Recipe Planning Application

Angela Anak Abong [a], Zehan Afizah binti Afip [a,1,*]

[a] Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia, Johor, Malaysia
[1] afizah@uthm.edu.my
* corresponding author

ARTICLE INFO

ABSTRACT

Kenyalang's Kitchen is an Android-based recipe planning application to promote Sarawak's traditional recipe. The application will assist user in the preparation of customary cuisine from various ethnicities in Sarawak. The user is able to choose the recipe based on the ingredients selected. Besides that, the application provides the 'Xprez List' that consists of recipe list that can be prepared in a minimum time. This application offers unique features such as 'Food Famous' which will list all the well-known cuisine from different ethnicities in Sarawak. Another uniqueness of this application is 'Glossary' to help the users to understand some of the unfamiliar terms. The recipe recommender is developed by using Object Oriented Software Development methodology. The software used is Android Studio in Java programming language. In short, the application aims to guide the users to prepare the Sarawak's traditional recipe.

1.   Introduction

Sarawak is well known with the various types of different ethnics [1]. This culture is often reflected in our life, especially in our food preparation. Sarawak has a unique taste of food that should be shared with the world such as Sarawak's iconic layered cake. It has become one of the state's most popular take-home foods to West Malaysia and Singapore [2]. Some of the unique foods from Sarawak are 'Dabai' ice cream and 'Terong Asam' ice cream that contain vitamin and nutrients [3]. This has shown that Sarawak has various traditional food that should be introduced to the new generations.

Nowadays, kids and adolescents prefer to consume fast food compared to home cooked meals [4]. Besides, there is no handy android application built for the Sarawak traditional recipes. Some of the videos of Sarawak traditional cooking method is not being compiled together in one application with the recipe of the food. With this recipe planning application, everyone in the world is able to explore the traditional and unique recipes of Sarawak.

This project focuses on the traditional food recipe in Sarawak. This application can be used by anybody who wishes to cook or learn about Sarawak foods culture.

It includes the decision support system of the data required by the user. Whereby, the user will select the menu based on the ingredient that the user got at home. This application also provides the 'Xprez List' features that will show recipe that can be prepare in a short time. There will also be some video for the most difficult part to cook or prepare the food to ensure the user understand clearly. 'Famous Food' is a feature that will display a famous list of recipe from each ethnic in Sarawak. Moreover, Kenyalang's Kitchen also offers 'Glossary' features to assist user to understand unfamiliar terms.

This reports is divided into several parts. Part II will cover the literature review. Part III will discuss the methodology used during the development of this project. Then, part IV will discuss about

analysis and design while part V explains about the project implementation. Part VI will conclude the overall project development.

2.   Related Works

This part will explains the background research done on traditional food of Sarawak, mobile application Android and comparisons done on three similar systems.

2.1   Traditional Food of Sarawak

Sarawak food is very unique as it has so many different ways to prepare the food compare to other traditional food. For example, Melanau ethnics' traditional food is 'ulat Mulong' cultivated from palm trees [5]. It can be cooked by grilling or frying. Meanwhile, the ethnic of Iban's famous food is Ayam Pansoh which is prepared by using bamboo [6]. There are about 45 of Sarawak traditional recipes that have been identified. It has been classified into 6 types which are Meat, Noodles, Desserts, Seafood, Vegetables and Fruits.

2.2   Android Based Application

Android is a mobile operating system which is based on the Linux kernel and currently developed by Google. Moreover, it is designed primarily for touchscreen mobile devices such as smartphones and tablet computers. Furthermore, Android is very popular with technology companies which require a ready-made, low cost and customizable operating system for high-tech devices [7].The Android Software Development Kit (SDK), that provided by Google are free and the SDK contains useful materials for developers, including extensive documentation, tutorials, samples and more [8].

2.3   Comparisons With Similar Applications

Comparisons have been done to three similar applications to provide input and insights into the development of Kenyalang's Kitchen Applications. The three applications reviewed are; Nigerian Recipe, Filipino Recipe and Fridge Check. Table 1 will illustrate the comparisons between the applications.

