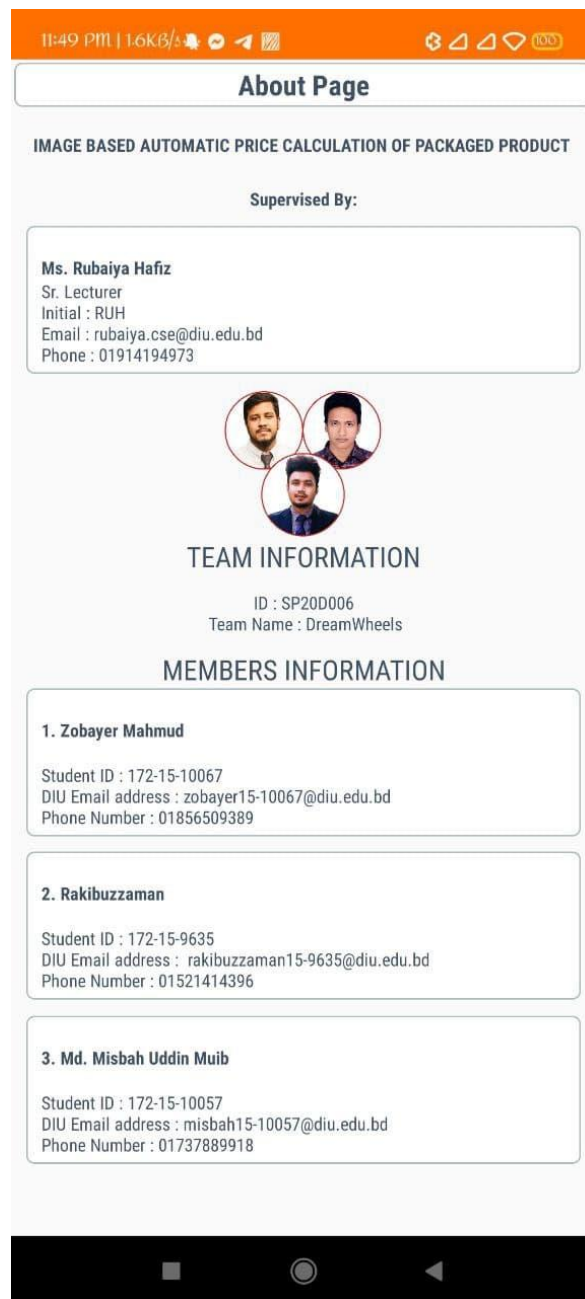


Figure 5.3.7: About us.



# CHAPTER 6

## Result Analysis

### 6.1 Introduction

Till now we have discussed on the featured problem, the probable solutions, existing alternative solutions, our implementation idea and so on. In this chapter, we will demonstrate some of our test data and the accuracy of our application.

### 6.2 Experimental Result

In this section, we will be including some test data and outputs. As mentioned in section 4.2 (Model Design), we captured the product image from different angles in order to train the models for getting better accuracy. Here, we will see the product detection process from different angles through our app.

