

Snorkelling and Diving Guidance System Using Location-Based Services (LBS)

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Abstract:- North Sulawesi, especially the city of Manado is one of the cities that has its own charm from the tourism sector. This makes domestic and foreign tourists interested in trying water attractions such as snorkelling and diving in Bunaken and the surrounding marine parks. However, information about water attractions is still difficult for tourists to obtain. To overcome this problem, researchers will create a Snorkelling and Diving Guidance System at the Bunaken marine park using Spatial-based LBS, where there is information about snorkelling and diving spots and how to get to the location desired by tourists, so that it can help tourists determine points snorkelling and diving are desired.

Keywords:- Spasial, Android, LBS, Snoekelling and Diving.

I. INTRODUCTION

A. Background

Indonesia is an archipelago that stretches from Sabang to Merauke which has a coastline of + 81,000 km² so it has a sea area of around 70% of the total territory of the Indonesian state of around 5.8 km². thus Indonesia is known as one of the countries rich in biodiversity of coral reefs and fish diversity. One important tourism sector to be developed is marine tourism. National Parks are original ecosystem areas managed by the zoning system for the purposes of Research, Science, Education, Tourism and Recreation. Stipulated in Law Number 5 of 1990 concerning Conservation of Living Natural Resources and Their Ecosystems. in accordance with Minister of Forestry Regulation No.56 / 2006, PP No.28 / 2011, Law 41 of 1999 concerning national park zones consists of core zones, forest zones, sea protection zones for water areas, utilization zones, and special zones such as zones traditional, rehabilitation zones and religious zones. (Bagindo, Sanim, & Saptono, 2016).

Bunaken marine park is one of the national marine park in North Sulawesi province, the National Park was established in 1991 and has an area of approximately 890.65 km². 97% of this park is marine habitat while 3% is land and has various marine park areas including Bunaken, Manado Tua, Mantehage, Naen and Siladen, and beaches in Manado City.

Travelers are people who do tourist activities in accordance with Act No.10 of 2009. The rating is divided into two groups, namely Nusantara (domestic) and foreign (from overseas). (Gunawan, Sinsuw, & Sambul, 2018). Because of the beautiful view of the sea with the biodiversity in it, the tourism sector must be developed. Underwater tour that is diving and snorkelling are excellent the tourists who come to visit the city of Manado, both foreign and domestic tourists.

In the present era of technology's role is crucial for supporting the development of tourism, especially marine tourism namely diving and snorkelling, so it requires a system that can help the tourism in search of information about sea travel, especially spot snorkelling and diving as well as a description of an underwater in the Bunaken Marine Park.

B. Problem Formulation

Based on the above background, the formulation of the problem can be taken, namely how to create a Snorkelling and Diving Location Guiding System in Bunaken Marine Park using Spatial-based LBS.

C. Research Objectives

The purpose of this research is to develop a system that can help tourists find snorkelling and diving locations and can provide information about existing marine habitats in locations where they were going

D. Research Benefits are:

- Travelers can find out information that is around the snorkelling and diving places before they do diving.
- Assist tour guide in conducting briefings
- Helping tourists to know the type of fish, coral and other habitats in locations where they were going
- Helping tourists to know the strength of underwater currents, visibility, depth of location, temperature and coral species.
- Helping the promotion of marine tourism in the city of Manado, especially in the Bunaken marine park.

II. RESEARCH METHODS

A. Research Stages

There are seven stages in the flow of research to be done, namely the stage of problem identification, problem definition stage, the stage of determining the objectives, benefits, and limitations of the problem, the data collection phase, the analysis phase, the system development phase, and phase analysis of the research results.

