

**SCHOOL OF
COMPUTING
CHENNAI**

20CYS404

Android Application Development

Lab Exam Computer Vision

Name : Sanjay Kumar A

Roll No : CH.EN.U4CYS21072

Aim:

To develop a Computer vision application.

Code:**activity_main.xml:**

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp"
    android:background="#FAFAFA">

    <ImageView
        android:id="@+id/topImageView"
        android:layout_width="200dp"
        android:layout_height="87dp"
        android:layout_marginLeft="100dp"
        android:layout_marginTop="10dp"
        android:contentDescription="Trophy Image"
        android:src="@drawable/ase" />

    <Button
        android:id="@+id/tileTextRecognition"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="120dp"
        android:layout_marginTop="120dp"
        android:text="Text Recognition" />

    <Button
        android:id="@+id/tilePlateDetection"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="190dp"
        android:layout_marginLeft="100dp"
        android:text="Number Plate Detection" />

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="600dp"
        android:layout_marginLeft="130dp"
        android:text="CH.EN.U4CYS21015" />

</RelativeLayout>
```

MainActivity.java:

```
package com.example.amritaapp;

import static androidx.core.content.ContextCompat.startActivity;

import android.content.Intent;
import android.os.Bundle;
import android.widget.Button;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Button plateDetection = findViewById(R.id.tilePlateDetection);
        Button textRecognition = findViewById(R.id.tileTextRecognition);

        plateDetection.setOnClickListener(v ->
            startActivity(new Intent(MainActivity.this, NumberPlateDetectionActivity.class)));

        textRecognition.setOnClickListener(v ->
            startActivity(new Intent(MainActivity.this, TextRecognitionActivity.class)));
    }
}
```

activity_text_recognition.xml:

```
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">

    <ImageView
        android:id="@+id/capturedImage"
        android:layout_width="match_parent"
        android:layout_height="300dp"
```

```

        android:scaleType="centerCrop" />

<Button
    android:id="@+id/captureButton"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Capture Image" />

<TextView
    android:id="@+id/textResult"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Detected Text"
    android:paddingTop="16dp" />
</LinearLayout>

```

TextRecognitionActivity.java:

```

package com.example.amritaapp;

import android.content.Intent;
import android.graphics.Bitmap;
import android.os.Bundle;
import android.provider.MediaStore;
import android.widget.Button;
import android.widget.ImageView;
import android.widget.TextView;
import androidx.activity.result.ActivityResultLauncher;
import androidx.activity.result.contract.ActivityResultContracts;
import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;

import com.google.mlkit.vision.common.InputImage;
import com.google.mlkit.vision.text.Text;
import com.google.mlkit.vision.text.TextRecognition;
import com.google.mlkit.vision.text.TextRecognizer;
import com.google.mlkit.vision.text.latin.TextRecognizerOptions;

public class TextRecognitionActivity extends AppCompatActivity {

    private ImageView imageView;
    private TextView resultTextView;
    private ActivityResultLauncher<Intent> takePictureLauncher;

    @Override
    protected void onCreate(Bundle savedInstanceState) {

```

```

super.onCreate(savedInstanceState);
setContentView(R.layout.activity_text_recognition);

imageView = findViewById(R.id.capturedImage);
resultTextView = findViewById(R.id.textResult);
Button captureButton = findViewById(R.id.captureButton);

takePictureLauncher = registerForActivityResult(
    new ActivityResultContracts.StartActivityForResult(),
    result -> {
        if (result.getResultCode() == RESULT_OK) {
            Intent data = result.getData();
            Bundle extras = data != null ? data.getExtras() : null;
            Bitmap imageBitmap = (Bitmap) (extras != null ? extras.get("data") : null);
            if (imageBitmap != null) {
                imageView.setImageBitmap(imageBitmap);
                runTextRecognition(imageBitmap);
            }
        }
    }
);

captureButton.setOnClickListener(v -> {
    Intent takePictureIntent = new Intent(MediaStore.ACTION_IMAGE_CAPTURE);
    if (takePictureIntent.resolveActivity(getPackageManager()) != null) {
        takePictureLauncher.launch(takePictureIntent);
    }
});
}

private void runTextRecognition(Bitmap bitmap) {
    InputImage image = InputImage.fromBitmap(bitmap, 0);
    TextRecognizer recognizer =
TextRecognition.getClient(TextRecognizerOptions.DEFAULT_OPTIONS);

    recognizer.process(image)
        .addOnSuccessListener(this::processTextRecognitionResult)
        .addOnFailureListener(e -> resultTextView.setText("Failed: " + e.getMessage()));
}

private void processTextRecognitionResult(Text result) {
    StringBuilder resultText = new StringBuilder();
    for (Text.TextBlock block : result.getTextBlocks()) {
        resultText.append(block.getText()).append("\n");
    }
    resultTextView.setText(resultText.toString());
}

```

