Implementation of Geographic Information System for Micro, Small, and Medium Enterprises (MSMEs) in Lampung Province using Android Platform

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Implementation of Geographic Information System for Micro, Small, and Medium Enterprises (MSMEs) in Lampung Province using Android Platform

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Abstract. Micro, Small, and Medium Enterprises (MSMEs) is one of a great contributor for Indonesian economy, but there are still many MSME actors who have difficulties in developing their business due to lack of knowledge about the use of technology to promote their products. On the other hand, the government also has difficulty obtaining MSME data because MSME actors are not all cooperative. This research offers a solution of the problems that have been described previously by developing Mobile Based Geographic Information System for Mapping Micro, Small, and Medium Enterprises. It is expected to help not only MSME actors to promote their products but also the government to collecting data. In addition, this system is also expected to assist users in obtaining information along with the location of MSME. This research has successfully generate Mobile Based Geographic Information System for Mapping Micro, Small, and Medium Enterprises by using Android platform. System testing result shows that Mobile Based Geographic Information System for Mapping Micro, Small, and Medium Enterprises has been successfully built and match the expected requirements.
Keywords: geographic information system, android, micro small medium enterprises

1. Introduction

Since the monetary crisis in 1997, MSMEs (Micro, Small and Medium Enterprises) continued to experience growth even though their growth was not as fast as before 1998. MSMEs were said to have a large role for the Indonesian economy. This was seen when the monetary crisis in which at that time one by one big company out of business, SMEs just do not falter and become the backbone of the Indonesian economy at that time [1]. Nonetheless, there are still many MSMEs struggling to expand its business.

One aspect that can help business development is promotion. Promotion is how to communicate the goods and services on offer so that consumers know and buy. With the existence of good promotions, the products produced will be better known by the wider community and of course can increase sales profits so that businesses will be more developed [2].

One way of promotion that is widely used today is through the internet. However, most MSME players still have not been able to make good use of this. The main reason is their ignorance to take advantage of internet as media in the promotion[3] or social media promotion[4].

In addition, according to Central Bureau of Statistics of Lampung Province, the government is also experiencing difficulties in record distribution of MSMEs caused by the data of MSMEs are sometimes invalid. Then, the lack of available funds also create difficulties governments conduct surveys directly to the locations of existing MSMEs. This led the government has not been able to manage and develop its full potential MSMEs.

In this regard, the concept of Geographic Information Systems (GIS) was chosen because it is a computer system that has the ability to build, store, manage, and display information with geographic reference[5]. Representation of GIS information considered to be better, especially in showing the geographical information of MSMEs[6].

This research was developed an application Geographical Information System (GIS) Distribution of MSMEs Using the Android platform to provide complete information along with the location of MSMEs. This would be a good medium for the promotion of MSMEs as it can connect between MSMEs with the user / consumer end products of SMEs directly. Through the data input directly by MSMEs, the data collection process that is usually done by the government will be easier. The government can better focus on data analysis for the potential development of MSMEs.

2. Materials and Methods

System development method used in this research is the prototyping Model. The steps taken in the prototyping model are shown in figure 1.

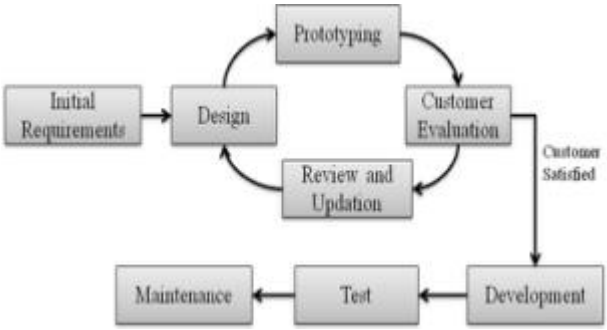

Figure 1. Prototyping Model

The Advantages of this model are when prototype Model is shown to the user, he gets a proper clarity about his requirements. And feel the functionality of the software, so can suggest the changes and modifications and It reduces risk of failure, as potential risks can be identified early and steps can be taken to remove that risk [7]. The explanation of Initial Requirements in this study are as follows.