B. System Design

Application design in general

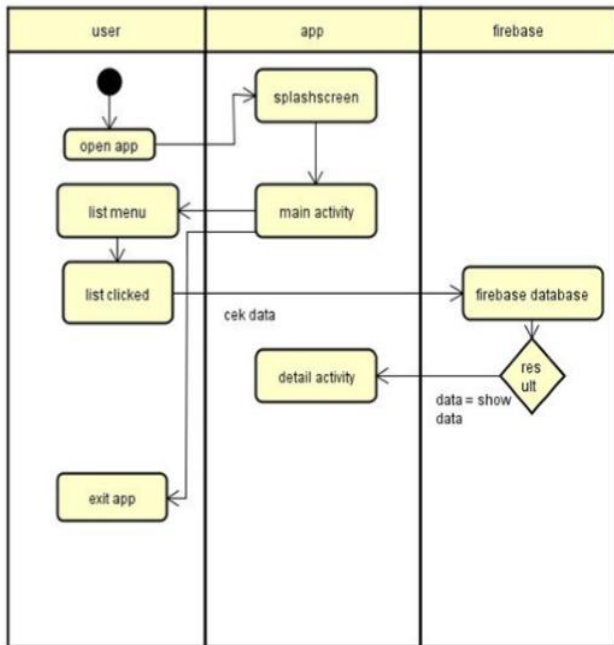


Fig 1:- Activity Diagram Application

Design a sequence diagram in general for the system flow as shown above

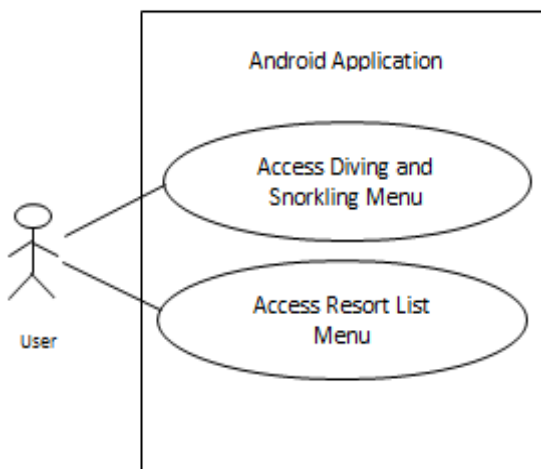


Fig 2:- Use case for Android Applications

Generally there are two menus available on the Android application after the user or client registers and logging in the application, which is a Menu to access the Snorkelling and diving Guidance System and a menu to access a list of resorts that provide snorkelling and diving equipment or facilities. To find dive point information and display the destination path to the selected dive point, the visitor or client must press the Diving and Snorkelling menu, then dive points will appear on Bunaken Island after selecting the desired point then the user must press the go to destination button.

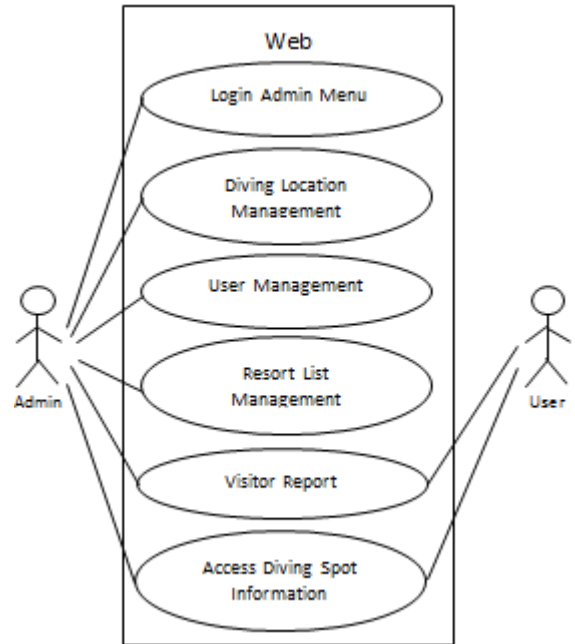


Fig 3:- Use case for website

On the website the admin will do management at each point of dive, resort, and menu reports daily, monthly, yearly. While the report menu the number of visitors who come at each dive point can be accessed by the User.

