

Mphoto Photography Tutorial Application

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Abstract: Mphoto Photography Tutorial Application is developed to solve the learning problems in mobile photography. It is aimed to design a platform for young generation who interested in mobile photography to learn photography. Platform used in this project is Android Studio and Firebase. This application contains various functions such as login, register; view or watch tutorial; create, view, update, delete the post; label or score photo; view, edit the personal information and chat with other users. The methodology used in this project is Object-Oriented Software Development (OOSD). This application enables the target users to have a platform to learn, to interact and to involve in photography.

Keywords: Photography, Mobile Photography, Tutorial Application, Android

1. Introduction

Nowadays, more and more people especially young people are paying more attention to smartphone. Smartphone can act as a source of entertainment, a communication tool, a search engine and so much more [1]. The rise of smartphone also makes the features or specifications of smartphone more important when the consumer wants to buy a new smartphone. In research “Influencing Factors on Consumer Buying Behaviour of Smartphones” [2], among all the specifications such as battery, processor, memory and more, phone camera has become one of the most preferences that affecting smartphone purchased. Moreover, Van Nhat Nguyen [3] said that “photography has now become more casual and user-friendlier than ever when every person who has access to a smartphone has the power to make it happen”. Hence, this came out with a new term, “mobile photography” or “smartphone photography”.

The main problems addressed in this paper are the complexity of camera setting, lack of interaction between users, less tutorial content and measurement on photography technique. Camera is definitely a complex device [4]. The settings of camera such as the ISO, shutter speed, exposure and many more are very important to capture an excellent photo. However, many existing tutorial applications still has plenty of problems such as the lack of interaction between users and less content of the tutorial. In order to reduce these problems, photography tutorial application may help more people that are interested in learning mobile photography to start their life as a photographer. They are able to learn it in an interesting way and have a better interaction with other people.

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The rest of the paper is organized as follows: Section 2 describes the related work. Section 3 presents the methodology. Section 4 shows the system analysis and design. Section 5 introduces the implementation of the application. Section 6 is the conclusion.

2. Related Works

This section will illustrate about the literature review that had been done for this application.

2.1 Background of Photography

Photography can be translated directly as drawing with light. It is essentially a combination of technique and visual observation [5]. This word comes from Greek and “photo” means light while “graphy” means writing. In simple words, photography is the art or practice of taking and processing photographs.

2.2 Mobile Photography

Mobile photography is the art of taking photos by using mobile device. Smartphone is a great option when it comes to mobile photography. To produce a good quality photo, the knowledge about mobile photography is necessary. There are many criteria that need to be paid attention such as megapixels, image stabilization, exposure control, image quality and many more. There are some limitations of mobile photography such as taking a high quality photo [4]. Low-light shooting is one of the most important limitations of smartphone camera.

2.3 Application Programming Interface (API)

Application programming interfaces (APIs) provides services for two applications to talk to each other through a set of predefined resources. Image labeling is one of the APIs. It is used to label the images such as people, animals, flower, mountains and others with confidence level. Firebase Image labeling gives insight into the content of images [6]. Image scoring is used to detect the quality of an image. Nowadays, image aesthetic quality has catches the attention of many people. Color, composition, pixels and other general features of an image are analyzed to represent the aesthetic quality of the image [7].

2.4 Study of Existing Related Application

In this section, three existing applications will be discussed and compare with the proposed application.

2.4.1 Smart Photography Tips

Smart Photography Tips is an Android application. It puts together a list of mobile photography related tips that will help user in learning the skills of smartphone camera. User can explore many different types of techniques in the app and see cameras in user’s phone can be used to take highly attractive photos. It contains the tips for back camera and front camera [8]. However, this application contains too many advertisements. Besides, the tips are only in article form. Tips in video form are not available. It also lack of the content, it has only 16 tips for back and front camera.

2.4.2 Photography Classes

Photography Classes is a tutorial application that teach in video form [9]. The photographer who tutors in the videos is a professional photographer Luke Ballard. It consists of 22 tutorial videos in this application. However, the video is just a direct link to YouTube. It also contains many advertisements when connecting to Wi-Fi.