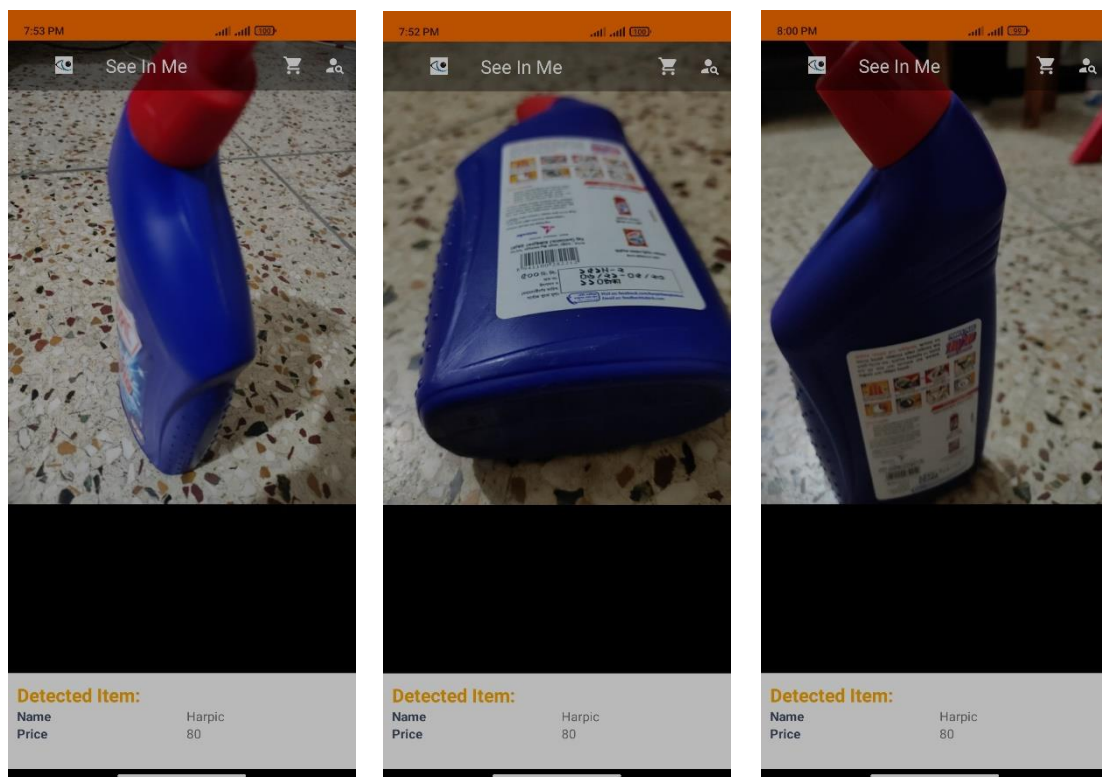


Figure 6.2.1: Product Detection from Different Angle (Harpic).

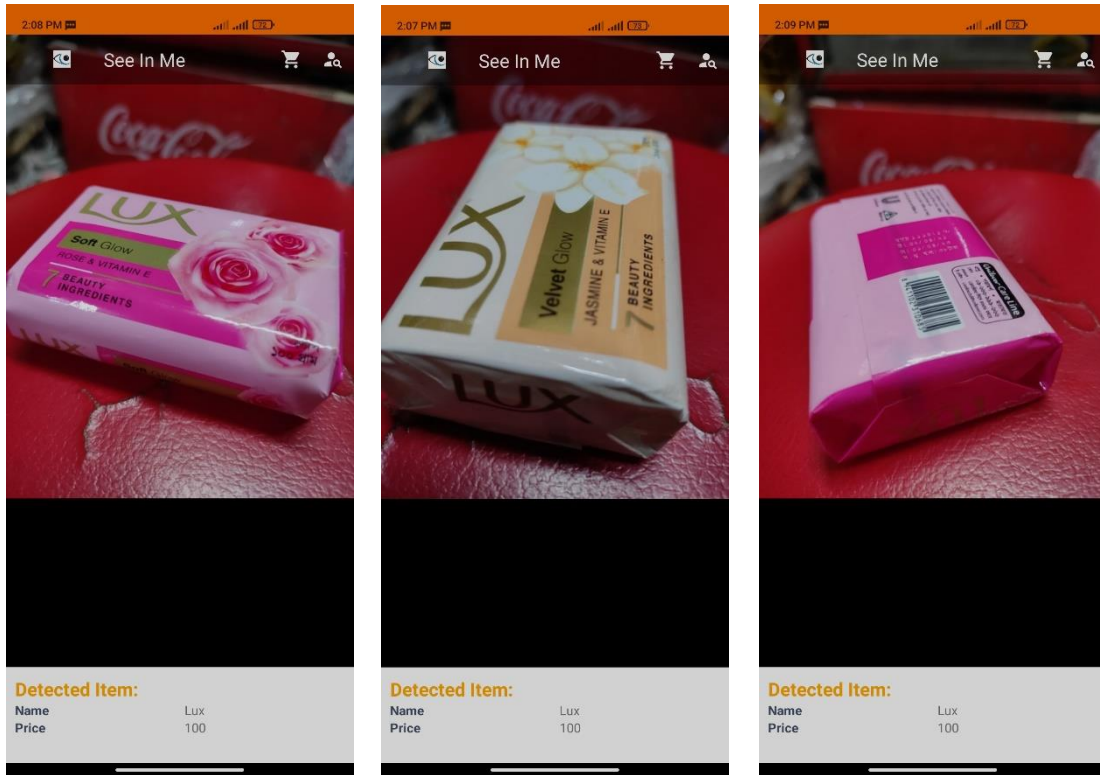


Figure 6.2.2: Product Detection from Different Angle (Lux).