2.3.1   Nigerian Recipe

Nigerian Recipe is an Android application that shows the recipe from Nigeria which has been categorized into eight types [9]. It was developed by Kennedy Ehimare in August, 2015. The application requires Android 4.0.3 and above. This application has the shopping list to help user prepare the ingredient. Besides, user can share the recipe via online by selecting sharing option. After the selection of the food category, Nigerian Recipe will display the recipe list based on the chosen food category. After the user selected the chosen menu, the application will display the description of the foods followed by the ingredients and instruction for cooking the recipe. Favourite button is also available for each recipe for the user to search it later.

2.3.2   Original Filipino Recipe

Original Filipino Recipe is an Android application that was developed by Ferdinand G. Gacer, from Fedar Computer Services in July, 2014 [10]. The size of application are 8.6Mb and it requires 2.2 Android and above for installation. The Original Filipino Recipes application contains various recipes from Filipino that has been categorized as Beef, Chicken, Fish, Others, Pork, Seafood and Vegetables. It has very attractive interface with pictures of food and good size of fonts. Besides that, the application also displays the description of the food followed by the ingredients and instructions based on the recipe chosen by the user. Overall, the Filipino Recipe allow user to choose the recipe, then display the ingredients and instruction of cooking.

2.3.3   Fridge Check

This application was built in October, 2015 and was based on decision support system [11]. At the start of using the application, user has to specify the ingredient that is available at home then choose the category and preparation time to cook the food. This will help to narrow down the searching and find the matching recipe. However, the application did not arrange the ingredients available

according to specific category. Next, Fridge Check will suggest the recipe based on the ingredient given by user. The user has to choose one of the suggested recipes to view the steps in preparing the recipe. At the same time, the user may share the recipe with their friends on social media. Besides that, if the user like the recipe, the user will be able to set the recipe as favourite for future references.

2.3.4 Kenyalang's Kitchen: Recipe Planning Application

This application will help user in planning Sarawak's famous meals. It will show the list of Sarawak's traditional recipes and will guide the user on how to prepare the food. Once the user has chosen the menu, the application will show the background of the food, list of the ingredients and the instructions on how to prepare the food. Besides that, this recipe planning application also includes decision support system, whereby the application will suggest the menu based on the ingredients selected. Furthermore, the users will be able to choose recipe based on 'Food Famous' which is the list of recipe that famous from each ethnics and 'Xprez List' that show list of recipe that can be prepared in a short span of time. 'Glossary' also been provided in this application to help users with some unfamiliar terms. It also introduces the secret recipe of Sarawak's food.

Table 1. Comparison between these systems

System Features	Filipino Recipe	Fridge Check	Nigerian Recipe	Kenyalang's Kitchen
Suggest recipe/Decision System Support	No	Yes	No	Yes
Video	No	No	No	Yes
Background of Food	Yes	No	No	Yes
Express List	No	No	No	Yes
Glossary	No	No	No	Yes
Food Famous	No	No	No	Yes

3. Methodology

The methodology selected for the development of Kenyalang's Kitchen Application is Object-oriented Software Development (OOSD). Figure 1 illustrates the conceptual phases of Object-oriented Software Development (OOSD).
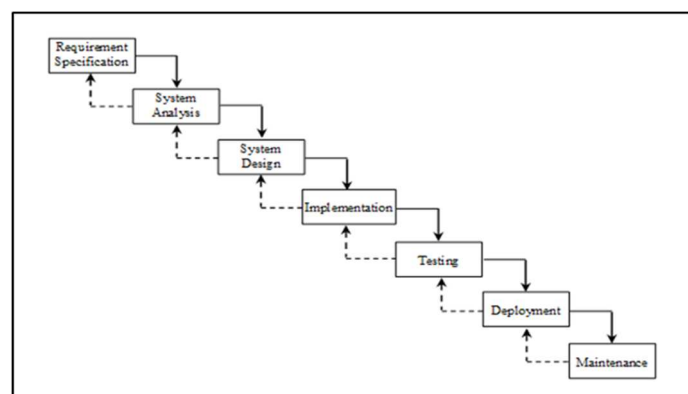

Figure 1. Object-oriented Software Development (OOSD) methodology [12]

Requirement analysis is the phase analysis to understand "what" the customer needs and problem. Four activities are applied to the system object to create the model of application. System analysis

phase will define the data flows, identify system input and output. The model is intended to capture the essential elements of the system and define service to the Kenyalang's Kitchen Application.