C. Research Methods

The research method applied is the waterfall method. The waterfall method is a systemic information system development model and the sequential waterfall method has the following stages:

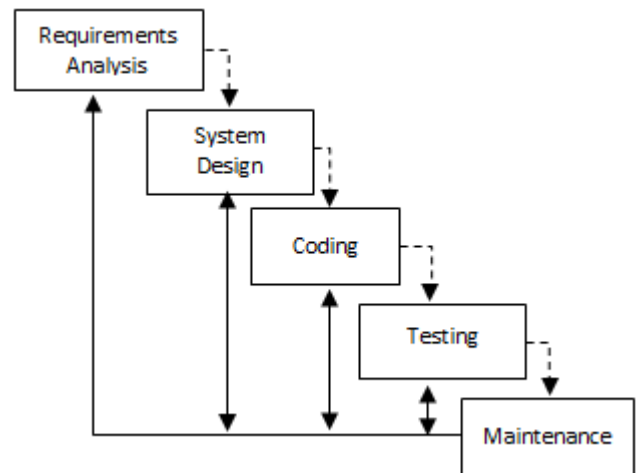


Fig 4:- Waterfall method

➤ **Requirements Analysis**

Software requirement analysis includes the collection of needs carried out intensively for specifying software requirements in order to understand the software required by the user. Software requirements specifications at this stage require documentation.

➤ System Design

Software design is a multi-step process that focuses on the design manufacture software program including data structures, software architecture, interface representations, and procedure coding. This stage of translating the software requirements analysis phase to design representation needs to be implemented into a program at a later stage. At this stage documentation is needed.

➤ Coding

Designs must be translated into software programs. The result of this stage is a computer program in accordance with the design that was created at the design stage.

➤ Maintenance

There is a possibility that a software will change when it has been used by a user. Changes can occur due to errors that appear and are not detected during testing or the software must adapt to the new environment. The maintenance phase can repeat the development process from specification analysis to changes to existing software, but not to create new software. (Sasmito, 2017)

D. Devices Used

There are two devices used to support this research, mainly hardware and software

➤ Hardware

The hardware used in the development of this system is a laptop with the following specifications.

- Processor Intel Core i7
- RAM 8 GB.
- Hard disk 1 TB.

➤ Software

The software used is:

- Operating system Windows 10
- Android Studio
- Visual Studio
- Xampp
- Star UML
- Photoshop cc
- Web Browser
- Node.js

E. Testing Method

Software Testing System in terms of functional specifications without testing the design and program code to find out whether the functions, inputs and outputs of the software match the required specifications. Blackbox testing method is one method that is easy to use because it only requires the lower and upper limits of the expected word, the estimated amount of test data can be calculated through the number of net data fields to be tested, the entry rules that must be met and the upper and lower limit cases that fulfills. And with this code, it can be seen that if the functionality is still able to accept unexpected data input, it will cause the data stored to be invalid.

(Cholifah, Yulianingsih, & Sagita, 2018)

III. RESULTS AND DISCUSSION

A. Results

➤ Data that can be obtained

The datas obtained from several resorts and dive master who interviewed, the obtained map names point dive in Bunaken marine park and surrounding areas, with data contributing on every point dive for example, the coordinates, the location name, the type of coral, the depth , visibility, temperature, water flow, fish species and coral species.



Fig 5:- Diving Map in Bunaken and Manado Marine Parks

➤ System Implementation

With the data obtained, a diving and snorkelling guide system was built around Bunaken Island in accordance with predetermined dive points or new dive points discovered by several dive masters abroad and domestically, as for the naming of each point is determined by the diver that found that place. The naming of divers points is usually taken from the name of the location around, the name of the person who found the location, the name of the types of coral or the name of the types of fish in the area. Here is a picture of an application that is built in the form of web and mobile.

