Food Recipe Finder Mobile Applications Based On Similarity Of Materials

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Abstract--**The era of technology today has become a bridge that connects humans with all the ease. Many of the activities carried out by humans using technology as a media help, ranging from address search, to shopping. Technology is becomes small things that always included in our daily lives, such as cooking example. This study utilizes a smartphone app called recepiece which has a function as a place to store and search for recipes based on materials owned by the user. By using several methods and approach such as Euclidean distance and Agile development program, this application are designed and develop based on mobile application especially for android smartphone. In this research, several samples are obtained to fill the survey and reviews the application performance include the functionality and non-functionality. The result showed that Recepiece application are capable to be used by user and have better performance although this application are build by using hybrid framework called Ionic. From survey result this application gained 90% approval from user if this application released globally.**

Keywords-- *Android, Cook, Recipe, behavior, log, hybrid, ionic*

I. INTRODUCTION

Food is one of the main human needs. Through food is the source of energy obtained. In its development, food today is not only as a filler of energy needs, but more than that food has become an art and has added value. A wide variety of innovative creations in food have been developed and spread widely. Many of them use only the minimal amount of material to create an original recipe. A recipe is a set of instructions telling you how to prepare and cook food, including a list of what food is needed for [1]. Cooking recipe consists of several aspects including: name, step, tools and materials, time and amount of dish.

Not everyone can memorize well the recipes they want. Their material is also an obstacle in cooking. Limited ingredients also become one of the causes of limited cooking creations, especially for someone who does not have passion in cooking.

In the current era of gadget technology, innovations have been created to help people gather and search for the recipes they want, including a mobile-based app like Cookpad that features to search for recipes based on the name desired by the user. However, there are often conditions where the user has only limited ingredients for cooking. While the applications that exist before it does not provide this feature.

The research we did here is to build a mobile app that has a feature to search for recipes based on material owned by the user. In this app we develop, the user is asked to load the materials owned, then the application will look for recipes that have the material most similar to the material owned by the user. In this research, we also had been reading behaviors performed by the user by recording all activity of what is being done in a logcat. From the logcat data stored then made a analysis based on the most frequently used materials and materials most sought after. From the results of the analysis will be seen the most frequently used food by some people.

There are many studies that utilize user data and computer ability for specific purposes, such as research on public security services [2] to detect a malware from the log activity of an app software [3], computer for controlling a wheelchair [4], and a polyclinic queue application [5].

In this research, the user log in though and in the analysis to produce a certain information presentation which will be useful for the development of the application and also provide benefits to the user user of the application. There are several stages and schemes done in this research, the first user is asked to register an account, then the user is requested to use this application for some time, everything done by the user will be read and recorded by the application. The output of this research is a graphical data info that represents the average of user approval that represent the functionality and non-functionality performance of this application.

II. METHODOLOGY

This research begins with designing and building a mobile application. The mobile app is built with an IONIC framework. The app is designed and built for 1 month. Please note that the application is only used in the regional city of Malang, East Java, Indonesia only. With respondents as many as 10 people. The steps of this study are explained in the next few points.

A. IONIC

Ionic is a framework devoted to building hybrid mobile apps with HTML5, CSS and AngularJS. Ionic uses Node.js, SASS, AngularJS as its engine. Ionic comes with CSS components like buttons, lists, cards, forms, grids, tabs, and more. So Ionic is a web technology that can be used to create a mobile application. Because the hybrid then the application is only made 1 time but can be released on more than 1 platform alias cross-platform. Ionic Using the Opensource license, using the latest web technologies Ionic utilizes AngularJS for its logic implementation that offers fast, native app performance and responsiveness. In addition to the free and opensource Ionic Framework, Ionic also introduced the Ionic Platform. Ionic Platform provides additional services for ionic developers. Ionic Platfrom adds Create, Deploy, Update, Analytics, Marketing (Ionic Market) and Push Notifications features to applications built with Ionic.

B. Agile Development

Agile methods are one of the few methods used in software development. Agile method is a type of short-term system development that requires rapid adaptation and developers to change in any form.

In Agile Software Development interactions and personnel are more important than processes and tools, software that functions more important than complete documentation, collaboration with clients is more important than contract negotiation, and the attitude of responding to change is more important than following the plan.