2.4.3 Mobile photography app – ClickChak

ClickChak is an application where user can upload and share mobile photographs, explore other people photos, participate in competition and redeem prizes in exchange for the like received for the uploaded pictures [10]. User can refer to the picture info in the e-magazine such as the mobile model, focal length, aperture, exposure and ISO. Although this application has an interesting user interface and features, it does not have a proper tutorial for user to learn. User can only comment under the picture posted if they have any questions.

2.5 Comparison with the Existing system

A comparison is made between the existing mobile application and proposed mobile application. There are 11 features to be compared. All of the application are Android-based operating system as Android OS is the most common and popular OS in the market. Next, Smart Photography Tips and Photography Classes do not have this function because user can only view the articles and video. Next, the tutorial of Smart Photography Tips is in article form whereas Photography Classes is in video form. ClickChak does not have both of the tutorial form while the proposed application will contain both article and video tutorials. The three existing applications do not have photo editing tutorial. Hence, it is better to add this feature into the proposed application. Smart Photography Tips and Photography Classes do not contain explore feature while ClickChak has this features. Explore features will be adapted into the proposed application.

Labeling and scoring system is the system will give the label, confidences or score of the photo when users upload their photos. All of the existing application does not have this feature while the proposed application will adapt this feature. System notification means that will the system notify users when there are some important messages. The proposed application will implement this function. All existing application does not have chat function that allows users to chat with another user. The proposed application will adapt this feature as it is useful for users. Post or content sharing is available for Smart Photography Tips and ClickChak while Photography Classes does not support this feature. Hence, the proposed application will be implemented this feature also.

Based on the comparison, Mphoto Photography Tutorial Application provides most features among four applications. The comparison between existing application and proposed application are summarized in Table 1.

Table 1: The comparison between existing application and proposed application

Features	Smart Photography Tips	Photography Classes	ClickChak	Mphoto Photography Tutorial Application
Operating System	Android-based	Android-based	Android-based	Android-based
Login or Register	No	No	Yes	Yes
Tutorial in article form	Yes	No	No	Yes
Tutorial in video form	No	Yes	No	Yes
Photo Editing tutorial	No	No	No	Yes
Explore page	No	No	Yes	Yes
Labeling system	No	No	No	Yes
Scoring system	No	No	No	Yes

Table 2: (cont.)

Features	Smart Photography Tips	Photography Classes	ClickChak	Mphoto Photography Tutorial Application
System Notification	No	No	Yes	Yes
Chat	No	No	No	Yes
Post/ Content Sharing	Yes	No	Yes	Yes

3. System Methodology

This section will illustrate about the methodology used in this project.

3.1 Object-Oriented Software Development (OOSD)

Object-oriented software development is a method to develop software by creating modules or objects that can be reused, modified or replaced. The process consists of five phases which are OO Analysis, OO Design, OO Programming, OO Test and OO Maintenance.

3.2 System Development Workflow

There are five main phases in the model used which are Planning, Analysis, Design, Implementation and Testing. Table 2 shows the workflow of development according to each phase for Mphoto Photography Tutorial Application.

Table 2: Workflow of development for Mphoto Photography Tutorial Application

Item Phase	Activities	Output
Planning	<ul style="list-style-type: none"> Determine problem statement Identify objectives of the project Determine scopes of project Identify project significance and expected result 	<ul style="list-style-type: none"> Proposal
Analysis	<ul style="list-style-type: none"> Analyze the user requirement gathered. Identify hardware requirement and software requirement. Collect all the data 	<ul style="list-style-type: none"> User requirement Hardware requirement and software requirement Use-case Diagram Activity Diagram Sequence Diagram
Design	<ul style="list-style-type: none"> Design wireframe Design user interface Design database 	<ul style="list-style-type: none"> Wireframe User interface design Class Diagram Entity Relationship Diagram
Implementation	<ul style="list-style-type: none"> Translate design to running code 	<ul style="list-style-type: none"> Mphoto Photography Tutorial Application
Testing	<ul style="list-style-type: none"> Undergoes functional testing. 	<ul style="list-style-type: none"> Test plan

4. Analysis and Design

In this section, analysis and design are described for this project.