2.1 Listening to Customers (Collection Requirements)

This stage collects the initial needs of the system to be built covering functional and non-functional requirement.

2.2 Functional requirement.

Functional requirements relate to the input and output processes of the system. The specifications for the functional requirements of this system include the following.

- User of this system is Perpetrators of MSMEs and customers.
- The system can perform a search of MSMEs.

- The system can perform a search of products or raw materials.
- The system can perform MSMEs and product management.
- The system can display the location of the distribution of MSMEs in the form of a digital map.
- The system can show you directions to the location of MSMEs.
- The system can show the products belong to MSMEs.
- The system can record user product expectations.

2.2.1 Non- Functional requirement.

Non-functional requirements describes the specification of non-functional requirements of the system, as follows:

- usage requirements
  - The system is easy to use.
  - Interface of the system should be friendly for the user.
- performance needs
  - The system has good security.
  - The system can do all the processes in a relatively fast time so it does not make users wait long.

2.3 Develop the Prototype

At this stage, the system was design using UML (Unified Modeling Language) which consist of Use Case Diagrams, Activity Diagrams and Class Diagrams. In addition, the system interface is also designed. Use case Diagram of Geographic Information System for MSMEs Mapping of can be seen in figure 2.

Figure 2. Usecase Diagram

Based on Use case diagram in figure 2, the entire system needs have been met by the existing functional in Use case Diagram. User requirements mapping can be seen in table 1.

Tabel 1. User Requirement Mapping

Actor	Use Case	User requirement
MSMEs Perpetrators and customers	display the location of MSMEs	System can display the location of MSMEs
	Show directions to the location of MSMEs	System perform directions to the location of MSMEs
	Searching for MSMEs	System can search for MSMEs
	Display MSMEs Products	System can displays MSMEs Products
	Display MSMEs profile	System can displays MSMEs profile
	Record the rating and feedback from customers on MSMEs and products	Customer can give rating and feedback on MSMEs and products and system record them
	Record favorite products	Customer can adding their favorite or expecting products
MSMEs Perpetrators	perform MSMEs profile	System can displays MSMEs owner profile
	perform MSMEs management/ business management	System can displays MSMEs business
	Perform product management	System can perform MSMEs products management

2.4 Testing

System testing is carried out using the Black Box Equivalence Portioning test method where this test is carried out by dividing the input domain into classes so that the test case can be obtained [8]. Some other tests performed include testing the Android version, screen resolution testing and screen density, and application menu functional testing [9,10].

3. Results and Discussion

The following are the display interfaces of the geographical information system application of MSMEs that have been successfully built along with an explanation of each feature.

Home Page

The home page is the main page of the application. There are several sections shown on this page, the latest products, the most popular products, and MSMEs. In each section only displays eight items and if you want to display the entire item, users can click on the "View More" text in the upper right corner of each section. The home page view can be seen in figure 3.

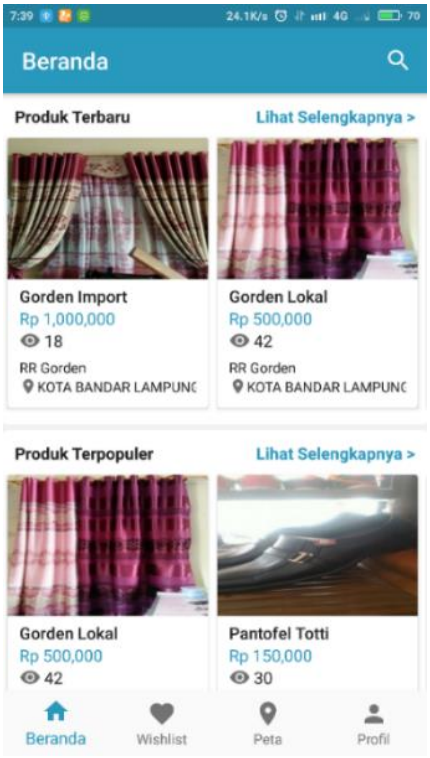

Figure 3. Home Page View

3.1 MSMEs Map Page

The map page is a page that displays maps that are equipped with markers that show the distribution of MSME locations, especially those in Lampung Province. If the marker of one of the MSME is touched, it will display brief information from the MSME and will display the navigation icon in the lower right corner of the map. When the navigation icon is touched, the application will open Google Maps which will display navigation to the selected MSMEs so that it can connect between MSMEs and customers who want to visit these MSMEs. The view of the map page can be seen in figure 4.