B. Web

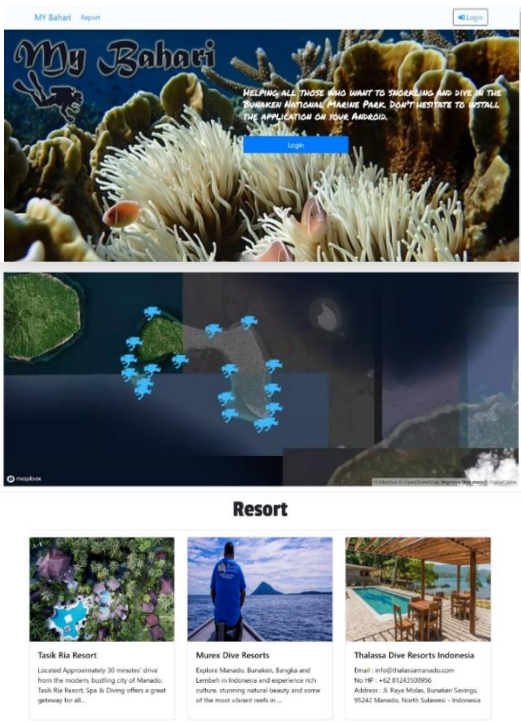


Fig 6:- Front Web Display

The above display is a dashboard system display in the form of a website there can be seen some content that has been built to complete the system designed, from the dashboard display above we can see the display of dive points in accordance with the dive points issued by the diving association of North Sulawesi. Also displayed several resorts that have been inputted before

C. Mobile



Fig 7:- Display Mobile Login

Fig 7. shows the mobile login that is used by the user to log in after the user has registered. This login process is only done once after initial registration after which the

system automatically enters the dashboard display of the mobile application.

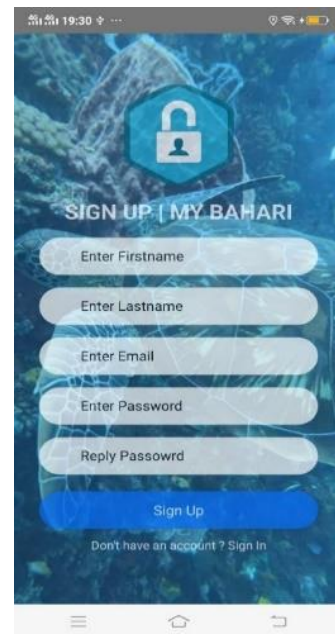


Fig 8:- Display Registration Form

Fig 8. After the user opens the installed application on the phone, they will first register. Picture 8 above is a display of the registration form where they will enter their name, email address, and password.



Fig 9:- Display of form registration

After the user logs in, a mobile dashboard will appear with several features, such as Snorkelling and Diving Guide, Resort List and Sidebar

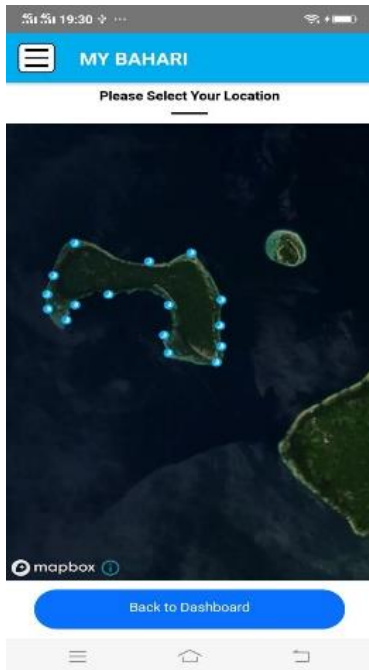


Fig 10:- Display of Dive Point in Bunaken Island

Fig 10 is a display of the dive points in Bunaken Island. When the user choose by pressing a Point, the information will come out relating to everything around the dive point

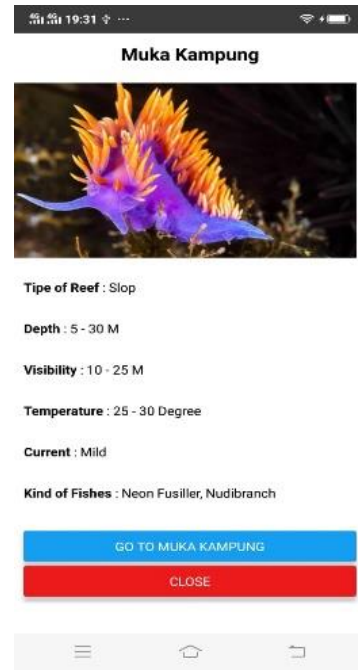


Fig 12:- Sidebar display

The display above is a display of information that appears when selecting a dive point

