WEB-BASED GEOGRAPHIC INFORMATION SYSTEM FOR LAMPUNG GIFT STORE

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Abstract

In the face of increasing technological advances, the development of society refers to the ability to keep up with technological developments and the ability to access and present useful information. Lack of information and knowledge about the location of the gift store makes the public or tourists only visit the nearest store or those suggested by friends and people around. This study aims to develop a web-based geographic information system to make it easier for people to find the location of Lampung gift store. In this study using extreme programming as a development method. Based on the results of testing ISO 25010 that has been carried out involving 50 respondents, the conclusion that the quality of the software produced has a success percentage with a total average of 90.66%. So it can be concluded that the percentage value obtained shows the overall software quality has a "Very Good" scale and is feasible to use.

Keyword: *extreme programming, geographic information system, gift store, ISO 25010*

1. Pendahuluan

Lampung is the southernmost province on the island of Sumatra with the capital city Bandar Lampung. Like many other cities in Indonesia, Lampung has local specialties, either goods or food. Lack of information and knowledge about the gift store location makes the public or tourists only visit the nearest store or those suggested by friends and people around. Thus, other lesser-known gift stores are rarely visited [1]. This also happens to gift stores that sell goods or typical Lampung food, especially in Bandar Lampung.

Information technology that is increasingly advanced and developing has a vital role in all aspects of life. One aspect of developing technology is internet technology that can build navigation applications to help users find locations [2]. Geographic Information System (GIS) is a location-based service that can be described as a service at the confluence of three technologies, namely Geographic Information System, Internet Service, and Mobile Devices. By utilizing GPS technology, this GIS system can determine the position based on the geographical point of the user's location and the intended location [3]. By utilizing GPS technology, this GIS system can determine the position based on the geographical point of the user's location and the intended location [3].

GIS has been widely applied in several case studies, namely mapping the location of typical Samarinda gift stores which results in that GIS can help provide information on mapping the location of gift stores scattered in Samarinda City [1]. GIS can also facilitate the mapping of public services such as mapping of public facilities [4], specialist doctor practices [5], mosques [6],

car repair stores [7], as well as culinary, arts [8], and culture [9]. In addition, GIS can also provide information on mapping natural resources [10], plantations [11], [12] to environmental quality [13]. Location mapping and information on typical Lampung gift stores can use GIS.

This study aims to develop a geographic information system to make it easier for people to find the location of gift stores. The system development method applied is the extreme programming method, which includes planning, design, coding, and testing stages. The system was developed using the PHP programming language to produce a web-based information system and utilize the Google Maps API for mapping geographic locations. As a development of previous research, the geographic information system developed will provide a rating feature in this study. This system is expected to make it easier for the public to obtain information on typical Lampung gift stores and search features and the nearest route.

2. Method

The study case is Bandar Lampung City, which requires a system to make it easier to search for stores. The observations stated that the community and tourists were still having difficulty knowing the place and information of the typical Lampung store. System development in this study uses the Extreme Programming method shown in Figure 1.
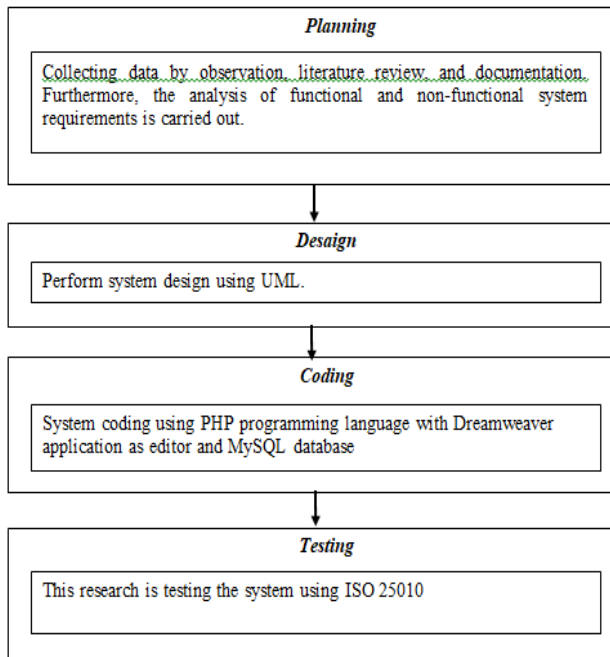
Planning

Collecting data by observation, literature review, and documentation. Furthermore, the analysis of functional and non-functional system requirements is carried out.

