

Pro Durian: Durian Farm Threats Identification Using Image Recognition

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Abstract: Pro Durian – A durian farm threat identification that uses image recognition and gives information on durian farm threat animals. The main objective of this research is to develop a mobile app for durian farming with animal threat alert features. This application contains two main modules which are image recognition modules that is focusing on animal detection with an alert feature to drive away those animals, while additional information modules focus on giving information to the users on each durian farm threat. Multimedia Development Life Cycle (MDLC) is used as the methodology to develop the recognition apps. The result from the alpha testing shows the app work as it should in each of the test cases. Furthermore, in the beta testing which was participated by 10 testers, the questionnaire received a percentage of 85% user acceptance. However, a few improvements can be made in the future.

Keywords: Durian Farm, Image Recognition, TensorFlow Lite, Android Studio

1. Introduction

Commonly, most of the existing applications that were found in the Play Store are applications developed especially for durian lovers, such that providing information on locations of trusted durian stalls in the country. In addition, the lacking of mobile applications in the agriculture sector is one of the reasons to develop a mobile platform application. Next, an image recognition mobile application for durian farm threats has not existed.

Durian is a popular fruit in Southeast Asia and is also known as the King of Fruits. Durian fruit also generated 47 percent of the total 139,476ha of land cultivated or RM1.97 billion sales of volume were contributed from the 66,038ha of land planted [1]. In order to achieve the highest quality product of durian, the farmers have to go through a lot of circumstances. For instance, the main concern of the agricultural products cultivated is that their farms are being under the threat from wild animals, such as wild boars, monkeys, and foxes if not guarded properly [2]. The farm is usually located near forest areas where there are lots of wild animals with severe threats that needed security to prevent them from attacking. However, wild animals have become major durian farms threats such as wild boar, fox, and

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monkeys. In agriculture fields, these animals regularly ate or destroy the durian either the fruits or the tree. This will cause huge damage to durians and also the quality of the durian will be decreasing if there is no countermeasure taken subsequently causing significant financial losses to farmers [3].

The objectives of the project are to (1) design a mobile app for durian farming focusing on animal identification; (2) develop a mobile app for durian farming with animal threats alert features, and (3) test the developed app on the target user using alpha and beta testing. In general, this proposed application consists of two main elements, which are an image recognition module and an information module, with detailed information on durian farm threats.

This application is targeted local farmers in Malaysia since the main language that will be used to develop the app is Malay language. For this application to develop, Encik Khusairi bin Sapuan agreed to be the Subject Matter Expert (SME). He owned a farm located at Kampung Sungai Ayam, Senggaram, Batu Pahat. The proposed application contains an image identification module that allows users to identify durian threats and gives an alert or notification to the user. Next, the second module will be the information module which will provide information focusing on three wild animals which are wild boar, fox, and monkey that are usually attracted to durian fruits and a video to show the users the characteristics of the animals in detail.

A fully functioning durian farm threats application is expected to be developed to help local farmers identify the wild animals that usually stole or ate the durian fruits and gives sound alert or notifications to the users. The application should be able to provide information about those animals with a video aiding the application that will be developed. Next, this application is also suitable to be used by other local farmers other than growing durian as it may also have wild animals which usually stole or even destroy their farm products. Also, this application also provides a lot of information for the user to apply in real-time life.

The rest of the paper is organized as follows: Section 2 discusses the literature review of the related work and existing applications. Next, the methodology used to develop the application including the analysis and design is described in Section 3. Section 4 explains about results and discussion. Lastly, the final section concludes the current work and highlights the future work to be performed.

2. Related Work

This section will discuss the technology involved in the development of a similar type of durian farm threats identification application that is related to the project.

2.1 Image Recognition

Image recognition technologies have improved the potential to capture high-resolution images in different environments and as a result of having more effective management of natural resources. This technology can be a bit tricky when there are a lot of images with different environments and backgrounds. For instance, there is a method called automated detection where the system will detect and track animals using color to separate the animal from the background has been successful [4]. Other than that, there is also a method where teaching a machine with various kinds of images with different environments and shapes of animals to make the system familiarized with a certain animal.

Generally, in computer science, deep learning refers to machine learning which involves more than one layer of learning in its model. Machine learning is a computer program that improves its performance on any task by learning from its experience [5]. The technology that was implemented in the application is TensorFlow Lite technology with a convolutional neural network (CNN) algorithm which is primarily used in deep learning architectures that consists of multiple layers and are mainly used for image

processing and object detection. The core concept of the convolutional layer is the presence of kernels (or filters) that learn to differentiate between the features of an image [5].

TensorFlow is a commonly used software for Machine Learning (ML) which is widely adopted as it provides an interface to express common ML algorithms and executable code of the models. The models created in TensorFlow can be ported to heterogeneous systems with little or no change with devices ranging from mobile phones to distributed servers [6].

In the era of globalization, mobile technology has caught the attention of many researchers for quite some time and has also gained a successful achievement in the commercial. Moreover, the development of mobile applications and services has become one of the important factors as it has made the most significant thing to have. Mobile technology also is not only used as a communication tool but it is becoming an essential part of people’s daily life resulting in being elegantly popular essentially in the smartphone market due to its requirements for information [7].

2.2 Comparison Between Reviewed Applications and Proposed Application

There are three similar mobile application that uses Image Recognition technology such as Musang King, Picture This – Plant Identifier, and Image Recognizer, are reviewed on the features and functionality of the system. The example interface for each three existing mobile applications is presented in Figure 1(a-c).