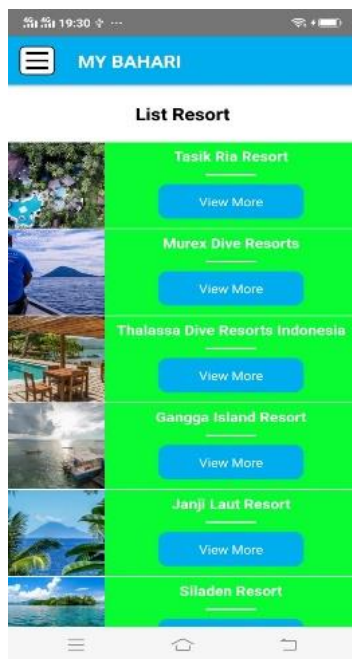


Fig 11:- Display of Resorts List

Fig 11 The display above appears when the user select the list of resorts features in the Mobile dashboard, which inside contains about the chosen resort

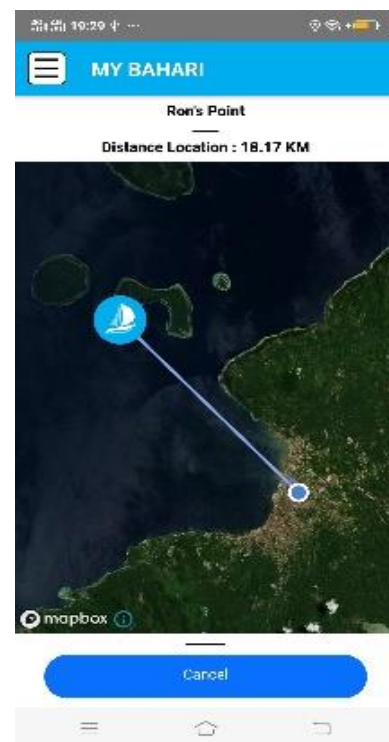


Fig 13:- Information display at one point

Fig 13 Is the display when the user presses the go to name point of destination will be the direction line that connects the starting point and the dive destination point

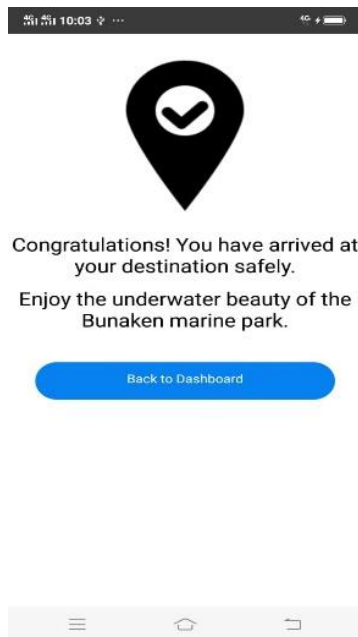


Fig 14:- Display of Information when arrived at the Dive Location.

The picture above is a display of information that appears when a visitor arrives at dive location

IV. CONCLUSIONS AND SUGGESTIONS

A. Conclusion

Conclusion from the results of the design to the Implementation of the system it can be concluded that:

- The system can be used to guide diving and snorkelling locations on the island
- Visitors can see some information's about the location of diving and snorkelling included with some underwater pictures
- Visitors can find out the distance from the resort and estimate the time it can take to get to the dive point
- Mapbox is an alternative for creating spatial-based projects
- Realtime tourists visit reporting
- Added a list of resort features that prepare diving and snorkelling equipment
- GPS moves according to the user's direction to get to the Destination

B. Suggestions

Suggestions in making of this application there are still some that must be resolved, therefore some suggestions that need to be done to complete this systems are as follows :

- Some features can be added in the form of location of souvenirs, and land tourism locations
- Can be developed by adding likes and favourites features to the application
- Can be developed by adding *direction* in the sea lane
- Can be developed with using Google Maps

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