4.1 Requirement Analysis

Requirement analysis is to determine the needs or conditions of a project. These requirements represent what targeted users need and it will be considered in the project. There are two types of requirement analysis which are important in developing an application. First is the user requirement analysis. It states that what does user can do in the application. Functional requirement analysis is what does the application can do and non-functional requirement analysis is the criteria that can be used to judge the operation of a system.

4.2 Unified Modelling Language (UML)

A Unified Modelling Language (UML) is the standard language for modelling of a system. UML diagram is a diagram that represents a system visually. In this project, activity and use-case diagram are used to show the relationship and process of the application.

4.2.1 Use-case Diagram

Figure 1 shows the use case diagram for the Mphoto Photography Tutorial Application. There are total fifteen use cases for this application. First users can register new account or login to their account. They can view or watch the tutorials. They are able to upload photo for scoring, labeling or posting. They can create, view, edit or delete the post that they created. Besides, they can also search the post or the registered users by typing the keywords in the search bar. Users are able to edit their profile such as name, profile picture and others. They will receive notification if there are other users like or comment on the post of the users. Lastly, they can logout from the application.

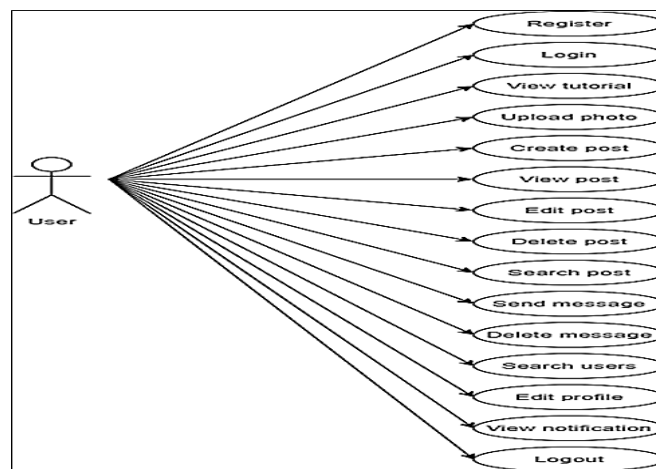


Figure 1: Use case diagram for Mphoto Photography Tutorial Application

4.2.2 Activity Diagram

For the login page, if user does not have an account, users need to register first. After login with the correct email and password, home page will be displayed. Users can create, view, edit and delete post in the home page. For tutorial page, user can view or watch the tutorials. For label and score page, user can upload their photos for labeling or scoring. Users can also search for registered users in user's page. They are able to chat with other users in chat page. Notification page allows users to view notification details. And last, users can logout from the application. Figure 2 shows the activity diagram for user of Mphoto Photography Tutorial Application

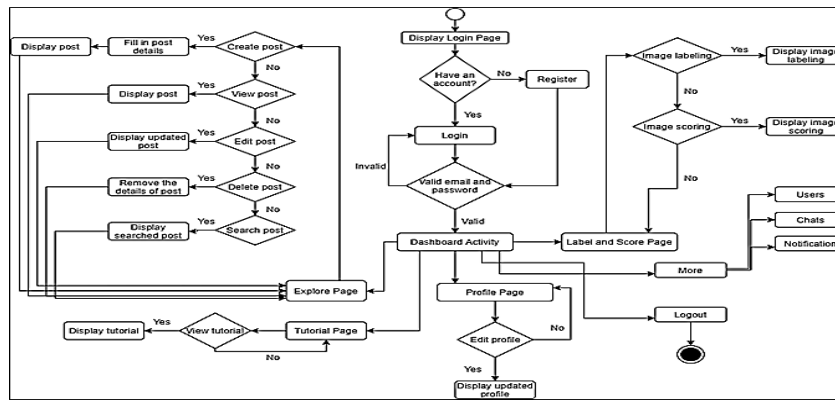


Figure 2: Activity diagram for Mphoto Photography Tutorial Application

4.3 Database Design

Database design shows the design of the classes, methods and relationships of the project. Entity Relationship Diagram (ERD) have point out the database design.