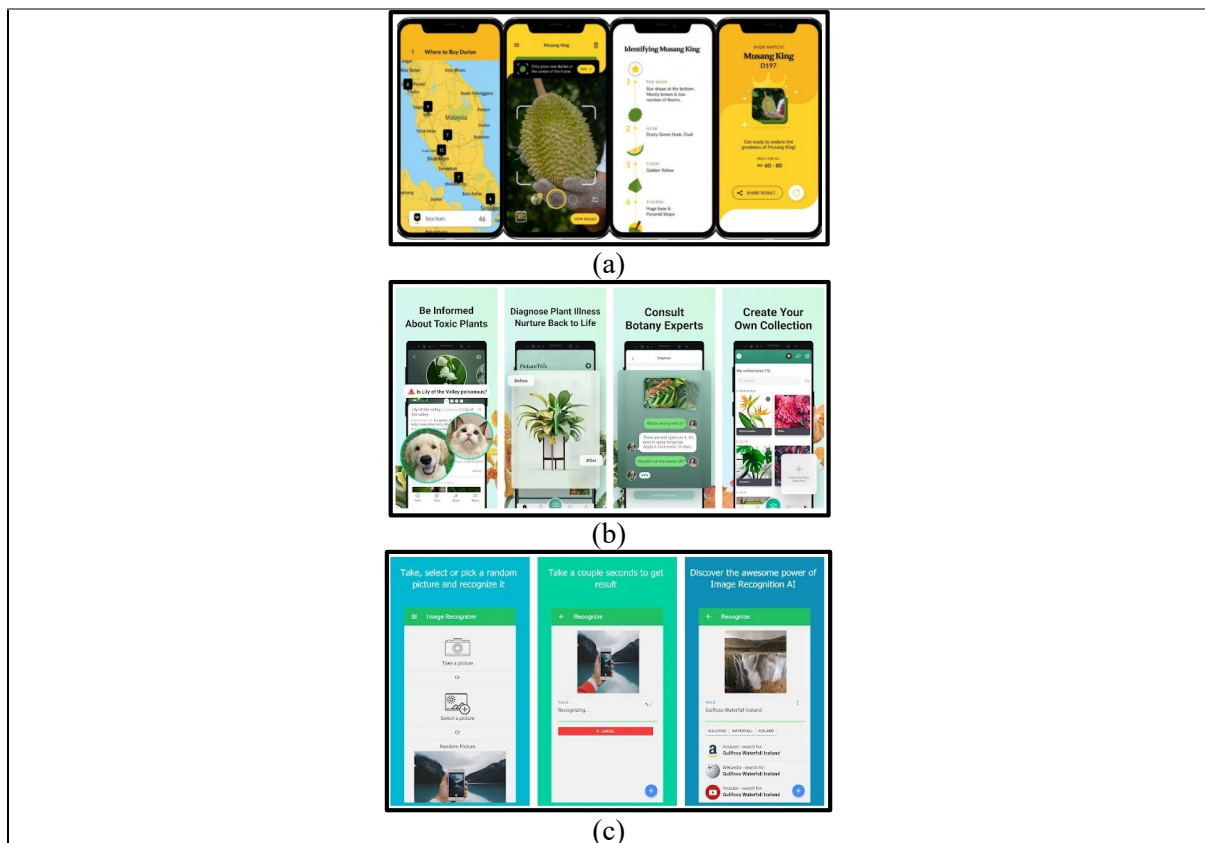


Figure 1(a) Musang King, Figure 1(b) Picture This, Figure 1(c) Image Recognizer

Next, the comparison between these three existing applications (Musang King, Durian: IOI Musang King and Image Recognizer) and developed application (Pro Durian) in terms of different comparison items such as language, image recognition feature, information section, user interface, and additional feature are tabulated and shown in Table 1.

Table 1: Comparison Between Reviewed Application and Proposed Application

Comparison Items	Musang King	Picture This – Plant Identifier	Image Recognizer	Pro Durian
Language	English Language	English Language	English Language	Malay Language
Image Recognition	Image identification by camera.	Take or upload a plant photo to identify.	Taking/select/random picture by the app.	Live image recognition through camera.
Information Section	Provides location of trusted local durian stalls locally	Provides detail variety of plants and weeds info.	Provides a lot of result by recognizing an image	Provides information of durian farm threats
User Interface	Consistent font size and type with a slide bar menu at the top left screen.	Consistent font size and type with main menu at the bottom of the screen.	Simple user interface with consistent font size and type	Simple and minimal user interface for users to easily navigate through the app.
Additional Feature	Durian sellers need to pay in order to make their stalls visible to the user.	Can auto diagnose a plant problem by adding 3 images.	Can recognize a QR code or even bar code.	There will be an alert sound when the durian farm threat animal was detected.