Agile Method can also be interpreted as a group of software development methodologies based on the same principles or short-term system
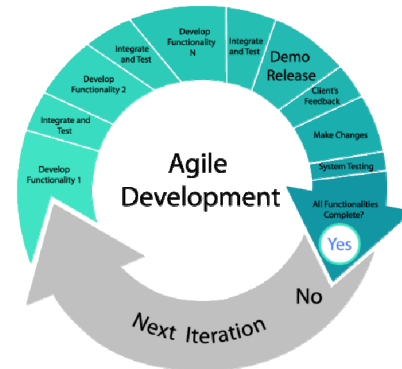

Fig.1. Agile Development Architecture

development that requires rapid adaptation of the developer to changes in any form, as shown in Fig 1.

Agile Method has a way of working close to the user, using this method the user will be able to directly assess the running of the application and what things are missing and need to be added to the application [6] . The pattern is what makes the software stepped by agile has a fast update rate,

C. MySQL Database

The term SQL can be interpreted as a language used to access a data in relational and structured database while MySQL in this case become software or tools to manage or manage SQL by using Query or special language. Basically the database managed in MySQL is not much different from Microsoft Access is a form of tables - tables that contain certain information. The difference lies in the use and management of such databases.

MySQL is classified as an open source software and licensed GPL or General Public License. This GPL license is only aimed at certain software for the purposes of the GNU project, this is the factor of the number of MySQL users worldwide. Besides of easy for use, this software can manage data more effectively because it uses a particular script or language and automatically will be a command to the system.

In the world of websites, the interface or face-to-face form for MySQL is often called phpMyAdmin. This is one of the factors of the relationship between the PHP language with MySQL, especially in terms of web

management. Some examples of MySQL implementation can also be found on E-Commerce, Blog sites or a CMS (WordPress, Joomla, and others).

D. Euclidean Distance

In mathematics, the Euclidean distance or Euclidean metric is the "ordinary" straight-line distance between two points in Euclidean space. With this distance, Euclidean space becomes a metric space. The associated norm is called the Euclidean norm. Older literature refers to the metric as Pythagorean metric. Any Euclidean equations are described in Equation (1).

$$d(p,q) = \sqrt{\sum_{i=1}^{n}(q_i - p_i)^2} \tag{1}$$

E. Application Design

This app is designed using the ionic framework. With this framework, the language used as logic is Javascript with additional CSS and also PHP. There are 4 main features in this application, namely write page, search page and timeline and login, showed in Fig. 2. Before designing the application, mockup design will be added first.

1. Write page

This page has functions for writing or adding recipes. This page can be accessed by any user who already has an account. The results of this recipe written by the user will be reviewed by our
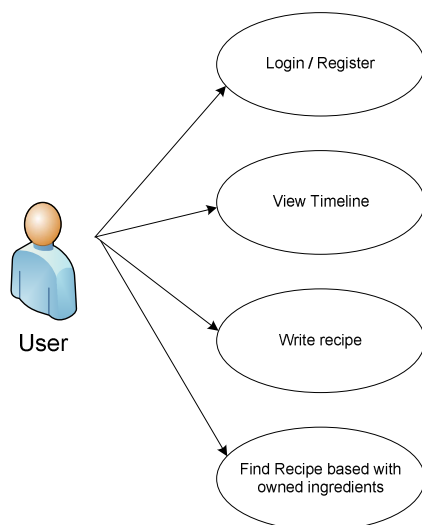
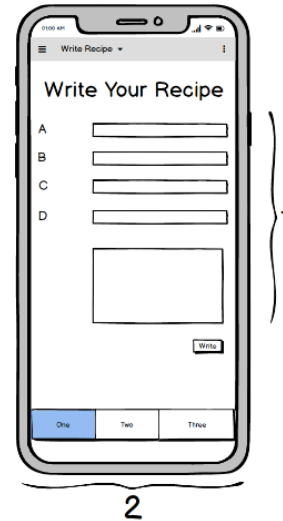Fig. 2. Use Case diagram of Recepiece application

Fig. 3. Write Page design

team and then displayed in the timeline and can be viewed also in access by all users of this application. The page views on this app are shown in Fig 3.

In Fig. 2. Users can fill the number of materials that users have, user can write down the steps in making the cooking according to the material in the step column. Users can also add photos as a complement to user posts.

2. Search Page

In this case, the user can find the recipe that the user needs based on the material that the user has. There are a total of 7 materials that can be used as a reference. The look of this search page is shown by Fig 4.
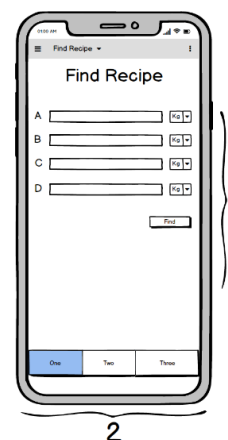
Fig. 4. Search page design

Users can also specify the number of materials in units of Kilo Gram or Gram, the program will automatically convert input provided by the user and look for recipes that have similarity of material with user input in the database.