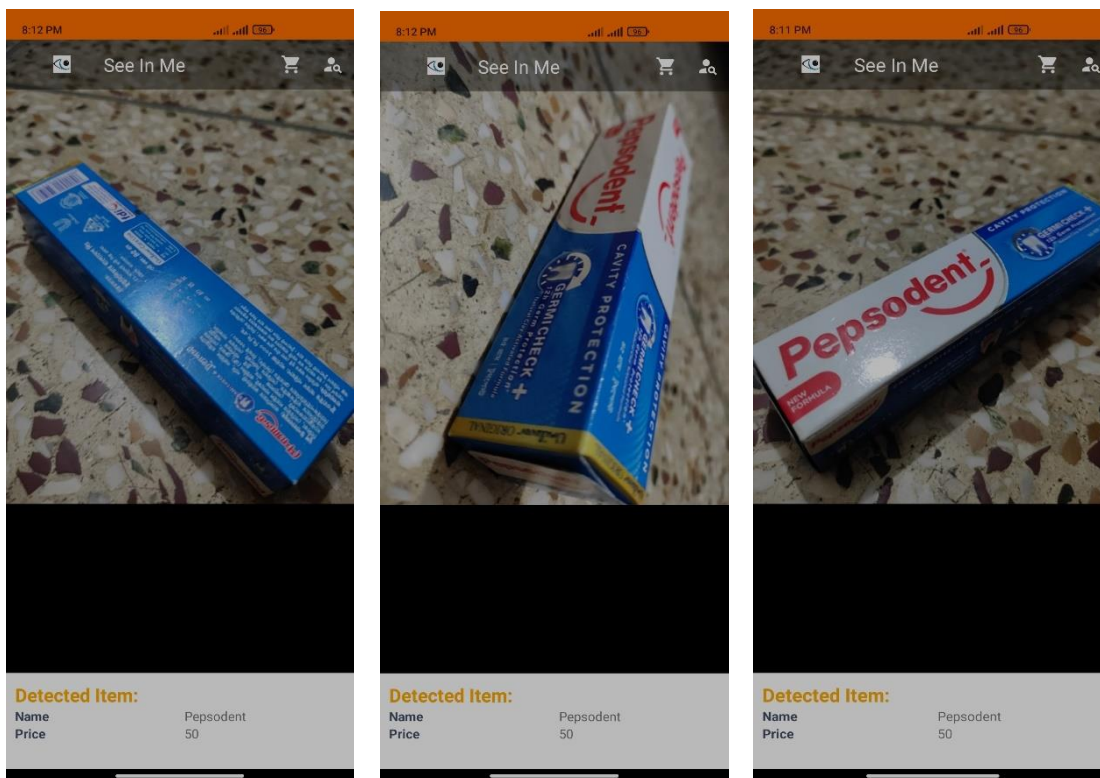


Figure 6.2.3: Product Detection from Different Angle (Pepsodent)