4.3.1 Entity Relationship Diagram (ERD)

Figure 3 show the ERD of Mphoto Photography Tutorial Application. There are six entities in the diagram the ERD of Mphoto Photography Tutorial Application.

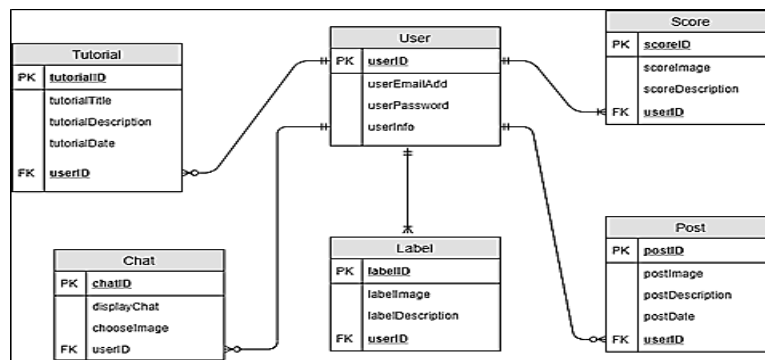


Figure 3: ERD of Mphoto Photography Tutorial Application

5. Implementation

This section introduces the implementation and user interface of every activity for the Mphoto Photography Tutorial Application.

5.1 Implementation

Mphoto Photography Tutorial Application is developed by using Android Studio and Firebase real-time database that used to store the users' information and data. Besides, Java programming was used to develop the function of the application and the xml file was used to design the layout.

5.1.1 User management Module

Figure 4 and 5 shows the code segment in register page and login page. Figure 6 shows the user interface for main activity, register page, login page, profile page and the registered users list. Users can either choose to login or register a new account. In profile page, users can edit the profile picture, cover picture, name, bio and change password. They can also view their posts in this page. The application will list out all the registered users in the user's page. Users can search for other users, view other users' profile or chat with other users. Figure 6 shows the user interface for main activity, register, login, profile and users list.

```
private void registerUser(String email, String password) {
    //email and password pattern is valid, show progress dialog and start registering user
    progressDialog.show();

    mAuth.createUserWithEmailAndPassword(email, password)
        .addOnCompleteListener( activity: this, (task) - {
            if (task.isSuccessful()) {
                // Sign in success, dismiss dialog and start register activity
                progressDialog.dismiss();
            }
        });
}
```

Figure 4: Code segment of register page

```
private void loginUser(String email, String passw) {
    //show progress dialog
    pd.setMessage("Logging In...");
    pd.show();
    mAuth.signInWithEmailAndPassword(email, passw)
        .addOnCompleteListener( activity: this, (task) - {
            if (task.isSuccessful()) {
                //dismiss progress dialog
            }
        });
}
```