3. Methodology/Framework

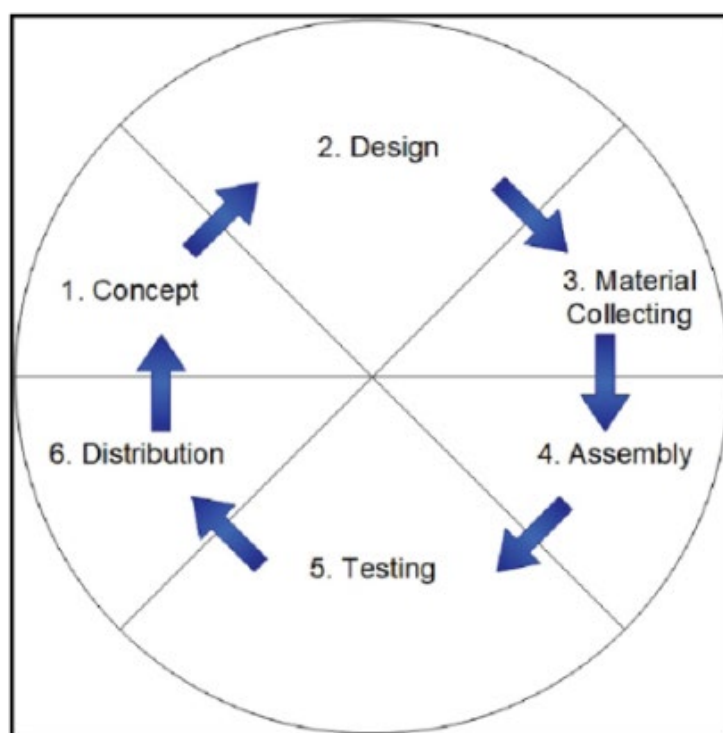


Figure 2: MDLC Methodology

Based on Figure 2, the MDLC methodology contains six main stages which are the conceptual and planning phase, design phase, material collecting phase, assembly phase, testing phase, and distribution phase [8].

3.1 Conceptual and Planning Phase

The first stage of MDLC is the conceptual and planning stage where research needs to be done to decide what the proposed of this research, what is the target user is, and how it will distribute. All the ideas and concepts of the app are defined such that the app will be developed in a mobile application

and the targeted user is local durian farmers. The app was developed with the purpose to introduce how dangerous durian farm threats can be towards the quality of durian fruits through a smartphone

3.2 Design Phase

In the design phase, the system overview and overall system flow took place. The design of the application overview and the overall application flow is shown in the flowchart, in Figure 3. Other than that, this phase included navigational structure as presented in Figure 4 to show the overview of the application structure. Also, the designing of the programming flow took place in this phase for managing the process of required the algorithm to develop the mobile application. Thus, it will help the developer to avoid all unexpected and unwanted errors when implementing the coding.