Desaign

Perform system design using UML.

Coding

System coding using PHP programming language with Dreamweaver application as editor and MySQL database

Testing

This research is testing the system using ISO 25010

Fig 1. Research stage

Based on Figure 1, here is the explanation.

2.1. Planning

At the planning stage, there is a questionnaire to the public to determine the needs and features developed into the system. The steps taken on planning are:

1. Data collection was conducted by observing how the community is in search of information about searching for gifts in Bandar Lampung. The observation documentation was carried out through the deployment of the questionnaire to obtain information and knowledge of respondents about gift stores in the city of Bandar Lampung.

2. Analysis of system requirements is also carried out by deployment of the questionnaire to find out the features needed on the system.

2.2. Design

Business process design in software development aims to construct a system that satisfies the functional requirements specifications [14], [15]. Unified Modeling Language (UML) is used at the design stage, namely Use Case and Class Diagram. After analysis, what needs are needed by the user in the geographical information system of typical geographical stores in the city of Bandar Lampung. The Use Case and Class diagram can be seen in Figure 2-3.

Based on UML design in Figure 2 and Figure 3, users in the system are divided into three roles: admin, store owner, and customer. Admin has access rights to log in, manage store, instructions, customer, store owners, comments and ratings, chat, and receive / store validation. The store owner has access rights to search the store's location (distance, route, and travel time), register, login system, chat, see help, see the instructions, and register the store. While the customer has access rights to search the store's location (distance, route, and travel time), register, login system, chat, give a rating, and comment.

2.3. Coding

At this stage, apply to design into a web-based geographic information system with the help of the Adobe Dreamweaver application. Web-based system development is carried out using the PHP programming language. Also, components needed to build this system include the MySQL database, bootstrap framework, and google maps API. The following is an explanation of each of these components.

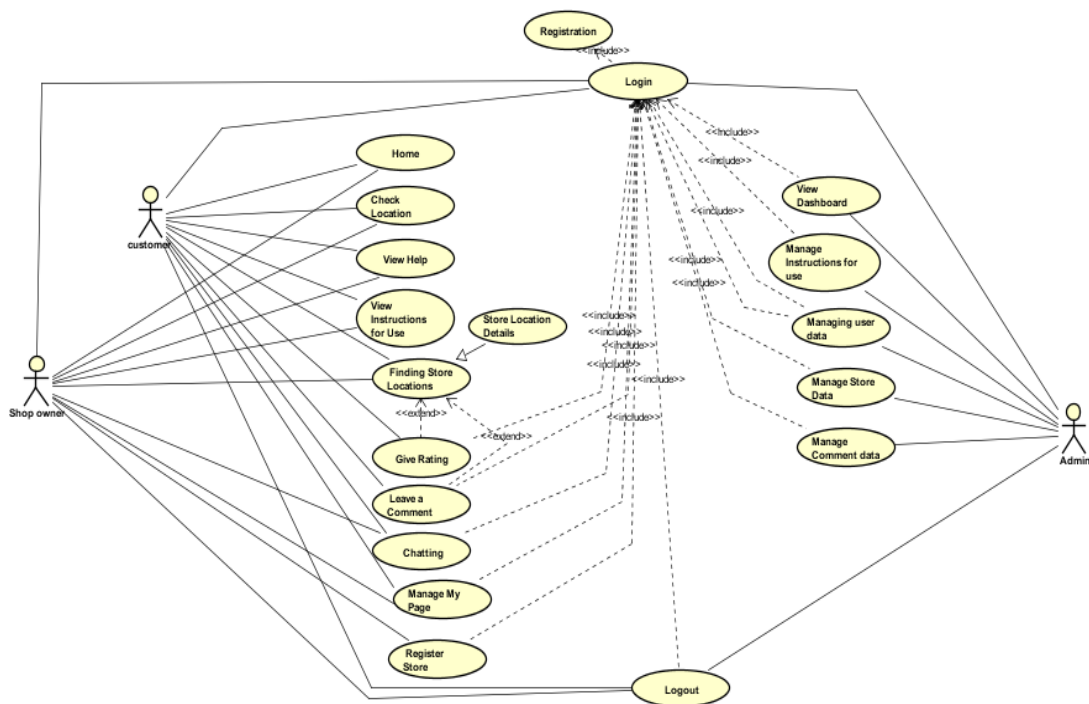1. PHP programming as the backend framework to