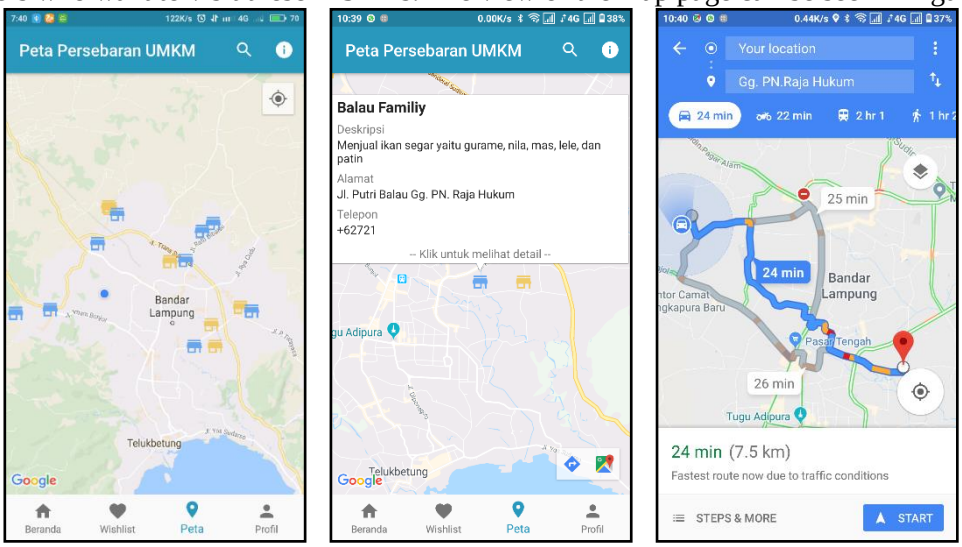

Figure 4. MSMEs Map Page

3.2 Profile Page

Profile page is a page that displays menus such as personal data, manage the business, product management, settings, and help. The difference between a Customer account and a MSME Actor is the absence of a product managing menu and managing a business on a Customer account. Display profile page can be seen in figure 5.

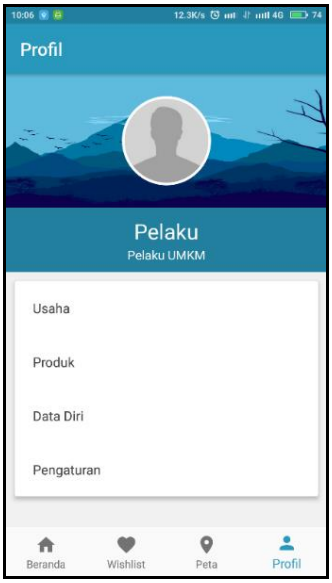

Figure 5. Profile Page

3.3 The Product Detail Page

The product detail page is a page that displays detailed information about the product selected by the user. The information displayed includes product photos, product names, product prices, product descriptions, product seller, general product features, and product specifications. The display of product detail pages can be seen in figure 6.

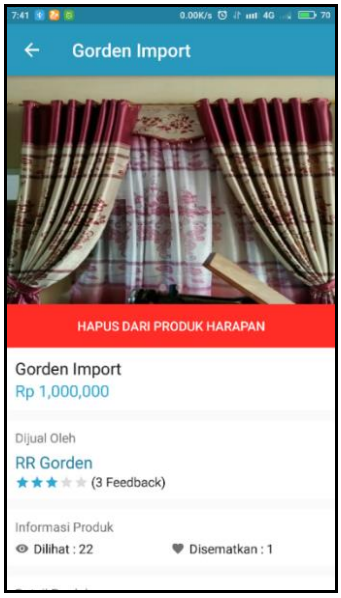

Figure 6. Product Detail Page

3.4 The Business Detail Page

The business detail page is a page that displays detailed information from a MSME. This page can serve to help the promotion of a MSMEs because it contains important information from MSME mainly product and rating that it is essential for customers. In addition there is also a telephone number that can be directly contacted by touching the existing telephone icon so that it can connect directly between the customer and the concerned MSME. Display of business detail pages can be seen in figure 7.

