THE DEVELOPMENT OF AN ANDROID-BASED APPLICATION FOR RECOMMENDATIONS ON THE ESTABLISHMENT OF NEW MICRO AND SMALL-SCALE CULINARY BUSINESS IN BANDUNG CITY

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ABSTRACT

Micro and Small Businesses are businesses that can help the country's economy, but when discussing about micro and small home-based businesses, there are often problems regarding planning process making businesses unprofitable, as for issues that are commonly encountered by new businessman are determining consumer segmentation, determine the type of business that is made, and know the market price recommendations, so it takes an application that can help in the process of assisting determine consumer segmentation, provide recommendations on the type of business, and provide recommendations on the selling price of a kind of business. The waterfall method is used in this development, and an Android-based mobile application platform is used with the help of GPS sensors in determining the location of the new businessman. In the development of its recommendations, Promethee-II is used for the recommendation process by using 5 criteria from factors that influence consumers to make a purchase, namely gender, marital status, employment, education and age taken from the sample of consumers of a type of Sundanese cooking business, where the location of the new busniessman determines the recommendation. It was concluded that the application that was built successfully achieved the goal of being able to new businessman to obtain business recommendations in accordance with the location, assist in the process of new businessman determining consumer segmentation, and assist in recommending selling prices according to the type of business.

Keynotes : *GPS, waterfall, Mobile Aplication, Promethee-II, Recomendations.*

1. INRTODUCTION

1.1. Background

Micro and Small Enterprises play a significant role in the economy in Indonesia; this is being proven by the monetary crisis in 1997, where when one by one large company went out of business, these MSME businesses were inaudible and instead became the backbone of the economy at that time [1].

When discussing the traditional culinary industry, it can be said that the majority are hereditary, traditional, and household-scale. However, even though this business is constrained by management, knowledge, marketing, networking, technology, and capital, business actors continue to run their businesses for years also though the business development is not significant [2].

Another problem arises from traditional culinary entrepreneurs because there is no guarantee whether this business can last long or not. Not a few culinary businesses that are open, then out of business in a short time, this is reinforced by the results of a questionnaire conducted by the writer to the citizens of Bandung, with a total of 84 respondents, where evidenced 83% of respondents answered "YES" to questions about the presence or absence of business shut down around the respondent with the reason "lack of buyers" as the first reason, "Discrepancy of culinary sold to the desires of buyers in a location", "Prices that do not match the market price of culinary products sold" as well as other reasons.

From this, it can be seen that lack of planning when opening a business becomes a significant problem, where when correlated with residents as primary consumers, the main factor of the business does not go according to expectations is due to the lack of demand in an area for the business being built, which in fact can be seen from behavioral factors consumers buy a thing, in this typical culinary.

This application will also be made with a Decision support system. The decision support system is an interactive information system which provides information, modeling, and manipulation of data. Even this system is used to help make decisions in semi-structured situations and unstructured situations, where anyone does not know precisely how decisions should be made. [3].

The method used for the recommendation system uses the Preference Ranking Organization Methods for Enrichment Evaluations II, in short Promethee-II, where this method is an outranking method that offers a simple way for users to analyze multi-criteria problems. [4].

Based on these problems, the authors intend to make an application that aims to provide recommendations of relevant factors that can be represented in the data which is a factor of consumers

to buy a traditional culinary product in an area with a primary target consumer in accordance with the location of the new businessman want to open a restricted stall in Bandung.

1.2. Micro and Small Business

As stipulated in Indonesian Law No. 20 of 2008, that Micro Business is a productive business owned by individuals and / or individual business entities that meet the criteria for Micro Business as stipulated in this Law, which has a maximum asset criteria of Rp. 50 Million and has a maximum turnover criteria of IDR 300 million, while Small Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or branch companies that are owned, controlled, or become a part either directly or indirectly from medium businesses or large businesses that meet the Small Business criteria as referred to in this Law where the asset criteria range from Rp 50 million - Rp 500 million and turnover criteria range from Rp 300 million - Rp 2.5 billion rupiah [5].