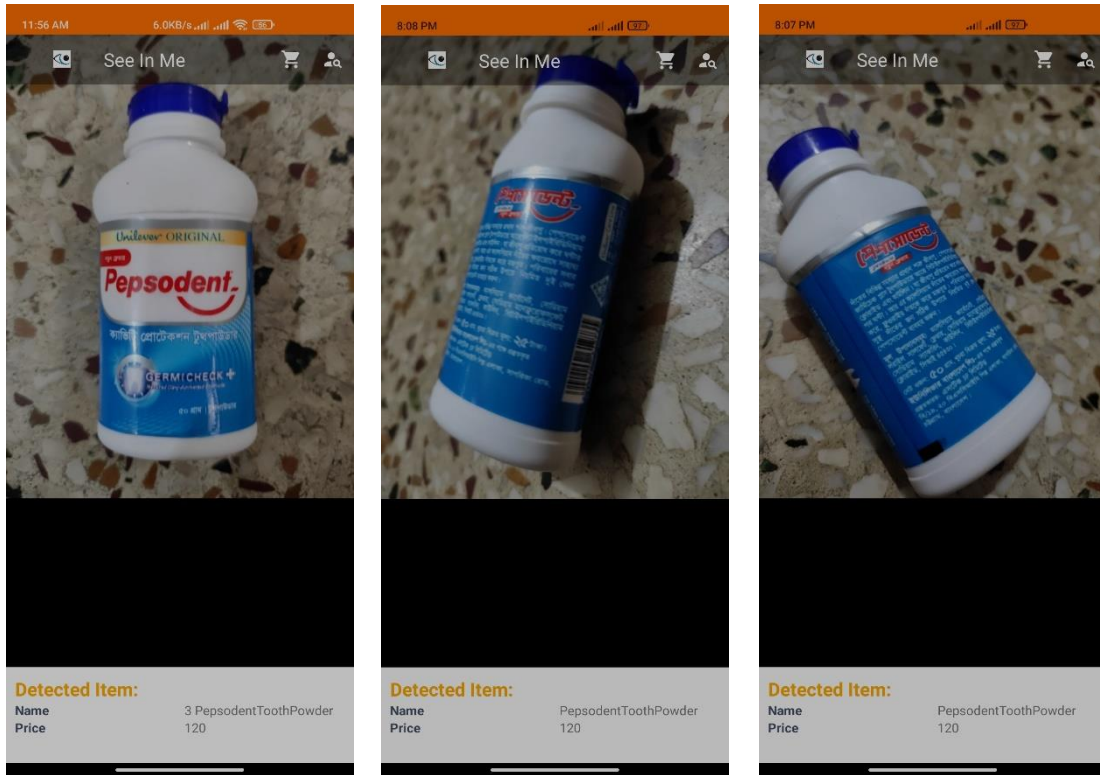


Figure 6.2.4: Product Detection from Different Angle (Pepsodent Tooth Powder).