Figure 5: Code segment of login page

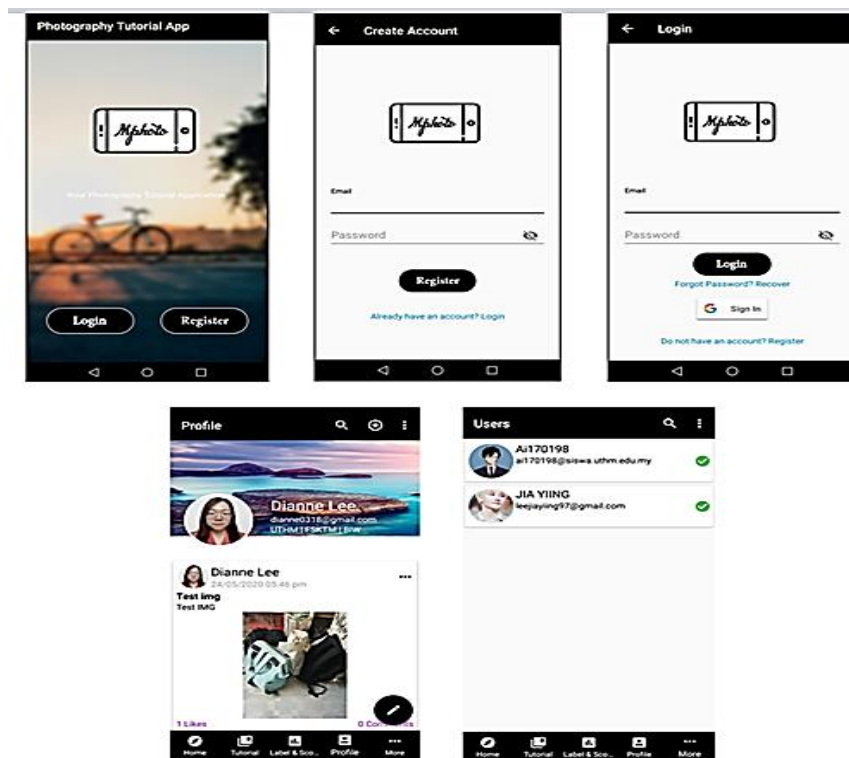


Figure 6: User interface for main activity, register, login, profile and users list of Mphoto Photography Tutorial Application

5.1.2 Explore and Tutorial Module

Figure 7 shows the user interface explore page and tutorial page. Users can create a post by clicking the add button at the upper navigation bar. Users must input the title and description of the posts; they can also choose an image from their phone gallery. Other users may like, comment or share the posts. Users can follow the tutorial step by step. Users can go to the next section by clicking the next button, previous button will back to the previous section and the home button will go to the dashboard. Figure 8 and 9 shows the code segment of explore page and tutorial page.

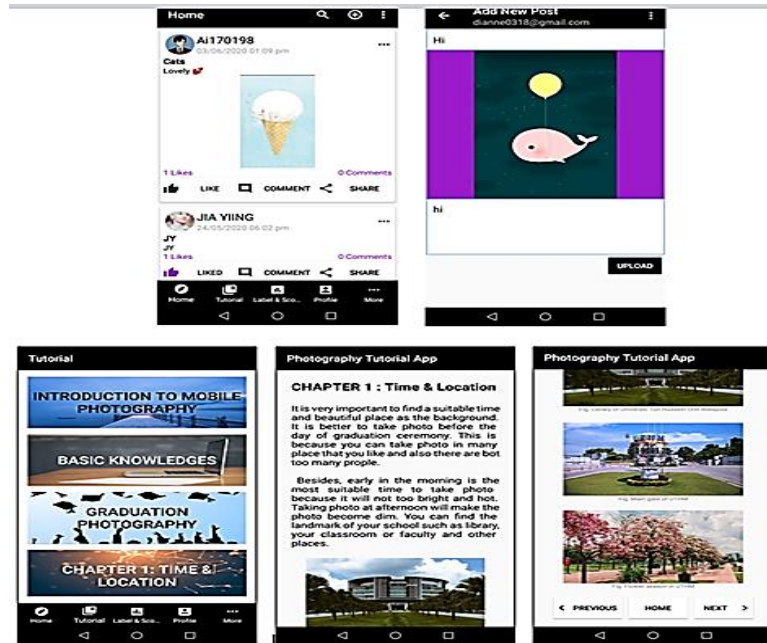


Figure 7: User interface explore page and tutorial page

```
private void loadPosts() {
    //path of all posts
    DatabaseReference ref = FirebaseDatabase.getInstance().getReference( path: "Posts");
    //get all data from this ref
    ref.addValueEventListener(new ValueEventListener() {
```

Figure 8: Code segment of explore page

```
@Override
public View onCreateView(LayoutInflater inflater, ViewGroup container,
    Bundle savedInstanceState) {
    // Inflate the layout for this fragment
    View v = inflater.inflate(R.layout.fragment_tutorial, container, attachToRoot: false);

    intro = v.findViewById(R.id.intro);
    basic = v.findViewById(R.id.basic);
    graduation = v.findViewById(R.id.graduation);
    timenLocation = v.findViewById(R.id.timenLocation);
```

Figure 9: Code segment of tutorial page

5.1.3 Label and Score Module

Figure 10 shows the user interface for label and score page. Image labelling will recognize the image that upload by users and display out the labels with their confidences. For image scoring, users will be redirected to the website and it will give out the score of the image that upload by the users. Figure 11 shows the code segment for label and score page.