Fig 2. Use case diagram

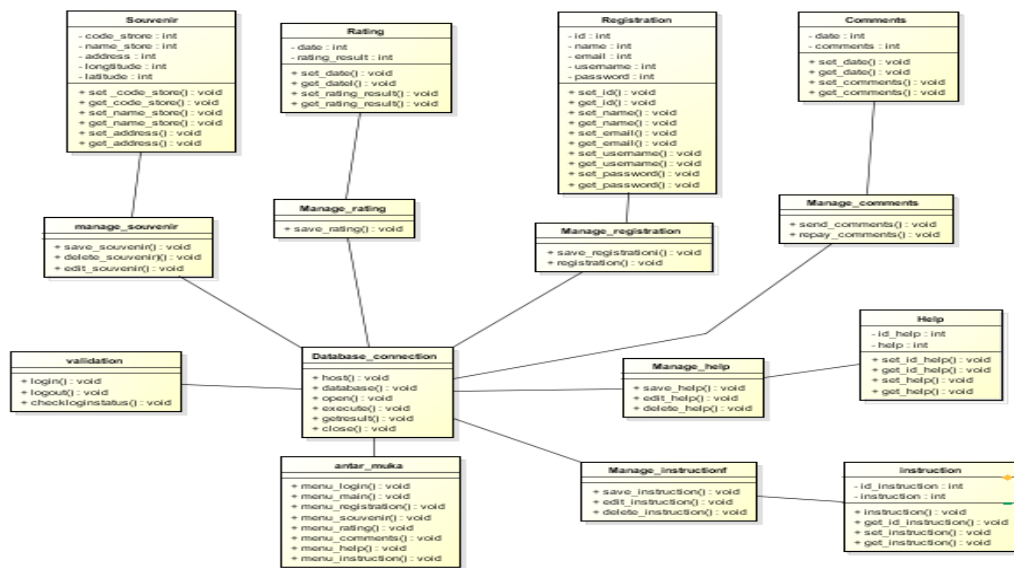integrate database and the user interface.

Fig 3. Class diagram

2. MySQL database as the storage for data used, such as spatial (longitude and latitude) and non-spatial data (store name, description, etc.).
3. Bootstrap framework as the front end to provide web-based interface.
4. Google maps API is used as the frontend of map at web-based interface

2.4. Testing

The analysis is carried out in the form of a conclusion from the system testing. The conclusion will be obtained on the geographic information system's performance and feasibility for Lampung gift store areas mapping. This study carried out testing using the ISO 25010 method with a functional aspect of suitability, usability, reliability, performance efficiency, and maintainability aspects. The selection of five of the eight aspects is an adjustment to the needs of the desired application [16]. The following is the formula for calculating the testing percentage in Equation 1 [17].

$$Testing\ (\%) = \frac{Actual\ score}{Ideal\ score}\ x\ 100 \qquad (1)$$

The actual score is the result of the answers of all respondents from the questionnaire given. Meanwhile, the ideal score is the highest value from the questionnaire provided. The test results obtained are then calculated using Equation 1, followed by an interpretation of the system's feasibility based on the Likert scale to get conclusions and suggestions for future development. The following is a range of interpretation criteria based on ISO 25010, shown in Table 1 [18].