1.3. Sundanese Traditional Traditional Cuisine

Sundanese traditional cuisine does not only have one taste. Many people assume that Sundanese is famous for its delicious cuisine but wrong. West Java food has a variety of flavors that will not make you bored.

The eight most popular foods following the questionnaire filled out by 101 residents of Bandung are as follows in sequence, namely: Rice Liwet, Batagor, Seblak, Lotek, Kupat Tahu, Surabi, Siomai and the last is Rice Timbel.

1.4. Google API

The Google API is a set of application programming interfaces created by Google that enables communication with Google Services and their integration into other services. Examples include Search, Gmail, Translate, or Google Maps. Third-party applications can use this API to utilize or extend existing service functionality.

The services that are often in the development of this application are Google SDK for Android, Google Maps Javascript, Place API, and Geocode which in particular is the Reverse Geocode [6].

1.5. Android

Android is an operating system that initially had a Linux base, which was designed for touch-layer mobile devices such as smart computers and tablet computers. Android itself was developed by the company Android, Inc., with capital support from Google, which then bought it in 2005. The Android operating system and later released in 2007.

Some of the main features of Android include WiFi, Multi-touch features, Multitasking, GPS, accelerometers, java support, and support for multiple networks (GSM / EDGE, IDEN, CDMA, EV-DO, UMTS, Bluetooth, WiFi, LTE & WiMAX) and also the necessary capabilities of mobile phones in general [7].

1.6. Laravel

Laravel is a Hypertext Preprocessor (PHP) programming language framework aimed at developing web-based applications by applying the Model View Controller (MVC) concept. Taylor Otwell created this framework and was first released on June 9, 2011. Laravel is a licensed open source, which means free to use without having to make payments [8].

1.7. MySQL

MySQL is a SQL database management system software or known as a DBMS (database management system); this database is multithreaded, multi-user. The strength of MySQL is not supported by a community, such as Apache, which is developed by the general population, and their respective owners own the copyright for the source code, but MySQL is fully supported by a professional and commercial company, namely MySQL AB from Sweden [9].

1.8. Promethee-II Method

The outranking method based on the Preference function is a particular type of MCDM tool that can provide ranking options for decision making. The PROMETHEE II method can obtain a full ranking of alternatives derived from predetermined criteria. In this paper, the PROMETHEE II method is used to get a comprehensive ranking of alternatives for a particular application.

The procedural steps, such as those involved in the PROMETHEE II method, are as follows:

Step 1: Normalize the decision matrix using the following equation:

$$R_{ij} = \frac{[X_{ij} - \min(X_{ij})]}{[\max(X_{ij}) - \min(X_{ij})]} \; (i = 1,2,\dots,n; j = 1,2,\dots,m) \quad (1)$$

where Xij is the i-th alternative performance measure concerning the j-th criterion.

For unfavorable criteria, Eq. (1) can be rewritten as follows:

$$R_{ij} = \frac{[\max(X_{ij}) - X_{ij}]}{[\max(X_{ij}) - \min(X_{ij})]} \quad (2)$$

Step 2: Calculate the evaluative difference of alternative i concerning to other alternatives. This step involves calculating the difference in the value of the criteria between various alternative pairs.

Step 3: Calculate the preference function, $P_j(i, i')$.

This is the following simplified preference function is adopted here:

$$P_j(i, i') = 0 \; if \; R_{ij} \leq R_{i'j} \quad (3)$$

$$P_j(i, i') = (R_{ij} - R_{i'j}) if \; R_{ij} > R_{i'j} \quad (4)$$

Step 4: Calculate the aggregate preference function by considering the criteria weights
Aggregated preference function,

$$\pi(i,i') = \frac{[\sum_{j-i}^{m} W_j \, x \, P_j(i,i')]}{\sum_{j-i}^{m} W_j} \qquad (5)$$

where wj is the relative importance (weight) of criteria j.
Step 5: Determine leaving and entering the outranking current as follows:
Leaving or positive flow for the I alternative,

$$\varphi^{+}(i) = \frac{1}{n-1}\sum_{i'}^{n} \pi(i,i') \qquad (i \neq i') \qquad (6)$$