The method or step used by this application to find the recipe with the most similar material possessed by the user is by applying the Euclidean equation. User input data is first converted into a data vector, then by using Euclidean data is calculated one by one with existing data on the database to know the distance that appears on each data. After that new ranking for each data from the lowest or most similar to the highest distance or the least close to the similarity.

In Equation 1, the value of $d(p, q)$ is the Euclidean distance value from point p to point q. While for each p value and q has a data length of 6 data in accordance with the list of existing ingredients of rice, meat, chicken, eggs noodles and fish. The length of the data is denoted by the value of n, with the value of n itself being 6.

The reason for using Euclidean distance itself is because of its ability to calculate the distance between 2 data vectors. According to statistics, the most common method used to calculate the Euclidean distance vector is with this [7]. In addition, the use of this method is also quite easy to implement in the programming language web or android specifically.

The result of a recipe search will be displayed on a new page called recipe search results. The results will display a list of recipes starting from top to bottom according to the level of similarity. The higher the level of similarity is higher.

3. Timeline Page

This page serves to display a list of dishes created by all users of the Recepiece application
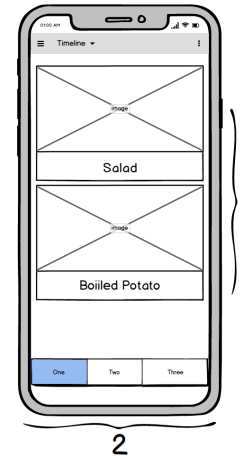

Fig. 5. Timeline page design

user. In this page, newly written recipes will automatically appear and be on the top. Users can view more details by pressing the recipe box in a news release. The display of this page is shown in Fig 5.

F. Database Structure

By using MySQL, the database of this application is built on PhpMyAdmin applications that have been hosted online on a particular web host. The structure of the application database table itself is shown in Fig 6.

From Fig 6 can be seen there are 5 tables namely Table Recipes, Table User, Main Recipe Table, Activity Table and Table Log. Recipes are located and stored in Table Recipes and user data are in Table User. For Table Log and Activity contents list of activities undertaken by the user in this application complete with the time and activities, finished task or recipe that also often seen or selected by user. Through this table later analysis can be done to determine the user's habits and what things done by the user.

Agile Development

The development method used in this application is by using Agile Development. Where there is link between user and us as developer.
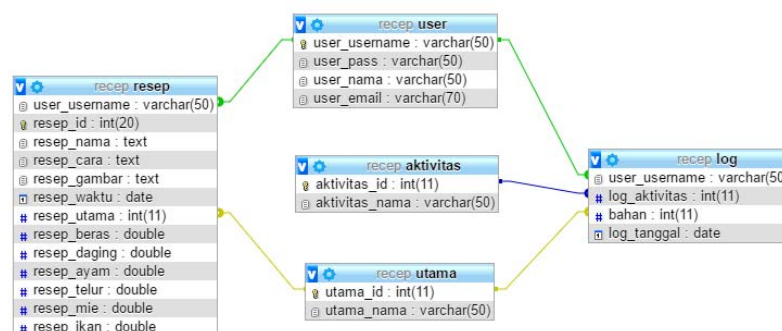

Fig. 6. Relationship design between tables in database recepiece

Each application is finished in release, then the user will immediately try and provide input and input is also in the base of the next development.

III.   RESULT & IMPLEMENTATION

As described in the previous chapter, this research uses several tools to build the application. The steps in the development of this application will be explained in this section.

This app is deployed through chat apps and social media like Whatsapp, Telegram and other popular chat apps. Where the target user is a local user who is in Indonesia. Users are selected randomly regardless of any background.

In this section, the result and analysis has divided into 2 categories, first category is the functional analysis and second is the nonfunctional analysis including the log activities and user behavior. User Interface of this app are shown in Fig.7.