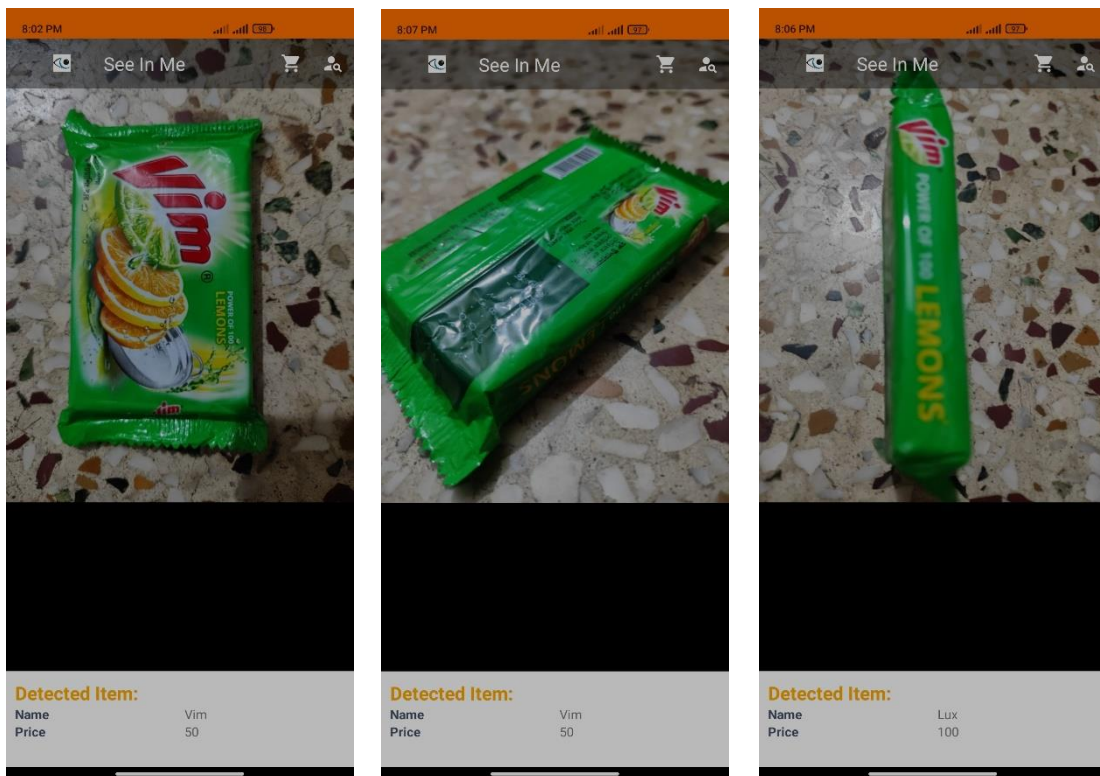


Figure 6.2.5: Product Detection from Different Angle (Vim).

### 6.3 Program Output

To train the models, we have taken a lot of photos and refined them. Then we finally trained the models. The number of photos to train the models are specified below:

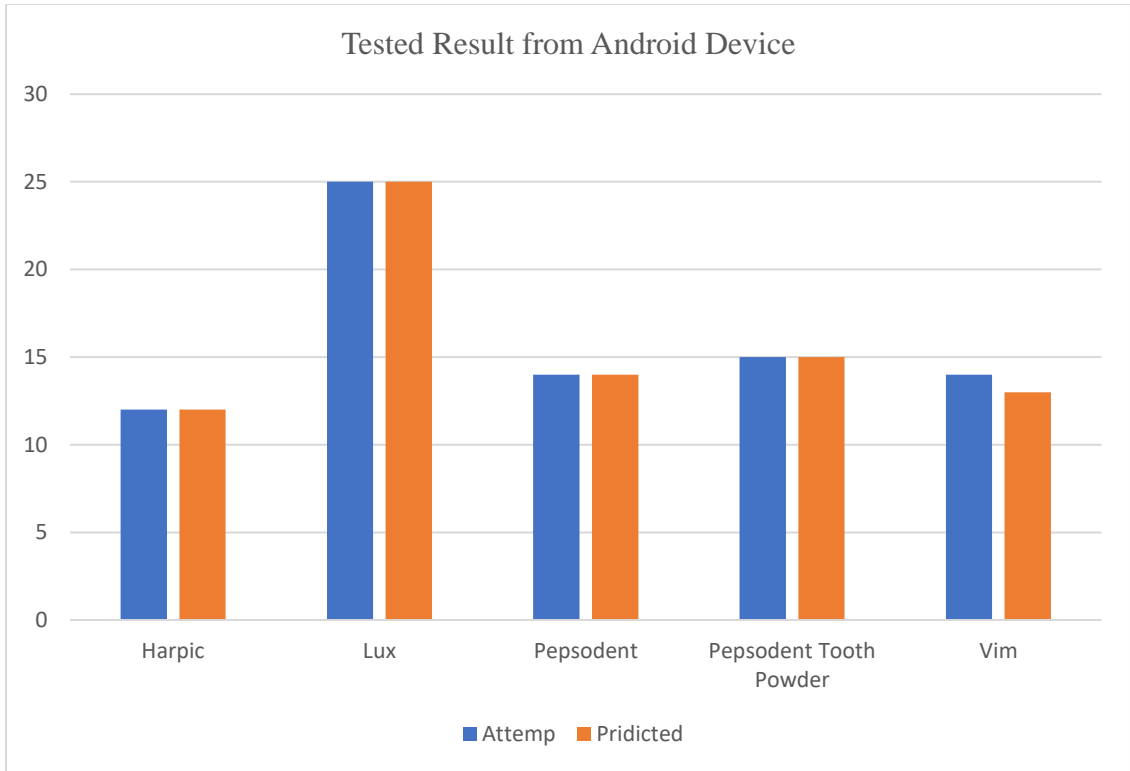
Table 6.3.1: Data Stats

<b>Product Name</b>	<b>Collected Data</b>
Harpic	117
Lux	191
Pepsodent	213
Pepsodent Tooth Powder	183
Vim	188

Finally, we have tested the accuracy of our app by pointing camera to the products from different angles and achieved this result:

Table 6.3.2: Tested Result from Android Device

<b>Product Name</b>	<b>Total Attempt</b>	<b>Positive</b>	<b>Negative</b>	<b>Accuracy</b>
Harpic	12	12	0	100 %
Lux	25	25	0	100 %
Pepsodent	14	14	0	100 %
Pepsodent Tooth Powder	15	15	0	100 %
Vim	14	13	1	93.86 %
<b>Total =</b>	80	79	1	98.77 %



## CHAPTER 7

### Impact on Society, Environment and Sustainability

#### 7.1 Impact on Society

This application will be very beneficial to the blind people. They always need support from others. See in Me will remove one barrier in front of them. By using See in Me, they don't need to rely on others to buy their necessities. They can be self-dependent and gain self-confidence.

#### 7.2 Limitation

No application is perfect. Every system has some limitations, so is ours. The limitation of our projects are written below:

- If the image of an item is taken from a corner, then the result percentage will be changed.
- Even if we don't take any picture, eventually it will show a result percentage.
- Once the item name is revealed in voice, it won't be repeated until we reopen the app.
- We need to increase image quantity.

#### 7.3 Obstacles & Achievements

During the development of the application, we have faced a lot of obstacles and successfully overcame most of them. Some of the obstacles were:

- We can't give 100% results for a particular item from all the angles.
- We have used quantized and then floating point. But it didn't change the result.
- We need to take same type of images again and again for the training model.
- If the camera hardware is not okay, then it makes effects on results.
- Shaking feature is not working in all devices as it uses sensors.
- Voice command d'not work properly in noisy environment.

Finally, after developing the project, we have successfully achieved:

- We made a system for image detection with image classifier.
- We created a cart system which will help blind people to shop easily.
- Created a voice system which will help to hear the items name & price after detecting.
- We can control the system with voice command.

## **CHAPTER 8**

### **Conclusion and Future Scope**

#### **8.1 Discussion and Conclusion**

In our society, there is so much neglect for people with disabilities. But a lot of people came forward and supported people with disabilities. This project demonstrates the use of a camera to detect objects and respond with the product name and price with voice for visually impaired people. This can be beneficial to a large number of users who are blind. It is totally eyes-free and hands-free voice control of their mobile devices. This application can reduce user's dependency on others because it is quite handy as it helps to shop.

#### **8.2 Scope for Further Developments**

Due to limitation of time, knowledge and experience, we couldn't develop some features of our project. These features, we desire to grow in the coming years. Those features are:

- Create an online shop for blind people.
- Create a system for volunteer.
- Improved model training.
- Adding more products.



## APPENDICES

### Product detection and store product in Shared Preferences

```
if (!pepsodent && recognitionTextView.getText().toString().equalsIgnoreCase("4
Pepsodent") && confi > 99) {
//      mp2.start();

    harpic = false;
    pepsodent = false;
    pepsodenttoothpowder = false;
    vim = false;
    lux = false;

    if (timeA == 0) {
        timeA = System.currentTimeMillis() + START_TIME_IN_MILLIS;
        mTimerRunning = true;
        mLeftInMillis = timeA;

        EasySharedPref.write("item", "Pepsodent");
        EasySharedPref.write("price", "40");

        item.setText("Pepsodent");
        itemImage.setImageResource(R.drawable.pepsodent);
        textToSpeech.speak("Pepsodent price 40 taka",
TextToSpeech.QUEUE_FLUSH, null, null);
//      toneGen1.startTone(ToneGenerator.TONE_CDMA_PIP, 150);
        pricee.setText("40");

    } else {
        timeNow = timeA - System.currentTimeMillis();

        if (timeNow < 0) {
            EasySharedPref.write("item", "Pepsodent");
            EasySharedPref.write("price", "40");

            item.setText("Pepsodent");
            itemImage.setImageResource(R.drawable.pepsodent);
            textToSpeech.speak("Pepsodent price 40 taka",
TextToSpeech.QUEUE_FLUSH, null, null);
//      toneGen1.startTone(ToneGenerator.TONE_CDMA_PIP, 150);
            pricee.setText("40");

            timeNow = 0;
```

```

    timeA = 0;
    mTimerRunning = false;

    } else {
        Log.i("Error ", "You can command after 5 seconds");
    }
}
}
}