Entering or negative flow for the alternative I

$$\varphi^{-}(i) = \frac{1}{n-1}\sum_{i'}^{n} \pi(i',i) \qquad (i \neq i') \qquad (7)$$

where n is the number of alternatives.
Step 6: Calculate net outranking flow for each alternative.

$$\varphi(i) = \varphi^{+}(i) - \varphi^{-}(i) \qquad (8)$$

Step 7: Determine the ranking of all alternatives considered depending on the value φ (i). The higher the value φ (i), the better the choice. Thus, the best option is one that has the highest φ (i) value [8].

1.9. Purpose and Objective

The purpose of this research is to build an application that can recommend a Sundanese culinary business for micro and small business types based on decision making based on relevant factors. The purpose of this study is as follows..

1. Assist candidates in opening a culinary business in determining consumer segmentation.
2. Assist candidates in opening a culinary business in determining the price of a recommendation to sell Sundanese culinary specialties.
3. Assist candidates in opening a culinary business in deciding the Sundanese culinary that is sold according to location or place

1.10. Research Methodology

Research methodology is a process used to solve a logical problem, which requires data to support the implementation of a study. This research method has two stages, namely the stage of data collection and the stage of software development.

Research methodology has been implemented on the implementation on this System, and had been tested on some test to make the final conclution of this research.
The following is the research flow:

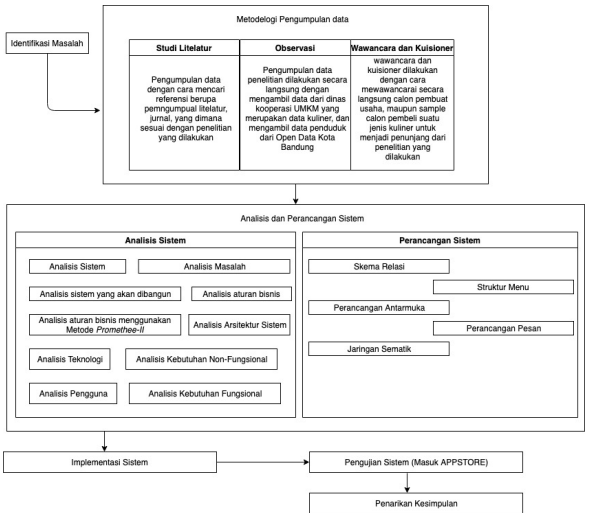

Figure 1. Research Metodelogy

2. Research Content

2.1. System Architecture

The system will be built with two web and mobile systems, plus one API system for mobile devices. The web system serves to process data so that the data for processing is appropriately maintained, the mobile system functions as a medium for prospective business makers to get recommendations and materials to be negotiated in the planning process when doing a business, while the mediator between the processing of mobile application processing with the database is the system API that outputs JSON, where all cumbersome processes will be run here.

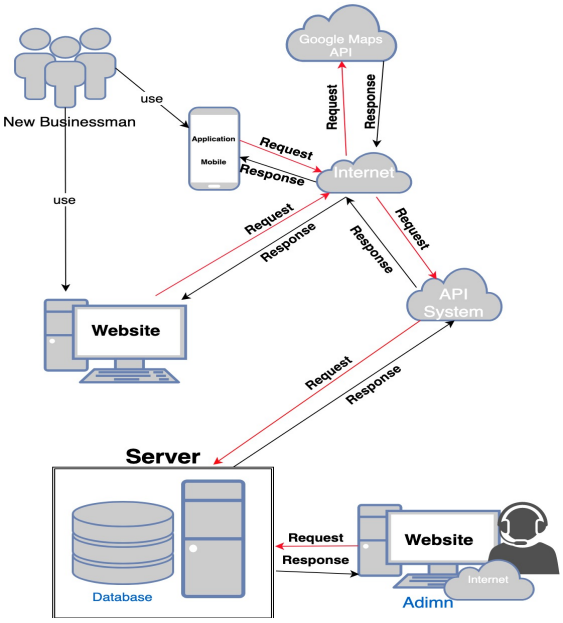

Figure 2. System Architecture

2.2. Problem Analysis

Based on the problems that have been described in chapter 1, here is the point of the problem in this study, namely:

1. New Businessman difficulties in determining consumer segmentation

2. New Businessman difficulties in determining the price of recommendations to sell Sundanese culinary specialties
3. New Businessman difficulties in deciding the Sundanese culinary sold according to location or place.