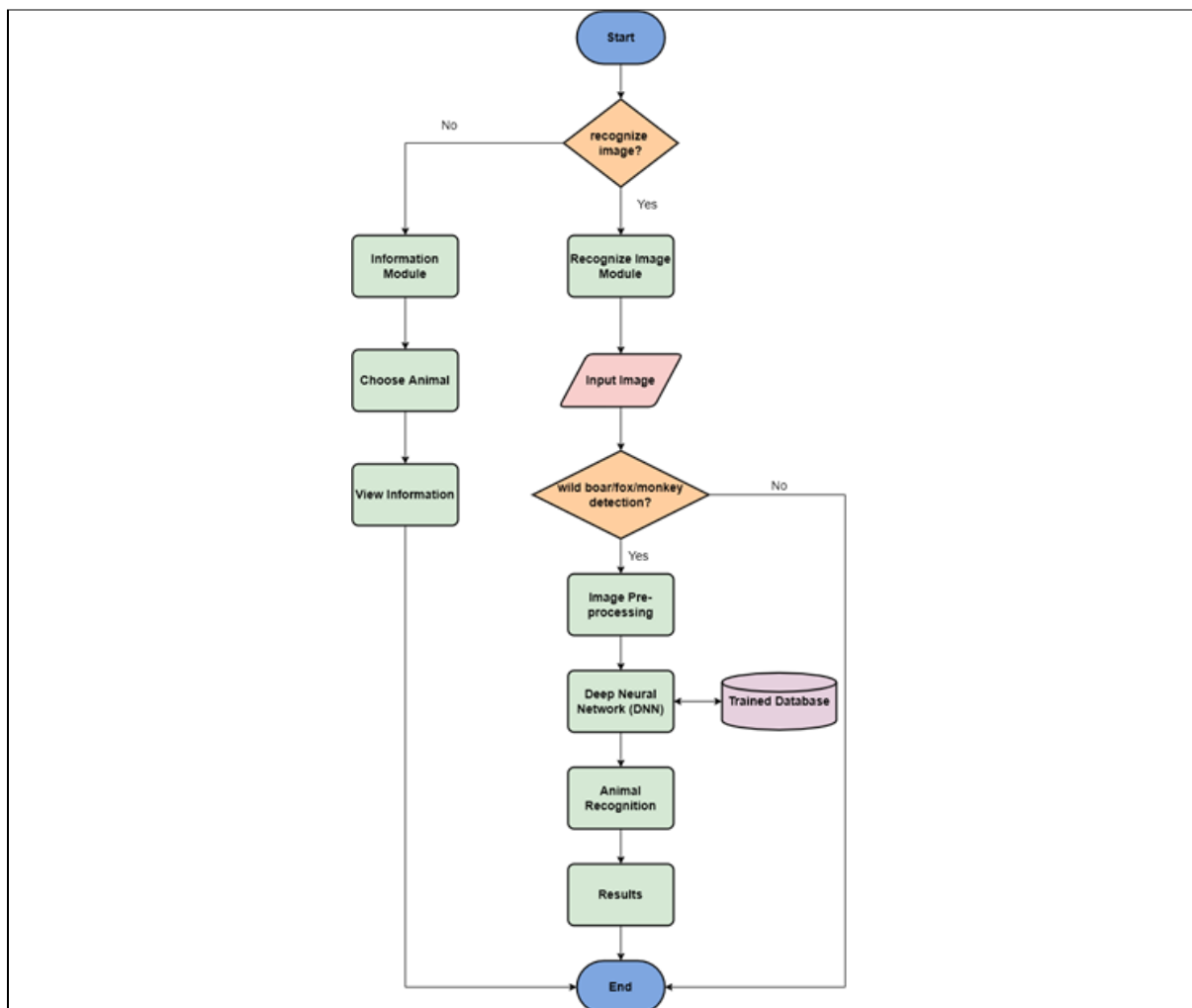


Figure 3: System Flowchart

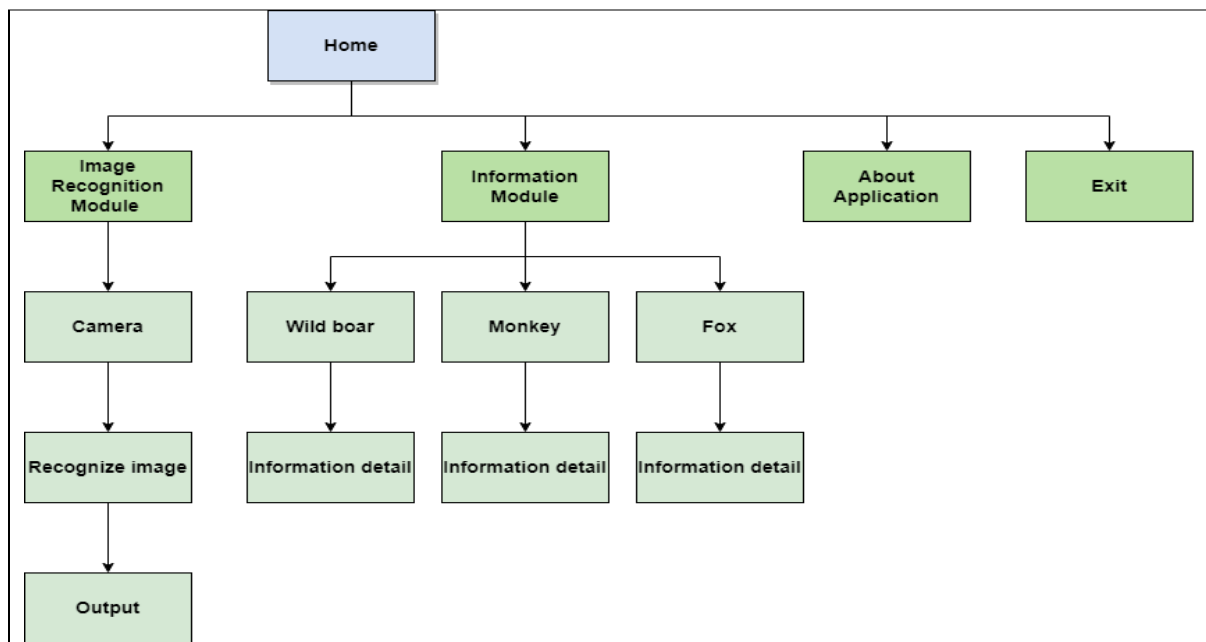


Figure 4: Navigational Structure

3.3 Material Collecting Phase

The third is the Material Collecting Phase, where at this phase, a developer has to collect materials based on the needs of the app like images, audio, videos, information, and scripts. For developing Pro Durian application, the first thing to collect is the images of durian threats which are wild boar, fox, and monkey. These images were collected at least 100 images for accuracy when the image was being recognized. Also, these images were taken from online websites such as google.com, unsplash.com, and pexels.com to be added to the dataset. In addition, the alarm sound also was taken from an online website by choosing the most suitable alarm sound to drive an animal from the durian farm.

3.4 Assembly Phase

In this phase, software tools that are going to use to develop this application are Android Studio and TensorFlow Lite. Android Studio is a new IDE where it is free to download by Google to Android Developers. In addition, Android Studio also provided an SDK Emulator that was used to implement some features of Android devices. Next, a Teachable Machine will be used to train a computer to recognize the images of durian threats. Teachable Machine is a fast, easy way to create machine learning models in the Pro Durian app. Later, after the image was processed by the Teachable Machine, it will export as a TensorFlow Lite file that will be used in Android Studio [9].

```

@Override
protected void onCreate(final Bundle savedInstanceState) {
    LOGGER.d("onCreate " + this);
    super.onCreate( savedInstanceState: null);
    getWindow().addFlags(WindowManager.LayoutParams.FLAG_KEEP_SCREEN_ON);

    setContentView(R.layout.tfe_ic_activity_camera);

    if (hasPermission()) {
        setFragment();
    } else {
        requestPermission();
    }
}

```

Figure 5: Permission Camera

Figure 5 displays a code for permission on using the user's camera. If the user already set the application to have all-time permission, the application will directly display the camera fragment and if not, the system will always ask for permission every time the user use the application

```

/** Loads input image, and applies preprocessing. */
private TensorImage loadImage(final Bitmap bitmap, int sensorOrientation) {
    // Loads bitmap into a TensorImage.
    inputImageBuffer.load(bitmap);

    // Creates processor for the TensorImage.
    int cropSize = Math.min(bitmap.getWidth(), bitmap.getHeight());
    int numRotation = sensorOrientation / 90;
    // TODO(b/143564309): Fuse ops inside ImageProcessor.
    ImageProcessor imageProcessor =
        new ImageProcessor.Builder()
            .add(new ResizeWithCropOrPadOp(cropSize, cropSize))
            .add(new ResizeOp(imageSizeX, imageSizeY, ResizeMethod.NEAREST_NEIGHBOR))
            .add(new Rot90Op(numRotation))
            .add(getPreprocessNormalizeOp())
            .build();
    return imageProcessor.process(inputImageBuffer);
}

```

Figure 6: Load Image

Figure 6 shows the code for pre-processing of the input image is to create a construct called ImageProcessor to resize and rotate the input images. The images are needed to resize so that it can match with the input size of the TensorFlow Lite model, and then convert it to RGB format to feed to the model. The system can easily do image resizing and conversion by using the ImageProcessor from the TensorFlow Lite Support Library.

```

// Gets the map of label and probability.
Map<String, Float> labeledProbability =
    new TensorLabel(labels, probabilityProcessor.process(outputProbabilityBuffer))
        .getMapWithFloatValue();
Trace.endSection();

// Gets top-k results.
return getTopKProbability(labeledProbability);
}