```
}
```

activity_number_plate_detection.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">

    <ImageView
        android:id="@+id/numberPlateImageView"
        android:layout_width="match_parent"
        android:layout_height="300dp"
        android:scaleType="centerCrop"
        android:layout_marginBottom="16dp" />

    <TextView
        android:id="@+id/resultTextView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Detected text will appear here"
        android:textSize="18sp"
        android:layout_below="@id/numberPlateImageView"
        android:layout_marginTop="16dp"
    />

    <Button
        android:id="@+id/processButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Process Image"
        android:layout_centerHorizontal="true"
        android:layout_below="@id/resultTextView" />

</RelativeLayout>
```

NumberPlateDetectionActivity.java:

```
package com.example.amritaapp;

import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.provider.MediaStore;
```

```

import android.widget.ImageView;
import android.widget.TextView;
import android.widget.Toast;

import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;

import com.google.android.gms.tasks.OnFailureListener;
import com.google.android.gms.tasks.OnSuccessListener;
import com.google.mlkit.vision.common.InputImage;
import com.google.mlkit.vision.text.Text;
import com.google.mlkit.vision.text.TextRecognition;
import com.google.mlkit.vision.text.TextRecognizer;
import com.google.mlkit.vision.text.latin.TextRecognizerOptions;

public class NumberPlateDetectionActivity extends AppCompatActivity {

    private static final int PICK_IMAGE_REQUEST = 1; // Request code for selecting an image

    private ImageView imageView;
    private TextView resultTextView;
    private Uri imageUri; // To store selected image URI

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_number_plate_detection);

        imageView = findViewById(R.id.numberPlateImageView);
        resultTextView = findViewById(R.id.resultTextView);

        // Trigger image selection
        selectImageFromGallery();
    }

    // Method to open the image gallery
    private void selectImageFromGallery() {
        Intent intent = new Intent(Intent.ACTION_PICK,
        MediaStore.Images.Media.EXTERNAL_CONTENT_URI);
        startActivityForResult(intent, PICK_IMAGE_REQUEST); // Start the gallery intent
    }

    // Handle the result when the user picks an image
    @Override
    protected void onActivityResult(int requestCode, int resultCode, @Nullable Intent data) {
        super.onActivityResult(requestCode, resultCode, data);

        if (requestCode == PICK_IMAGE_REQUEST && resultCode == RESULT_OK && data != null &&

```

```

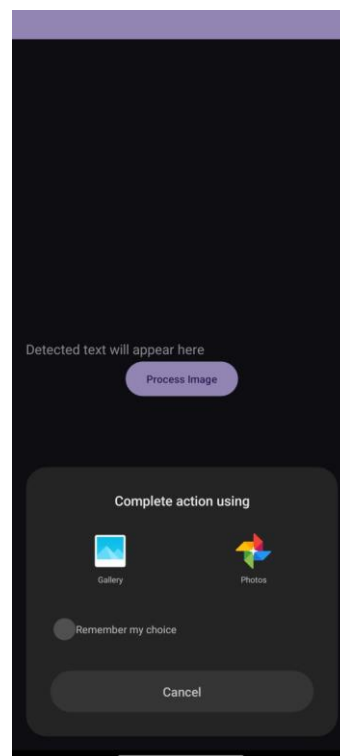
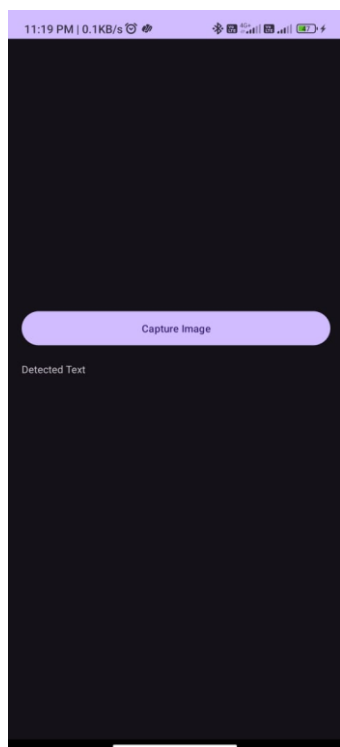
data.getData() != null) {
    imageUri = data.getData(); // Get the URI of the selected image
    imageView.setImageURI(imageUri); // Display the image in the ImageView
    processImage(imageUri); // Process the image for text recognition
} else {
    Toast.makeText(this, "No image selected", Toast.LENGTH_SHORT).show();
}
}

// Method to process the selected image
private void processImage(Uri imageUri) {
    try {
        InputImage image = InputImage.fromFilePath(this, imageUri);
        TextRecognizer recognizer =
TextRecognition.getClient(TextRecognizerOptions.DEFAULT_OPTIONS);

        recognizer.process(image)
            .addOnSuccessListener(new OnSuccessListener<Text>() {
                @Override
                public void onSuccess(Text result) {
                    String recognizedText = result.getText();
                    resultTextView.setText("Detected text: " + recognizedText);
                }
            })
            .addOnFailureListener(new OnFailureListener() {
                @Override
                public void onFailure(Exception e) {
                    Toast.makeText(NumberPlateDetectionActivity.this, "Error: " + e.getMessage(),
Toast.LENGTH_SHORT).show();
                }
            });
    } catch (Exception e) {
        Toast.makeText(this, "Error processing image: " + e.getMessage(),
Toast.LENGTH_SHORT).show();
    }
}
}

```


Output:



Result:

A computer vision application has been developed.