```

## Working to shake sensor

```

public void onSensorChanged(int sensor, float[] values) {
    if (sensor == SensorManager.SENSOR_ACCELEROMETER) {
        long curTime = System.currentTimeMillis();

        if ((curTime - lastUpdate) > 100) {
            long diffTime = (curTime - lastUpdate);
            lastUpdate = curTime;

            x = values[SensorManager.DATA_X];
            y = values[SensorManager.DATA_Y];
            z = values[SensorManager.DATA_Z];

            float speed = Math.abs(x+y+z - last_x - last_y - last_z) / diffTime * 10000;

            if (speed > SHAKE_THRESHOLD) {
                Log.d("sensor", "shake detected w/ speed: " + speed);

                int m = 0;
                # Reading Data from SharedPreferences for Itemname and Itemprice
                String itemname = EasySharedPref.read("item", "");
                String itemprice = EasySharedPref.read("price", String.valueOf(m));

                myDatabaseHelper.insertData(itemname, itemprice);
                toneGen1.startTone(ToneGenerator.TONE_CDMA_PIP, 150);
            }
            last_x = x;
            last_y = y;
            last_z = z;
        }
    }
}

```

```
}  
}
```

## Permission for voice command

```
public void voiceOn(){  
    Intent intent = new Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH);  
    intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL,  
RecognizerIntent.LANGUAGE_MODEL_FREE_FORM);  
    intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE, Locale.getDefault());  
    try {  
        startActivityForResult(intent, 10);  
  
    } catch (Exception e){  
        Log.d("Error_Device ", e.getMessage());  
        Toast.makeText(getApplicationContext(), "Your Device Doesn't Support  
Voice Command", Toast.LENGTH_SHORT).show();  
    }  
}
```

## Receive command for showing cart page

```
if(results.get(0).equals("show me the products") || results.get(0).equals("Show  
me the products") ||  
    results.get(0).equals("show me the product") || results.get(0).equals("Show  
me the product") ||  
    results.get(0).equals("show me product") || results.get(0).equals("Show me  
product") ||  
    results.get(0).equals("show me products") || results.get(0).equals("Show me  
products") ||  
    results.get(0).equals("go to cart") || results.get(0).equals("Go to cart") ||  
    results.get(0).equals("go to cart list") || results.get(0).equals("Go to cart  
list") ||  
    results.get(0).equals("All cost") || results.get(0).equals("all cost") ||  
    results.get(0).equals("Total cost") || results.get(0).equals("total cost") ||  
    results.get(0).equals("Check") || results.get(0).equals("check") ||  
    results.get(0).equals("Check products") || results.get(0).equals("check  
products") ||
```

```

        results.get(0).equals("Check product") || results.get(0).equals("check
product") ||
        results.get(0).equals("Check cart") || results.get(0).equals("check cart")){

        startActivity(new Intent(CameraActivity.this, CartActivity.class));

    }

```

## Receive command for deleting items from cart

```

        else if(results.get(0).equals("delete product") || results.get(0).equals("delete cart")
||
        results.get(0).equals("Delete product") || results.get(0).equals("Delete cart")
||
        results.get(0).equals("Clear") || results.get(0).equals("clear") ||
        results.get(0).equals("Clear all") || results.get(0).equals("clear all") ||
        results.get(0).equals("Clear product") || results.get(0).equals("clear
product") ||
        results.get(0).equals("Clear products") || results.get(0).equals("clear
products") ||
        results.get(0).equals("Clear cart") || results.get(0).equals("clear cart") ||
        results.get(0).equals("Remove cart") || results.get(0).equals("remove cart") ||
        results.get(0).equals("Remove product") || results.get(0).equals("remove
product") ||
        results.get(0).equals("Remove products") || results.get(0).equals("remove
products")){

        myDatabaseHelper.deleteData();
        textToSpeech.speak("items deleted", TextToSpeech.QUEUE_FLUSH, null,
null);

    }