```

Figure 7: Inference

Based on Figure 7, the object that maps each label to its probability is called labeledProbability in the List<Recognition> class. With the support from the TensorFlow Lite Support Library, it gives the benefit to convert from the model output to a human-readable probability map.

```

@UiThread
protected void showResultsInBottomSheet(List<Recognition> results) {

    if (results != null && results.size() >= 3) {
        Recognition recognition = results.get(0);
        //double percent = (100 * recognition.getConfidence());
        if (recognition != null) {
            if (recognition.getTitle() != null) recognitionTextView.setText(recognition.getTitle());
            if (recognition.getConfidence() != null)
                recognitionValueTextView.setText(
                    String.format("%.2f", (100 * recognition.getConfidence()) + "%");
        }
    }
}

```

Figure 8: Display Result

Figure 8 shows a calculation of the precision of the detected image and gets the name of the durian threats animal by getting the confidence score. The score is a number between 0 and 1 that indicates confidence that the object was genuinely detected. Hence, the closer the number is to 1, the more confident the model is. Then, the result will be set into a string format and multiply it with 100.


```
String a = recognitionValueTextView.getText().toString();
double b = Double.parseDouble(a);
if (b >= 90.00){
    if (player == null) {
        player = MediaPlayer.create(context, this, R.raw.alarm_sound);
        Toast.makeText(context, this, text: "Animal Detected", Toast.LENGTH_SHORT).show();
    }
    player.start();
}
```

Figure 9: Alarm Sound

From the result that was produced by detecting the image, the string is converted into a double format. If the result is more than 90, the system will fetch and play the audio file and display a text to show that the durian threat animal was detected.

```
private void setSingleEvent(GridLayout mainGrid) {
    for (int i = 0; i < mainGrid.getChildCount(); i++) {
        CardView cardView = (CardView) mainGrid.getChildAt(i);
        final int finalI = i;
        cardView.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (finalI == 0) {
                    Intent intent = new Intent(packageContext, MainActivity.this, ClassifierActivity.class);
                    startActivity(intent);
                }
                else if (finalI == 1) {
                    Intent intent = new Intent(packageContext, MainActivity.this, InformationActivity.class);
                    startActivity(intent);
                }
                else if (finalI == 2) {
                    Intent intent = new Intent(packageContext, MainActivity.this, AboutActivity.class);
                    startActivity(intent);
                }
                else if (finalI == 3) {
                    AlertDialog.Builder builder = new AlertDialog.Builder(context, MainActivity.this);
                    builder.setMessage("Adakah Anda Ingin Keluar?");
                    builder.setCancelable(true);

                    builder.setNegativeButton(text: "YA", new DialogInterface.OnClickListener() {
                        @Override
                        public void onClick(DialogInterface dialog, int which) { finish(); }
                    });
                }
            }
        });
    }
}
```

Figure 10: Main Menu

Figure 10 shows the code segment for the main menu of the Pro Durian application. All the buttons displayed in the interface were displayed by using a card view with an image and the title text of each module.

```
@Override
protected void onMeasure(final int widthMeasureSpec, final int heightMeasureSpec) {
    super.onMeasure(widthMeasureSpec, heightMeasureSpec);
    final int width = MeasureSpec.getSize(widthMeasureSpec);
    final int height = MeasureSpec.getSize(heightMeasureSpec);
    if (0 == ratioWidth || 0 == ratioHeight) {
        setMeasuredDimension(width, height);
    } else {
        if (width < height * ratioWidth / ratioHeight) {
            setMeasuredDimension(width, measuredHeight: width * ratioHeight / ratioWidth);
        } else {
            setMeasuredDimension(measuredWidth: height * ratioWidth / ratioHeight, height);
        }
    }
}
```

Figure 11: Camera View

Figure 11 displays the code segment to display the camera view by measuring the ratio of width and height the layout of the mobile screen layout.


```

ViewTreeObserver vto = gestureLayout.getViewTreeObserver();
vto.addOnGlobalLayoutListener(
    new ViewTreeObserver.OnGlobalLayoutListener() {
        @Override
        public void onGlobalLayout() {
            if (Build.VERSION.SDK_INT < Build.VERSION_CODES.JELLY_BEAN) {
                gestureLayout.getViewTreeObserver().removeGlobalOnLayoutListener( victim: this);
            } else {
                gestureLayout.getViewTreeObserver().removeOnGlobalLayoutListener( victim: this);
            }
            //          int width = bottomSheetLayout.getMeasuredWidth();
            int height = gestureLayout.getMeasuredHeight();

            sheetBehavior.setPeekHeight(height);
        }
    });
sheetBehavior.setHideable(false);

```

Figure 12: Result View

Figure 12 shows a code segment for the result view at the bottom of the camera view. The system will fetch the created layout for the bottom sheet and the sheet behavior is measured, as well as function to hide and open the bottom sheet.

```

private void initListData() {
    listGroup.add("Pengenalan");
    listGroup.add("Tabiat");
    listGroup.add("Cara-cara menghalau");

    String[] array;

    List<String> list1 = new ArrayList<>();
    array = getResources().getStringArray(R.array.boarintro);
    for (String item : array){
        list1.add(item);
    }

    List<String> list2 = new ArrayList<>();
    array = getResources().getStringArray(R.array.boarhabitat);
    for (String item : array){
        list2.add(item);
    }

    List<String> list3 = new ArrayList<>();
    array = getResources().getStringArray(R.array.boarshoo);
    for (String item : array){
        list3.add(item);
    }

    listItem.put(listGroup.get(0), list1);
    listItem.put(listGroup.get(1), list2);
    listItem.put(listGroup.get(2), list3);
    adapter.notifyDataSetChanged();
}

```

Figure 13: Additional Information

Figure 13 displays a code segment to display the additional information. Basically, the system will fetch the data from the strings.xml file and display it in the application by using the array method.