System design phase involves the use of many levels of abstraction to decompose the problem into manageable components, identify classes and interfaces and establish relationships among the classes and interfaces. The conceptual model was developed to implementing classes, are identify constraints and designing interfaces. Use case diagrams were designed as a representation of a user's interaction with the system and describe the specifications of a use case. Activity diagrams also represent the workflow of the system in terms of activities and actions. Followed by the class diagram where it was static structure diagram that describes the structure of the system. In implementation phase, it requires the process of translating the system design into a program which involves coding, testing and debugging. The Kenyalang's Kitchen is installed and made operational in the production environment after the system and user's acceptance testing. Activities in this phase include notification to end users, execution of training, and system monitoring.

Testing phase is done to ensure that the code of Kenyalang's Kitchen meets requirement specification and weeds out bugs. A test was conducted in order to make sure the Kenyalang's Kitchen meets the requirements and work properly without error. The most widely used process consists of five stages which is unit testing, module testing, subsystem testing, system testing and acceptance testing. In Deployment phase, the Kenyalang's Kitchen application was installed and successfully implemented by user without any error.

4.   Analysis and Design

Kenyalang's Kitchen Application is developed by using object-oriented approach. The working flow of application is outlined using the detailed sketching of use case diagram, class diagram, and activity diagram.

4.1   Analysis and System Design

Use Case diagram shows the user's interaction with Kenyalang's Kitchen application. Users are able to select the available ingredients, search for recipe, view recipe, view video and view glossary. Figure 2 shows the use case diagram of Kenyalang's Kitchen.
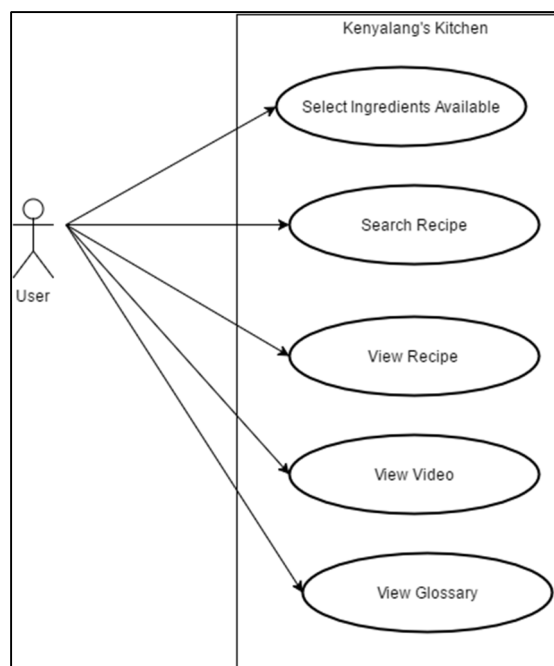