Table 1. Interpretation score range

Range (%)	Assessment
0-20	Very poor
21-40	Poor
41-60	Slightly not good
61-80	Good
81-100	Very good

3. Result and Discussion

3.1. GIS for Lampung Gift Store

The following are menu page examples that have been developed:

1. The main menu is a home page that displays the customer and store owner's location and contains links to the login menu, instructions for use, help, and store search. The customer's main menu display can be seen in Figure 4.

Fig 4. Main menu

2. The rating and comments menu displays comments and ratings on a store. The comments and customer ratings menus are divided into two: customers who have not logged in can only see comments and ratings, and logged-in customers who can provide

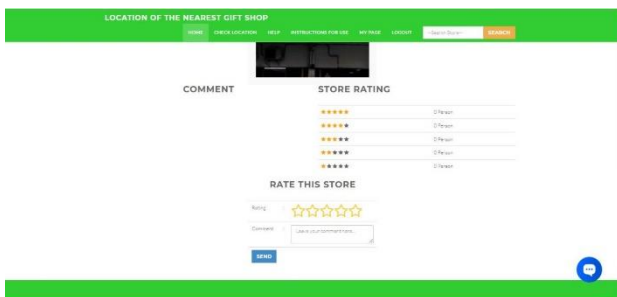comments and ratings. The display of the rating and comments menu can be seen in Figure 5.

Fig 5. Rating and comment menu

3. Login Menu to enter the system, containing username and password input and a registration link for customers or store owners who do not have an account. The login menu display can be seen in Figure 6.
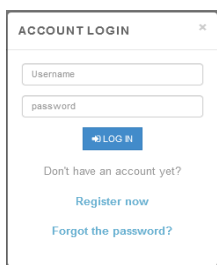

Fig 6. Login menu

4. Store data menu to display store data that has been inputted and registered by the store owner. In this menu, there is a search field to find the required store data. This menu can only be accessed by admin-type users. Admin can add data and approve stores registered by store owners. The store data menu display can be seen in Figure 7.
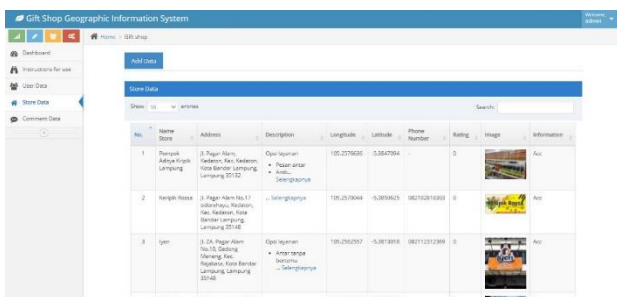

Fig 7. Store data menu

5. In the store data menu, there is an add button to add store data. The store data add form contains fields for the store name, address, telephone number, store description, latitude, and longitude obtained from google maps include photos about the store. The store data add menu can be seen in Figure 8.
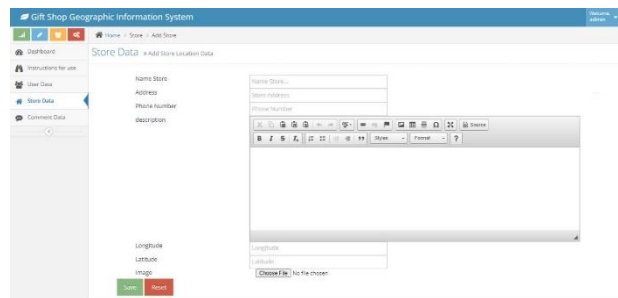

Fig 8. Store data add form

3.2. ISO 25010 Testing

The system developed was tested involving 50 respondents with 45 people as customers and five owner gift stores. Here are the test results:

1. Functionality, testing is carried out to assess functionality feasibility to do specific work for users and provide precise results and accuracy to user needs. The results of the questionnaire functionality assessment on the system with 16 questions to 50 respondents. The following is the calculation result of each respondent's weight values to the questions given for the system functionality.

$$\frac{3627}{4000} \times 100\% = 90.67\%$$

Based on the testing quality result of the software built in the functionality aspect of the application, the percentage of success is 90.67%. The obtained value is then converted based on likert scale at Table 1. It can be concluded that the percentage value obtained indicates the quality of the software functionality aspect has a scale of "Very Good".

2. Usability, testing is carried out to assess the ease of users for using and operating it. The results of the questionnaire usability assessment on the system with 14 questions to 50 respondents. The following is the calculation result of each respondent's weight values to the questions given for the system usability.

$$\frac{3134}{3500} \times 100\% = 89.54\%$$

Based on the testing quality result of the software built in the usability aspect of the application, the percentage of success is 89.54%. The obtained value is then converted based on likert scale at Table 1. It can be concluded that the percentage value obtained indicates the quality of the software functionality aspect has a scale of "Good".

3. Reliability, testing is carried out to assess the software's resilience when used by users under specific conditions, such as handling inevitable failures and restoring data due to these failures. The results of the questionnaire reliability assessment on the system with 6 questions to 50 respondents. The following is the calculation result of each

respondent's weight values to the questions given for the system reliability.

$$\frac{1389}{1500} \times 100\% = 92.6\%$$

Based on the testing quality result of the software built in the reliability aspect of the application, the percentage of success is 92.54%. The obtained value is then converted based on likert scale at Table 1. It can be concluded that the percentage value obtained indicates the quality of the software reliability aspect has a scale of "Very Good".

4. Performance Efficiency, testing is carried out to assess the resources and time required when performing an action from a function in the application. The results of the questionnaire performance efficiency assessment on the system with 4 questions to 50 respondents. The following is the calculation result of each respondent's weight values to the questions given for the system performance efficiency.

$$\frac{916}{1000} \times 100\% = 91.6\%$$

Based on the testing quality result of the software built in the performance efficiency aspect of the application, the percentage of success is 91.6%. The obtained value is then converted based on likert scale at Table 1. It can be concluded that the percentage value obtained indicates the quality of the software performance efficiency aspect has a scale of "Very Good".

5. Maintainability, testing is carried out to assess the degree to which a software can be modified, such as improvements, changes, or adjustments to the software to change to a specific environment, requirements, and functionality. The results of the questionnaire performance efficiency assessment on the system with 4 questions to 50 respondents. The following is the calculation result of each respondent's weight values to the questions given for the system maintainability.

$$\frac{1134}{1250} \times 100\% = 90.72\%$$

Based on the testing quality result of the software built in the maintainability aspect of the application, the percentage of success is 90.72%. The obtained value is then converted based on likert scale at Tabel 1. It can be concluded that the percentage value obtained indicates the quality of the software maintainability aspect has a scale of "Very Good".

Here are the ISO 25010 test results, which include five aspects: functional suitability, usability, reliability, performance efficiency, and maintainability.

$$\frac{10200}{11250} \times 100\% = 90.66\%$$

Based on the results of testing ISO 25010 to 50 respondents, the geographic information system of gift store can make it easier for users to search for store locations according to their wishes or the location of the closest store to the user. The geographic information system of gift stores can also be implemented because it is for user needs.

4. Conclusion

The system developed has succeeded in making it easier for people to find the location of the desired gift store or closest to the user's location. In addition, the benefits obtained from this system are that users can view information and locations anytime and anywhere more efficiently. System development uses the extreme programming method, including planning, design, coding, and testing. Based on the results of testing ISO 25010 involving 50 respondents, the system is feasible because it is by user needs. This is evidenced by the percentage obtained with a total average of 90.66%, representing the "Very Good" criteria.

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