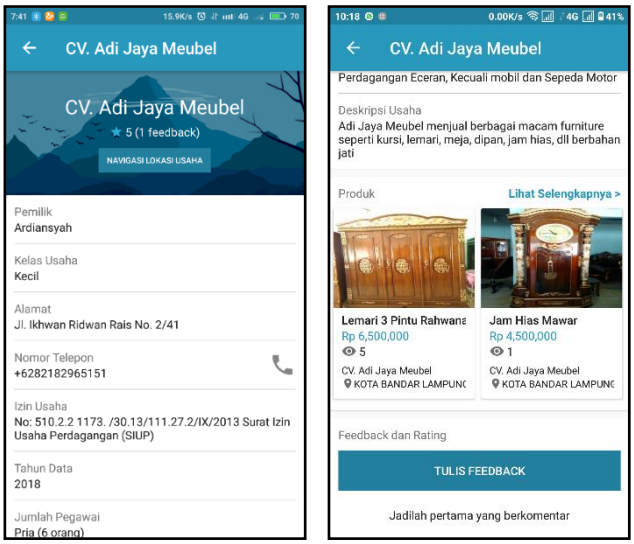

Figure 7. The Business Detail Page

Based on the tests that have been carried out, the expected results are in accordance with the actual results, so it can be said that the system that is built can function in accordance with the needs of users. In addition, non-functional testing is carried out through user satisfaction surveys to 41 respondents using a Likert Scale and results obtained as shown in table 2.

Table 2. Results of User Satisfaction Survey

No.	Question	Scale					Total	Average (%)
		5	4	3	2	1		
1	The application can run well on the Android version used	24	14	3	0	0	185	90.24
2	Applications can display MSME products well	29	10	1	1	0	190	92.68
3	The application can display product details well	20	17	4	0	0	180	87.80
4	Applications can do product searches well	24	14	3	0	0	185	90.24
5	The application can display a list of MSMEs well	25	11	5	0	0	184	89.76
6	The application can display MSME details well	20	18	3	0	0	181	88.29
7	The application can run the	20	18	3	0	0	181	88.29

No.	Question	Scale 5	4	3	2	1	Total	Average (%)
	navigation function to the location of the selected MSMEs							
8	The application can display the UMKM distribution on the map well	19	17	4	1	0	177	86.34
9	Applications can store the product expectations/ favorites well	21	15	4	1	0	179	87.32
10	The application can store ratings & feedback on MSMEs well	24	12	4	1	0	182	88.78
11	The application is easy to understand so it's easy to use	28	9	4	0	0	188	91.71
12	the text in the Application is easy to read	27	10	4	0	0	187	91.22
13	Application interfaces are convenient to see	21	14	6	0	0	179	87.32
14	Application display proportional to smartphone screen resolution	24	9	8	0	0	180	87.80

Likert Scale and its statement used in the test:
5: Strongly Agree
4: Agree
3: Neither agree nor disagree
2: disagree
1: Strongly disagree

Based on the Likert scale assessment category, the test results are categorized as “Very Good” with an average value of 89.13%.

4. Conclusions

From the results of research conducted conclusions can be drawn as follows.

- This system has succeeded in displaying the spread of MSMEs in Lampung Province in the form of digital maps. In addition, the system has also succeeded in displaying the products of a MSME along with product detail information, displaying detailed information from a MSME, as well as performing navigation function to the MSME location.
- Based on the results of testing, the MSME Mapping Information System can run well on the Android 4.0 - 4.0.4 (Ice Cream Sandwich) version and above.
- Based on the results of the testing, the display of the MSMEs Mapping Information System is appropriate and proportional to all types of screen resolutions tested.
- The final results of testing using a Likert scale get the Very Good category with an average value of 89.13%.

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