Figure 2. Use Case Diagram of Kenyalang's Kitchen Application

4.2 Use-Case Diagram

Class Diagram in figure 3 describes the classes, attributes, operations and the relationship among objects. It can be also be used for data modeling. It shows eleven class functions; User, recipe category, searching method, recipe match, food famous, food famous list, Xprez list, all recipe list, recipe content, glossary and term list.
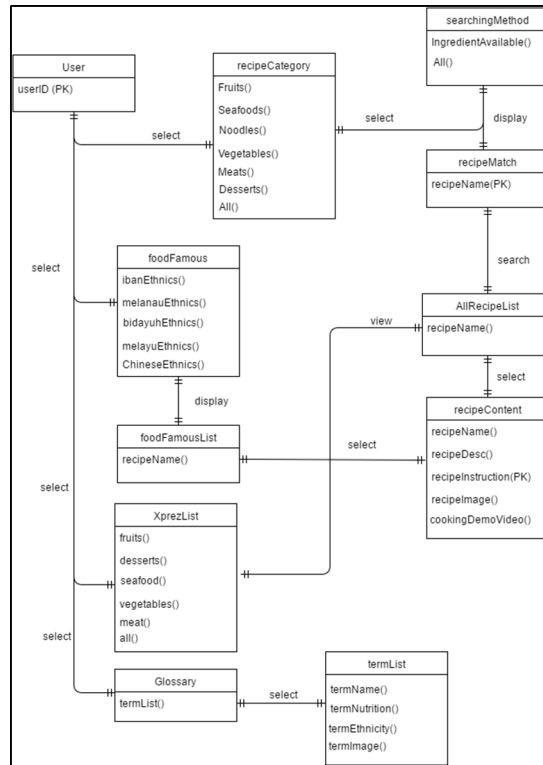

Figure 3. Class Diagram

4.3 Activity Diagram

Activity diagram in figure 4 shows the work flows of the Kenyalang's Kitchen application. It represents the flow from one activity to another. These activities describe the operation of the system. Users have several options whether to choose recipe, food famous, Xprez list or glossary to start the Kenyalang's Kitchen activity.
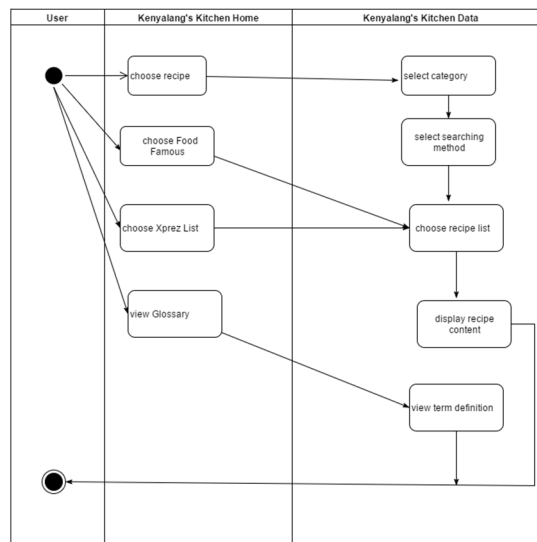

Figure 4. Activity Diagram

4.4   Sequence Diagram

Sequence diagram in figure 5 shows sequence diagram of displaying recipe based on ingredients available selected by user.
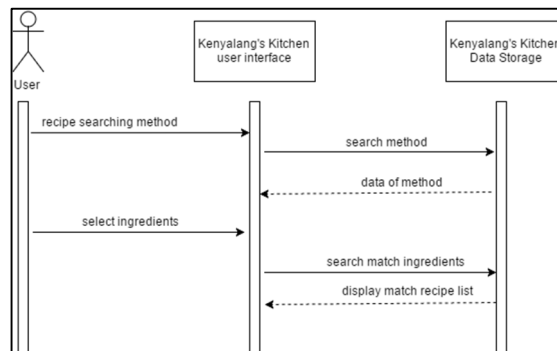

Figure 5. Sequence Diagram of select ingredients searching method

Table 2 below will describe the flow of events for searching method to select ingredient.

Table 2. Flow of Event for select ingredients searching method

Precondition	1. Require user to enter Home Screen of application 2. Select Ingredients Available searching method
Main success scenario	1. User able to choose recipe based on ingredients available 2. User can choose any of the suggested recipe match from the ingredients selected
Post Condition	1. User able to prepare recipe that contain most of the ingredients available

4.5   System Design

Figure 6 shows the sample interface of the Kenyalang's Kitchen application. The home screen has four options to start the activity, which is 'Search recipe button', 'Food Famous', 'Xprez List' or 'Glossary'.