```

## Receive command for close application

```

        else if(results.get(0).equals("exit") || results.get(0).equals("Exit") ||
results.get(0).equals("exit app") ||
        results.get(0).equals("Exit app") || results.get(0).equals("Close") ||
results.get(0).equals("close") ||
        results.get(0).equals("Close app") || results.get(0).equals("close app")){

        myDatabaseHelper.deleteData();

```

```

    finish();
    System.exit(0);
}

```

## Receive command for add item into cart

```

else if(results.get(0).equals("ok") || results.get(0).equals("Ok") ||
        results.get(0).equals("okay") || results.get(0).equals("Okay")){

    int m = 0;
    String itemname = EasySharedPref.read("item", "");
    String itemprice = EasySharedPref.read("price", String.valueOf(m));

    myDatabaseHelper.insertData(itemname, itemprice);
    toneGen1.startTone(ToneGenerator.TONE_CDMA_PIP, 150);
}
}

break;
}
}

```

## Convert text into voice method

```

private TextToSpeech textToSpeech;

textToSpeech = new TextToSpeech(CartActivity.this, new
TextToSpeech.OnInitListener() {
    @Override
    public void onInit(int status) {
        textToSpeech.setLanguage(Locale.US);
        textToSpeech.setSpeechRate((float) 0.5);
        textToSpeech.speak("Total cost "+sum+"taka", TextToSpeech.QUEUE_FLUSH,
null, null);
    }
});

```

## SQLite database handling procedure

```

static final String DATABASE_NAME = "Items_Database.db";
static final String TABLE_NAME = "Items_Details";
Cursor cursor;
static final int VERSION_NUMBER = 2;
static final String ID = "Id";

```

```

static final String ITEMS = "Items";
static final String PRICE = "Price";
Context context;
static final String CREATE_TABLE_COMMAND = "CREATE TABLE " +
    TABLE_NAME + "( " + ID + " INTEGER PRIMARY KEY
AUTOINCREMENT, " +
    ITEMS + " VARCHAR(255), " + PRICE + " VARCHAR(255));";

static final String DROP_TABLE_COMMAND = "DROP TABLE IF EXISTS " +
TABLE_NAME;
static final String SHOW_ALL_DATA_COMMAND = "SELECT * FROM " +
TABLE_NAME;

public MyDatabaseHelper(@Nullable Context context) {
    super(context, DATABASE_NAME, null, VERSION_NUMBER);
    this.context = context;
}

```

### When Database is launched first time

```

public void onCreate(SQLiteDatabase sqLiteDatabase) {
    try{
        sqLiteDatabase.execSQL(CREATE_TABLE_COMMAND);
        Log.i("Database message ", "Database created successfully");

    } catch (Exception e){
        Log.i("Database error ", e.getMessage());
    }
}

@Override
public void onUpgrade(SQLiteDatabase sqLiteDatabase, int oldVersion, int
newVersion) {
    try {
        sqLiteDatabase.execSQL(DROP_TABLE_COMMAND);
        Toast.makeText(context, "Database upgraded successfully",
Toast.LENGTH_LONG).show();
        onCreate(sqLiteDatabase);
    } catch (Exception e){
        Toast.makeText(context, "Exception: " + e, Toast.LENGTH_SHORT).show();
    }
}

```

## Insert data into Product.db database

```
public long insertData(String items, String prices){
    SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();
    ContentValues contentValues = new ContentValues();
    contentValues.put(ITEMS, items);
    contentValues.put(PRICE, prices);
    long rowId = sqLiteDatabase.insert(TABLE_NAME, null, contentValues);

    Toast.makeText(context, "Items Added to Cart",
Toast.LENGTH_SHORT).show();
    Log.i("Inserted_items ", items + " " + prices);

    return rowId;
}
```

## Retrieve data from Product.db database

```
public Cursor retrieveData(){
    SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();

    try{
        cursor = sqLiteDatabase.rawQuery(SHOW_ALL_DATA_COMMAND, null);

    } catch (Exception e){
        Log.i("Error", e.getMessage());
    }

    return cursor;
}

public void deleteData(){
    SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();

    try {
        sqLiteDatabase.execSQL(DROP_TABLE_COMMAND);
        onCreate(sqLiteDatabase);

    } catch (Exception e){
        Log.i("Error", e.getMessage());
    }
}
```

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