2.3. Analysis of the procedure to be built

The system to be developed is a system design that can assist the Planning process carried out by prospective entrepreneurs, although not fully assisted by the system design

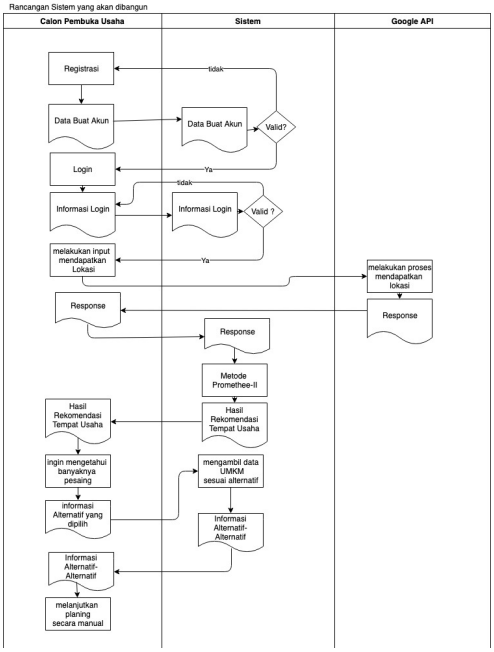

Figure 3. Analysis of the procedure to be built

2.4. Technology Analysist

Technology analysis aims to find out what technology will be used in a system that is built. The technology used in the system that was built include:

1. GPS sensor analysis

In the design of making its own application, one of the sensors that will be used is GPS technology which is used to get the user's location or device from its personal user, from which the coordinates will be processed into something useful to be used in obtaining villages, or districts where taken with the requirement to know in advance about the longitude and latency first.

2. Analysis of Google Maps APIs

Actually in Google Maps API provides several API features that can be used in the development of its own application, here what needs to be done first is to register with the Google Cloud Platform to get an API key to use the API features provided in the Google Maps API, after completion register yourself, then do an addition dependency so that the API can be used in this Business Account application.

As said before, the Google Maps API provides various features that can be used by developers.

3. Analysis of the JSON API application

JSON is a concise format of computer data exchange that is easily understood by humans because it is text-based, in the process of data communication in the Business Account application, there are several modules. Connections made by mobile devices lead to the fire address at http://rekusaha.com/api. These modules are broadly classified into sections..

2.5. *Promethee-II Method Analysist*

In decision making recommendations, there are 5 criteria taken for the decision making process, where these criteria are taken from the first highest factor of the factors that influence consumers which are obtained from the Business Management Journal which discusses the factors that influence consumers in the purchase of snacks. traditional in the city of Malang.

The 5 criteria in this factor are age, occupation, education, marital status, and gender.

2.6. Analisis Kebutuhan Fungsional

The functional requirements specification will describe the system services that must be provided. The functional requirements specifications can be seen in the following figure:

Table 1 Functional requirements specifications

No	Functional Requirements Specifications
SKPL-F-001	The system provides registration for prospective business makers
SKPL-F-002	The system provides prospective business makers the ability to login
SKPL-F-003	The system provides prospective employers the ability to recover their account if Forgot Password
SKPL-F-004	The system provides prospective business makers can change the password if desired
SKPL-F-005	The system provides prospective business makers with the ability to fill in forms to optimize application recommendations
SKPL-F-006	The system provides prospective business

No	Functional Requirements Specifications
	makers with an alternative recommendation for Sundanese traditional food and the recommended price according to the demographic location of the prospective business maker
SKPL-F-007	The system provides prospective business makers to be able to see the number of competitors from a traditional Sundanese food type in accordance with the location of prospective business makers
SKPL-F-008	The system provides for prospective resident data workers according to the location of the prospective businessman.
SKPL-F-009	The system provides prospective business makers the ability to log out from an account

2.7. Use Case Diagram

Use Case Diagrams are used to illustrate the interaction between actors and activities contained in the system being built. By describing the Use Case Diagram, the functional functions contained in the system.