Figure 6. Home screen interface of Kenyalang's Kitchen Application

5.   Implementation and Testing

Implementation and testing is the phase to execute the project and to ensure the application functioning well as designed.

5.1 Implementation

5.1.1 Search for Ingredients

The system will start with login in the main page. There will be type of login, which are login as administrator and as a membership. Figure 4 shows the Login interface in the MACMA Membership Management System.

Figure 7 shows segment of codes to select the ingredients while Figure 8 shows the interface of selecting ingredients available at home developed by the code.

```
<CheckBox
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Sugar" android:id="@+id/checkBox154"
android:layout_marginTop="15dp"
android:textSize="18sp" android:textStyle="normal"
android:onClick="selectItem" /
<CheckBox
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Butter" android:id="@+id/checkBox155"
android:layout_marginTop="15dp"
android:textSize="18sp" android:textStyle="normal"
android:onClick="selectItem" />
<CheckBox
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="Cream cheese"
android:id="@+id/checkBox156"
android:layout_marginTop="15dp"
android:textSize="18sp" android:textStyle="normal"
android:onClick="selectItem" />
```

Figure 7. Code segments for select ingredients

Figure 8. Kenyalang's Kitchen select ingredients interface

5.1.2 Kenyalang's Kitchen Find Match result interface

Figure 9 are the partial codes to show the matching recipe from the ingredient available. The interface was shown in Figure 10. The function of this page is to display result to the user. The result will be based on the available ingredients.

```
<Button
android:layout_width="200dp"
android:layout_height="40dp"
android:textAllCaps="false"
android:id="@+id/bunbtton"
android:background="#d1e6fb"
android:layout_gravity="center_horizontal"
android:layout_marginTop="15dp"
android:onClick="finalSelection"
android:text="Find Match!" />
<TextView
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:id="@+id/final_result"
android:text="Matching Recipe"
android:textSize="18sp" />
```

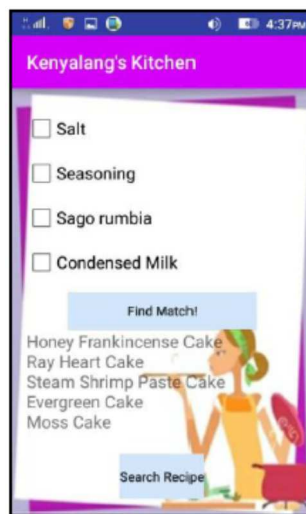**Figure 9.** Partial codes for Find Match result interface

Figure 10. Find Match Result interface

5.2   Testing

Function testing is to test the application functionality and efficiency. This testing is important to ensure there is no problem while running the application. Table 3 showing the test cases that been tested.

Table 3. Test cases that has been tested

Test Cases	Expected Output	Actual Output
Choose Recipe	Show the list of categories of the Kenyalang's Kitchen recipe	Success
Cooking Demonstration	Show the cooking demonstration videos in Kenyalang's Kitchen	Success
Select and Find Match	User choose the ingredients available at home and get match recipe	Success

For User Acceptance Test, 20 users have been selected to test Kenyalang's Kitchen Application. This test is to get feedbacks from the users on how well the Kenyalang's Kitchen Application functions.
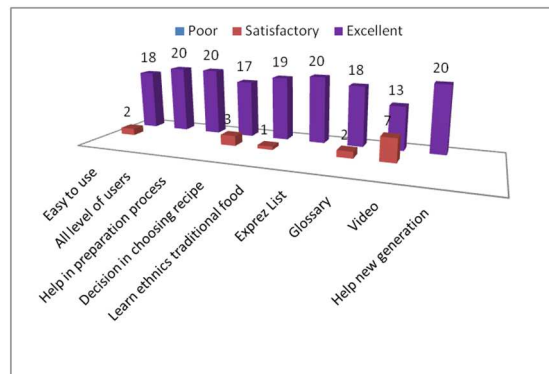
Figure 11. User Acceptance Test Result