3.5 Testing Phase

The fifth phase is the testing phase that happened after completing the assembly phase by running a trial. The application is tested and tried by applying alpha and beta testing for the application. Alpha testing is the process of testing that will be performed to identify bugs inside the application by the developer before releasing the product to the users or the public.

Next, beta testing is performed by real users of the software application in a real environment. Beta testing is usually performed by clients who are not part of the organization to collect user input on the product. The result of the testing will be discussed further in the Results and Discussion section.

3.6 Distribution Phase

Lastly, the final phase or distribution phase allows the developer to compile the application-related files in *.apk format so that they can be run on an Android platform smartphone device [10]. Also, preparation and duplication of the application for distribution to the users will be done by distributing the application through telegram and whatsapp platform for durian farmers and other farmers that owns a farm.

4. Results and Discussion

This section presents the user result output and testing that was conducted for Pro Durian application.

4.1 User Interface

This section will show all the interfaces that are used in the application. The visual layout of the items that users may interact with within the mobile application is referred to as user interface design and is created in the Android Studio with XML markup language. The target user’s nature should be considered in designing the interface. As it should be appealing and easy to use. Table 2 shows the user interface design for this app.

Table 2: Table of user interface design


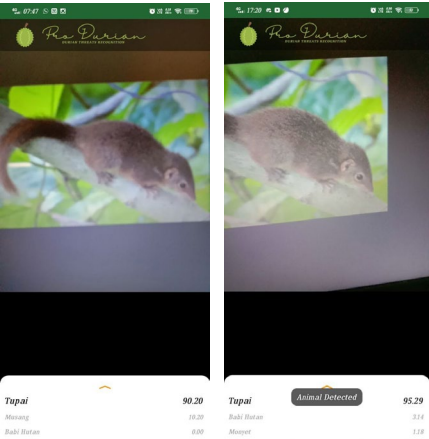
User Interface	Description
	<p>Main Menu</p> <ul style="list-style-type: none"> ● Consist of four main buttons. ● User can choose the ‘Rekognasi Imej’ button to start recognizing an animal. ● User can choose ‘Maklumat Tambahan’ button to choose the selection information on an animal. ● User can choose the ‘Tentang Aplikasi’ button to view application info. ● User can exit the game by clicking on the ‘Keluar’ button.
	<p>Image Recognition</p> <ul style="list-style-type: none"> ● This appears when the user clicks on the ‘Rekognasi Imej’ button on the Main Menu page. ● It allows users to grant permission on using the camera. ● The bottom sheet can hide and unhide to view the resulting output. ● When the percentage reaches 90, a message “Animal detected” will display and the alert sound will activate.

Table 2: (continued)





User Interface	Description
	<p>Additional Information</p> <ul style="list-style-type: none"> • Consist of four animals which is wild boar, monkey, fox, and squirrel. • Additional information for each animal selection page. • User can choose up to four durian farm threat animals.
	<p>View Animal's Information</p> <ul style="list-style-type: none"> • This is a page to view the information of the animal (e.g Babi Hutan) from the selection animal page. • Consist of three headers which are 'Pengenalan', 'Habitat', and 'Cara-Cara Menghalau'. • User can slide the image display by sliding on the image left and right. • To view the detailed information, the user has to click on the header in green color. • User can expand and close the detailed information.
	<p>View About Application</p> <ul style="list-style-type: none"> • This is the page to view the information of the application when the user clicks the 'Tentang Aplikasi' button on the Main Menu. • Consist of two headers which are 'Rekognasi Aplikasi Modul' and 'Maklumat Tambahan Modul'. • This page is a user guide on how to use the application.

Table 2: (continued)

User Interface	Description
	<p>Exit</p> <ul style="list-style-type: none"> • In this exit page, two options are given to the users to choose whether they want to exit the app or stay in the app. • If the user chooses to exit the app ('YA'), the app will be closed • If the user chooses not to exit the app ('TIDAK'), the Main Menu page will appear.

4.2 Testing

This section will discuss further based on the result in the testing phase. In the testing phase, alpha testing and beta testing were done to achieve the goal of user requirements. Alpha has been done by the developer to identify any possible bugs or errors while beta testing was done by distributing the .apk file along with the Google Form questionnaire and the result of the questionnaire will be display in Appendix.

4.2.1 Alpha Testing

Table 2 shows the testing results for the Image Recognition module and the Additional Information module from the three-test category which tested the functionality of the system is stored and manipulating the camera view, confidence score, and activation alarm. The proposed application manages to pass all the tests with the following expected results.

Table 3: Table of test category

Test Category	Description
1	Test the functionality of the system of view camera and manipulate the stored dataset to recognize an animal.
2	Test the functionality of the system confidence score of the detected image.
3	Test the functionality of the system activation alarm sound.
4	Test the functionality to display the list of durian farm threats.
5	Test the functionality to display an animal's image through an image slider.
6	Test the functionality to expand the list of information (Pengenalan, Habitat, and Cara-Cara Menghalau).
7	Test the functionality of the system in about application section
8	Test the functionality to expand the list of information (Rekognasi Imej Module and Maklumat Tambahan Module).
9	Test the functionality of the system on the exit button.