The system can be seen briefly. The Use Case Diagram on a mobile system built can be seen as follows:

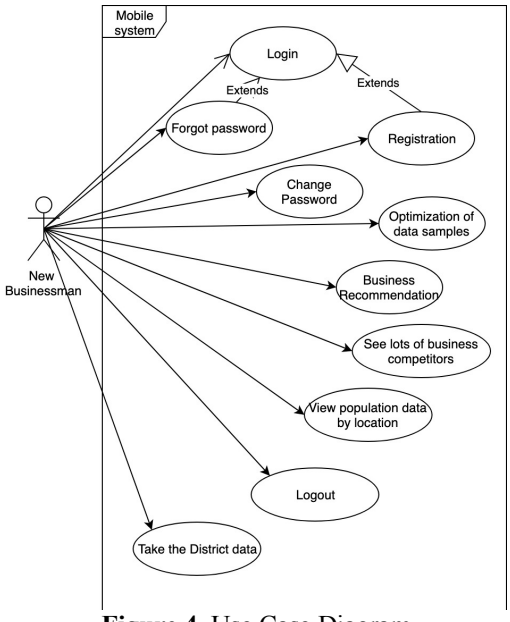

Figure 4. Use Case Diagram

The identification of the usecase diagram is as follows:

Table 2. Usecase Identification

No	Use Case	Aktor	Description
1	Registration	New Businessman	The functionality to register to be able to create an account
2	Login	New Businessman	Functionality to enter the Mobile application using the account that has been created.
3	Forget Password	New Businessman	The functionality to recover accounts that forgot their password
4	Change Password	New Businessman	The functionality to change old passwords into new passwords
5	Data Sample Optimization	New Businessman	The functionality to provide feedback data for applications so that the recommendations are more optimal.
6	Business Recommendations	New Businessman	Functionality to provide business recommendations that can be made based on location.
7	Seeing Many Competitors	New Businessman	Functionality to see the number of competitors in the location.
8	View population data by location	New Businessman	Functionality to view population data as processed material for the business planning process.
9	Logout	New Businessman	Functionality to exit accounts

2.8. Perancangan Arsitektur menu

The architecture design itself is made so that the design can be seen more flow to interpret the application to be built, therefore the architectural design is made as follows:

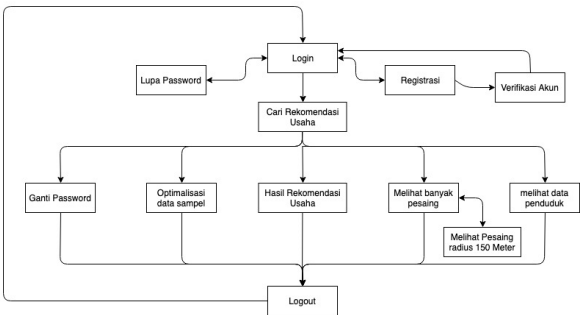

Figure 5. Menu Structure

3. CLOSING STATEMENT

3.1. Conclution

Based on the results of research that has been done and refers to the research objectives, the following conclusions are obtained::

1. Applications built in this study canhelp aspiring new businessman in Determine consumer segmentation..
2. Applications built in this study can help aspiring new businessman in Determine the price of a recommendation to sell Sundanese cuisine.
3. Applications built in this study canhelp aspiring new businessman in determine the type of Sundanese culinary sold according to location or place

3.2. Advice

In supporting the further development of the system, there are several suggestions given based on the results of this study, namely::

1. Add a chat feature prospective business opening with entrepreneurs to become information-sharing media
2. Develop an application not only to recommend businesses that only exist in Bandung..

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