From the questionnaire result as shown in figure 11, 13 of the user rate the application as Excellent. All of them said that the cooking demonstration videos are useful. Out of 20 respondents, 90% users ranked the easiness to use Kenyalang's Kitchen as Excellent and agree that 'Glossary' features help user to understand the unfamiliar terms in the application. Besides that, 17 of the users agreed that Kenyalang's Kitchen Application can help in choosing recipe to be prepared based on selected ingredients. All of the users also agreed that 'Exprez List' is really helpful in suggesting recipe list to be prepared in a minimum time.

The results from the user acceptance test, has support the entire objective in developing Kenyalang's Kitchen Application. All of the user agreed that Kenyalang's Kitchen Application can guide the new generation to prepare the traditional food and help to give decision in suggesting recipe. This has clearly support the objective of the project.

6.   Conclusion

In conclusion, Kenyalang's Kitchen application has been developed successfully by achieving the objectives of the project. This application is designed to help the user to cook the traditional recipe of Sarawak, Malaysia. It is designed to improve the user effectiveness and convenience by improving the time to search for recipe. This application also reduce usage of paper to records the recipe and now everyone can try Sarawak secret cuisine using Kenyalang's Kitchen applications.

References

[1]   Jabatan Penerangan Malaysia (2009). "Profil Negeri Sarawak". Retrieved 9 October 2015 from http://pmr.penerangan.gov.my/index.php/maklumat-kenegaraan/9043-profil-negeri-sarawak.html

[2]   Joanna Yap (2013). "Promote kek lapis at national, global levels". Retrieved 9 October 2015 from http://www.theborneopost.com/2013/12/11/promote-kek-lapis-at-national-global-levels

[3]   Bernama (2015). "Keunikan Aiskrim 'Dabai' dan 'Terong Asam' Dari Sarawak". Retrieved 9 October 2015 from http://www.bernama.com/bernama/v8/bm/ge/newsgeneral.php?id=1177494

[4]   Alexandra Sifferlin (2015). "34% of kids Eat Fast Food on a Given Day, study says"Retrieved on 9 October 2015 from http://time.com/4035490/fast-food- kids/

[5]   Paran, R. (2011, January 17). "Ulat Mulong juadah istimewa". Utusan Sarawak. Retrieved on October 17, 2015 from http://ww1.utusan.com.my/utusan/info.asp?y=2011&dt=0117&pub=Utusan_ Malaysia&sec=Sabah_%26_Sarawak&pg=wb_01.htm

[6]   Rose, D. (2010, September 26). "Best of Bario in Miri City".The Star. Retrieved on October 17, 2015 from http://www.thestar.com.my/story/?sec=Sundaymetro&file=%2f2010%2f9%2f26%2fSundayMetro%2f 7084132

[7]   Tariq, A. (2015). "5 Interesting Facts About Android". Prolinked Magazine. Retrieved on October 17, 2015 from http://prolinkedmag.com/tech/5- interesting- facts-about-android/

[8]   Williamson, L. (2011). "The benefits of developing Android applications using commercial Eclipse-based solutions". Embedded Computing Design. Retrieved on October 17, 2015 from http://embedded-computing.com/articles/the-commercial-eclipse-based-solutions/

[9]   Ehimare, K (2014). "Nigerian Recipe". Retrieved on October 17, 2015 from https://apk-dl.com/nigerian-recipes/com.nigerianrecipes

[10]   Gacer, F. G. (2014). "Original Filipino Recipe". Retrieved on October 17, 2015 https://play.google.com/store/apps/details?id=com.fegar.pinoy_recipes

[11]   Fridge Check. (2014). Retrieved on October 17, 2015 from https://play.google.com/store/apps/details?id=com.fridgecheck&hl=en

[12]   Liang, D. Y. (2007). "Introduction to Java programming", Sixth Edition, 2007 Pearson Education, Inc.

Angela Anak Abong et.al (Recipe Planning Application)