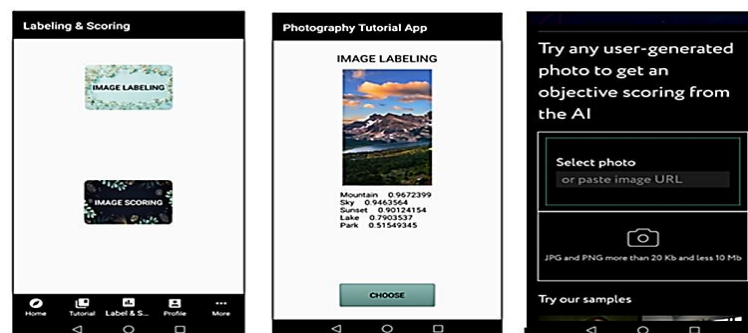


Figure 10: User interface label and score page


```

public void onActivityResult(int requestCode, int resultCode, @Nullable Intent data) {
    super.onActivityResult(requestCode, resultCode, data);

    if (requestCode == 121){
        imageLabel.setImageURI(data.getData());

        FirebaseVisionImage image;
        try {
            image = FirebaseVisionImage.fromFilePath(getApplicationContext(), data.getData());
            FirebaseVisionImageLabeler labeler = FirebaseVision.getInstance()
                .getOnDeviceImageLabeler();
        }
    }
}
    
```

Figure 11: Code segment of label and score page

5.1.4 Chat and Notifications Module

Figure 12 shows the user interface for chat and notification module. Users can chat with other users by sending text message or even an image. A notification will show in the notification page if other users like or comment on the original post. Users can set whether they want a push notification in the setting. Figure 13 shows the code segment of chat page.

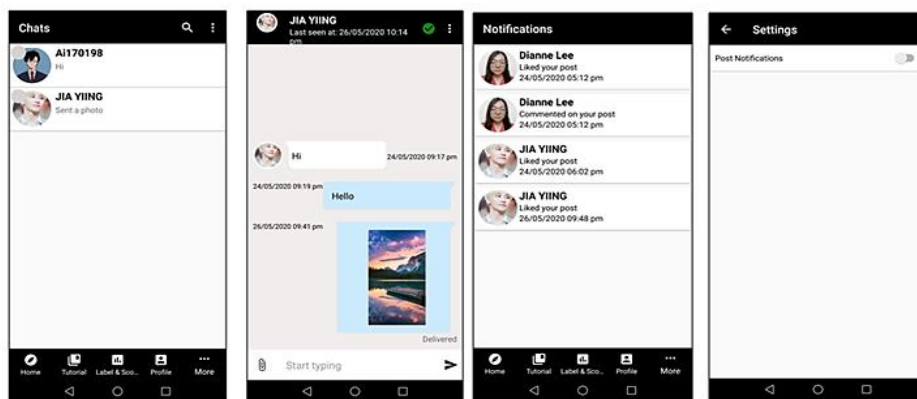


Figure 12: User interface label and score page

```

DatabaseReference databaseReference = FirebaseDatabase.getInstance().getReference();

String timestamp = String.valueOf(System.currentTimeMillis());

HashMap<String, Object> hashMap = new HashMap<>();
hashMap.put("sender", myUid);
hashMap.put("receiver", hisUid);
hashMap.put("message", message);
hashMap.put("timestamp", timestamp);
hashMap.put("isSeen", false);
hashMap.put("type", "text");
databaseReference.child("Chats").push().setValue(hashMap);
    
```

Figure 13: Code segment of chat page

6. Conclusion

In conclusion, Mphoto Photography Tutorial Application is successfully developed and it had achieved the objectives. All the proposed modules also have been developed as expected in this project. Users are allowed to create, view, edit and delete post. They can also view the tutorial in the tutorial module and view the result of the image labeling and image scoring. Search post of users and chat with other users are allowed and users will receive notification also. It enables users to register, login and logout an account. It is hoped that the Mphoto Photography Tutorial Application will help the users to know more about mobile photography.

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