Table 4: Table of test plan results

No.		Description		Expected Results	Actual Results
1	I.	Click on the module.	I.	Module appears	Pass
	II.	Display the camera view.	II.	Camera appears	
2	I.	Display the percentage of the resulting output.	I.	Output appears	Pass
3	I.	Activate the alarm sound when reaches 90%.	I.	Alarm sound activates	Pass
4	I.	Click on the module.	I.	Module appears	Pass
	II.	Display the list of animals.	II.	List display	
5	I.	Display the image slider.	I.	Image moving	Pass
6	I.	Display the information in expandable view.	I.	Info expand	Pass
7	I.	Click on the module.	I.	Module appears	Pass
	II.	Display the information about the application.	II.	Info display	
8	I.	Display the information in expandable view.	I.	Info expand	Pass
9	I.	Display the confirmation message (YA/TIDAK).	I.	Choose the option	Pass

4.2.2 Beta Testing

The beta testing is a testing that is enclosed to the chosen target which is durian farmers was conducted through Google Form. Half of the testers have a durian farm or another kind of farm that they own. A set of questions also have been created using Google Form to avoid any human error calculation as it has an auto-generated graph. There are 10 respondents, the questionnaire is a linear scale questionnaire 1 – ‘Sangat lemah’ to 5 – ‘Sangat baik’, and the Google Form have 3 sections on functionality, design, and feedback on the application. In the functionality section, most of the users answered the ‘Sangat baik’ or ‘Baik’ score, while others answered the ‘Neutral’ score since there are some parts that I need to fix. Next, for the design section, almost all respondents answered ‘Sangat baik’, while the rest answered ‘Baik’. Lastly, the feedback section provides questions for users to give overall feedback on the application and it also contains an open-ended question. Based on the open-ended, most of the feedback given were all positives feedback such as some of them are interested in this application and some of them commented that the application is good but can be improve.

5. Conclusion

In conclusion, Pro Durian is an android based mobile app that was successfully developed and works as it was proposed. Based on the previous chapter looking at the Beta Testing section, most of the testers evaluate a high score and gave positive feedback. This shows that the applications were a success and were accepted by the end-user. The objective of the app also has been achieved by documenting the UI and UX design, and the alert feature will be activated when there is an animal detected, as well as alpha and beta testing, was successfully executed.

The users can gain advantages when using this application with the image recognition module that can identify durian farm threats on the durian farm. In addition, the users can use the pieces of information in the additional information module that contains the introduction, habitat, and ways to drive away those animals on each of the durian farm threat animals. The disadvantage of this application is the user cannot turn off the alert sound and have to wait for 10 seconds for the alarm sound to stop. Furthermore, even though there were no animals on the screen camera, the system still can detect and give output results on the screen.

This section discusses on the upgrades and improvements for Pro Durian in future works. The improvements might need to apply on the system that it can only detect durian farm threat animals only. Also, a guide for the user or system feedback to the application can be provided.

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Appendix A

Table 6: Non-functional requirement

Category	Details
Usability	<ul style="list-style-type: none"> • The application is in the Malay Language. • The application should be easy to use.
Implementation	<ul style="list-style-type: none"> • The application shall be able to run using the Android platform. • The application can be run on any available platform in Android Studio.
Performance	<ul style="list-style-type: none"> • The average response time between click and reaction is less than 0.2 seconds. • The application should be able to load the results of the recognized image within 0.5 seconds.

Table 7: Functional Requirement

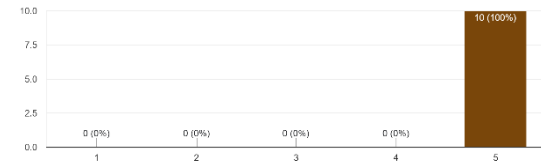
Category	Details
Autonomous system	<ul style="list-style-type: none"> • After launching the app for the first time, the system will display the Main Menu. • After the user chooses the image recognition module, the system will ask the user to choose an image from a file to recognize an image. • After the user chooses the information animals module, the system will list out the wild animals that are available in the system. • After the user clicks on one of the wild animals listed, the system will give information about that animal.
User Interaction	<ul style="list-style-type: none"> • If the user clicks the button, the system shall display the result of what they click. • In the image recognition module, the user can click recognize image button to see whether the image is durian threats or not. • In the information module, the user can view the list of three main durian farm threats by clicking on each of the animal's name

Table 8: Questionnaire user acceptance

<p>Butang Rekognasi Imej 10 responses</p> <table border="1"> <thead> <tr> <th>Rating</th> <th>Count</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> <td>0%</td> </tr> <tr> <td>2</td> <td>0</td> <td>0%</td> </tr> <tr> <td>3</td> <td>0</td> <td>0%</td> </tr> <tr> <td>4</td> <td>0</td> <td>0%</td> </tr> <tr> <td>5</td> <td>10</td> <td>100%</td> </tr> </tbody> </table>	Rating	Count	Percentage	1	0	0%	2	0	0%	3	0	0%	4	0	0%	5	10	100%	<p>Butang Maklumat Tambahan 10 responses</p> <table border="1"> <thead> <tr> <th>Rating</th> <th>Count</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> <td>0%</td> </tr> <tr> <td>2</td> <td>0</td> <td>0%</td> </tr> <tr> <td>3</td> <td>0</td> <td>0%</td> </tr> <tr> <td>4</td> <td>0</td> <td>0%</td> </tr> <tr> <td>5</td> <td>10</td> <td>100%</td> </tr> </tbody> </table>	Rating	Count	Percentage	1	0	0%	2	0	0%	3	0	0%	4	0	0%	5	10	100%
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Table 8: Questionnaire user acceptance (cont)