A.   Functional Analysis

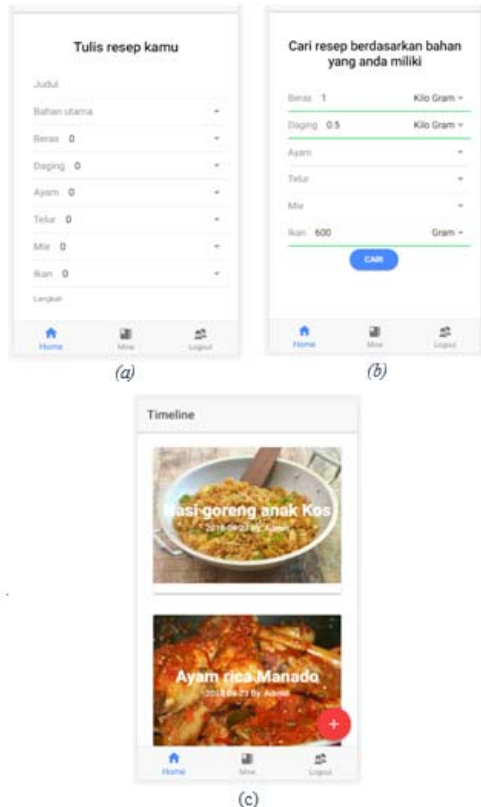Recepiece software build in ionic firmware, in other words it develop by utilize programming

Fig. 7. (a) Write recipe page. (b) Search recipe page (c) Timeline Page
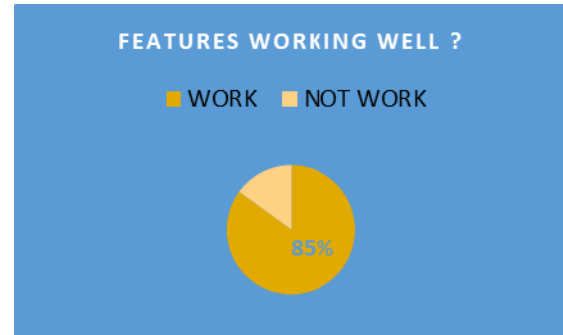

Fig. 8. User responses of Recepiece features

web language and run in native. This size of software when installed on the phone was 10,93

MB included the local storage data like user account and password. By doing functional analytic, software must be sure to run well on the phone.

In this application there are 4 features, with 1 main feature that runs the recipe search feature based on similarity of materials. Testing of this application involves 20 respondents with some questions related to the performance of recepiece applications. Rating forms are randomly shared to users who have signed up and tried features in the recepiece application. Assessment data collection conducted for 3 days by utilizing google form. Questions posed to respondents are related to their opinions about this application and their responses to application features and performance. The results of the ratings are shown in Fig. 8.

According to the Fig.8 it can be found that more than 80% of respondents said the application is feasible to use and has a feature that can work well, the feature in question is a recipe search feature based on similarity of material owned. From the survey results can be obtained conclusion that this application is able to run well. The completeness features are shown in Table 1.

Table 1 shows the functional analytic in recepiece software. From the User Activity Diagram, it can assume that recepiece had 4 main activity including

TABLE 1. FUNCTIONAL FEATURE TESTING OF APPLICATION

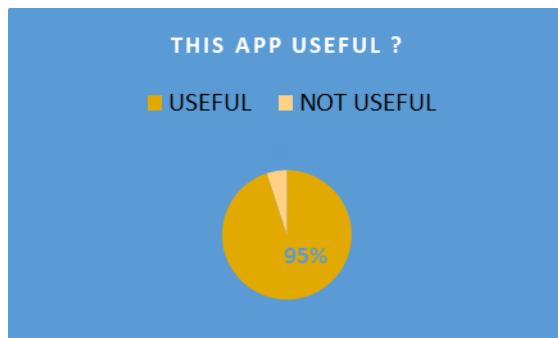| No	Features	Status	Validator	User Agree
1	Login & Register	Work	User	90%
2	Timeline	Work	User	89%
3	Write Recipe	Work	User	81%
4	Find Recipe	Work	User	80%

Fig. 9. User reaction of recepiece released globally

Fig. 10. User reaction of the application beneficial

register, Timeline view, write the recipe and find recipes.

B. Nonfunctional analysis

Nonfunctional analysis contains about the application analysis of the user's interest level, in this section will explain how the application is tested in such a way and get the user's assessment of the appropriateness and condition of the application. in this test the user is required to try to run this application by installing and running it for several days, after which the user is asked to provide their judgment regarding the feasibility of this application to be used and released to the market. User survey result are shown in Fig. 9 and Fig. 10.

IV. CONCLUSION

Recepiece application is an application that moves in the search field, more specifically this application has a function to find recipes online with the basis of similarity of materials owned by the user. With this application users can find recipes with ingredients that match what is owned by the user.

From various surveys and series of tests performed related to the functional Recepiece application, it can be concluded that this application is able to be accepted by the user well.

Regardless of the imperfection of this application, the core features offered can still run well. This is evidenced by the survey results that show about 90% of users agree if the application is released globally.

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