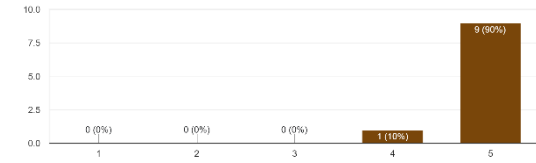
Maklumat tupai
10 responses



Maklumat tupai

- Sangat baik (100%)

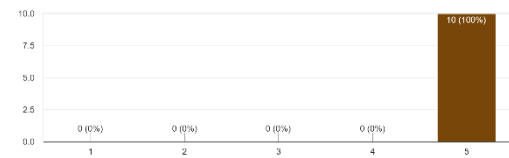
Maklumat tentang aplikasi
10 responses



Maklumat tentang aplikasi

- Sangat baik (100%)

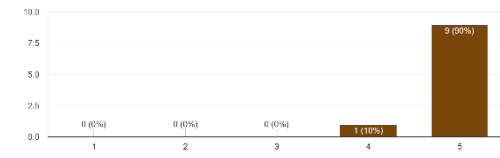
Mudah digunakan dan mudah difahami
10 responses



Mudah digunakan dan mudah difahami

- Sangat baik (100%)

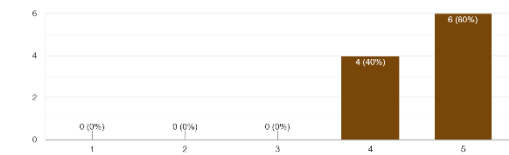
Tulisan yang digunakan adalah terang dan boleh dibaca
10 responses



Tulisan yang digunakan adalah terang dan boleh dibaca

- Sangat baik (90%)
- Baik (10%)

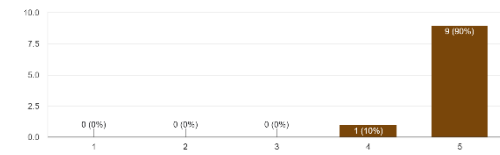
Penggunaan warna adalah sesuai
10 responses



Penggunaan warna adalah sesuai

- Sangat baik (60%)
- Baik (40%)

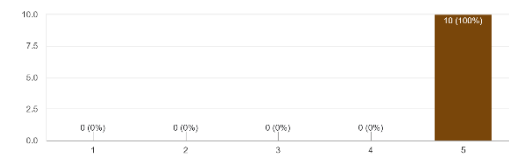
Gambar yang digunakan adalah sesuai dan menarik
10 responses



Gambar yang digunakan adalah sesuai dan menarik

- Sangat baik (90%)
- Baik (10%)

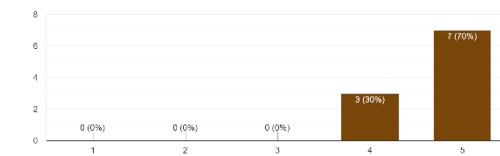
Reka bentuk aplikasi keseluruhan adalah menarik
10 responses



Reka bentuk aplikasi keseluruhan adalah menarik

- Sangat baik (100%)

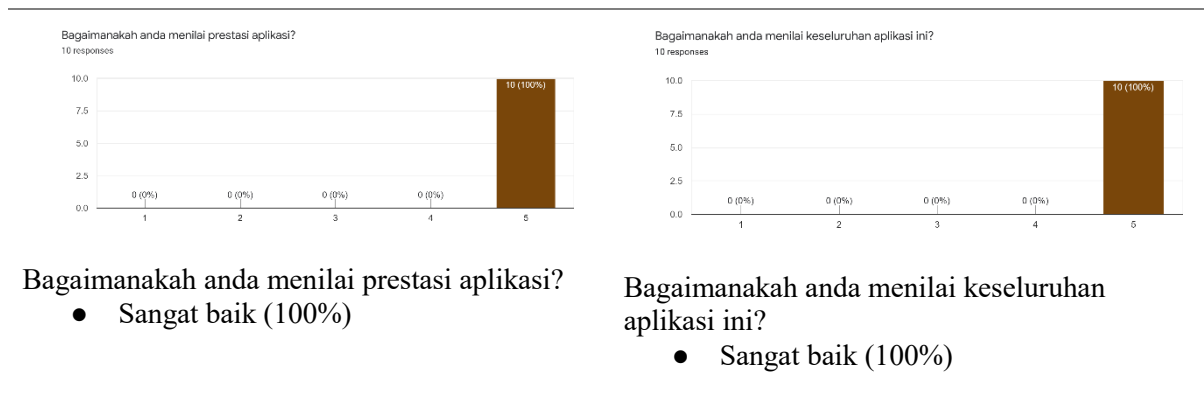
Bagaimanakah anda akan menilai tahap fungsi kepenggunaan aplikasi?
10 responses



Bagaimanakah anda akan menilai tahap fungsi kepenggunaan aplikasi?

- Sangat baik (70%)
- Baik (30%)

Table 8: (continued)



Komen dan pendapat anda tentang aplikasi ini.
8 responses

- aplikasi yang menarik untuk digunakan
- terbaik nokk
- terbaik, nak... teruskan usaha... pencapaian yang baik
- Aplikasi yang sangat baik kegunaannya tapi boleh ditambahbaikkan.
- boleh improve lagi bahagian yg recognise binatang.
- bagus untuk digunakan di kebun saya.
- Function sgt kalau dapat diaplikasikan di kebun yang sbnar
- Sangat kreatif

Komen dan pendapat anda tentang aplikasi ini.

- It shows that most of the testers gave positive feedback such that it would be nice to have this technology on their own farm means that they are interested in this application.

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