Application Search School Location Method Using Location Based Services (LBS) based on J2ME

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Abstract— **One of the most important aspects in the development of a city is the educational aspect. The quality of a good education sector in the city will also affect the quality of the city. The quality of education is also supported by a variety of factors, one of which is the school. Generally, people will be looking for good schools and proximity to the neighborhood. So that people can easily get the desired information about the school, in this study, school location search application using J2ME-based mobile phone, the case study is the city of Cirebon. This application is designed to enable the public to know the location of the nearest school with the user's location. This application, created using NetBeans and Java programming language. Java is very flexible and can be used on a variety of hardware platforms and easy to use. This application uses the method of location based services (LBS) that provides location information as well as the geographical position of the school on a mobile device. This application uses the latest technology, so as to facilitate the public to find out information about the means of education and promote education. This application contains several menus, they are Start, Help, About and Exit. On the Start menu there is a sub menu that are elementary, junior high, and high school, and have been tested and implemented on the Nokia X2 and Nokia C6.**

Keywords—Location Based Service (LBS); School; J2ME; Java

I. Introduction

Along with the technology continues to evolve as if there is no end point, it becomes an opportunity for developers of Information Technology (IT). One of the technology is mobile devices which growing very significantly. Most people have to rely on mobile devices to obtain information. Information is an essential requirement for most humans. By using mobile devices, the information can be obtained wherever they may be in a short time. Among which information about the location of the school which is a requirement in most communities.

However, public often find difficulty in finding the location of existing schools, especially in small towns or the countryside. Many school locations are out of reach so that it can't be a reference because it is not known by the public. Of course, this resulted in the development of the area. In addition, traffic in some areas is relatively dense. Of course, it will spend a lot of time to get to the location of the school that will be addressed. So time will be wasted during the journey.

This study discusses the school location search application in the city of Cirebon using Location Based Service[1]. This application is made to a Java based mobile phone users which can get information about the location of the school site. The application is executed with a Java[2] based mobile phones which are widely used because Java is open source, dynamic (Java can be used in many hardware platforms) and easy to use. This interface is made as easy as possible so that users can easily understand the use and be efficient in time. This application uses NetBeans[3][4] as a script editor to write Java.

II. Literature Review

A. Java

Java according to the definition of the Sun is the name for a set of technologies to create and run the software on a standalone computer or in a network environment. Java was developed in August 1991, with the original name of the Oak. In January 1995, as the name Oak considered less commercial, then changed to Java. In December 1998, Sun introduced the name "Java 2" (J2) as the second generation of the Java platform. The new naming convention is applied to all Java editions, Standard Edition (J2SE)[5], Enterprise Edition (J2EE)[6], and Micro Edition (J2ME)[7][8]. There are three Java platforms, each geared to a specific purpose and for a computing environment that is different:

- Standard Edition (J2SE): J2SE is at the core of the Java programming language. J2SE is designed to run on desktop computers and computer workstations.
- Enterprise Edition (J2EE): With built-in support for servlets. JSP, and XML, this edition is intended for server-based applications.
- Micro Edition (J2ME): Designed for devices with limited memory, limited display screen and processing power is also limited.

B. Location Based Service (LBS)

Location Based Service (LBS) provide personalized services to users of mobile devices (mobile devices) that are tailored to their current location. LBS open a new market for developers, mobile network operators and service providers to develop and deliver value-added services: providing information on current

traffic conditions, add the route information, help locate the nearest tourist sites, and many more.

There are five main components of the technology support Location Based Services, among others:

- Mobile device is one of the important components in the LBS. This tool serves as a tool for users to request information. The results of the requested information can be text, sound, images and so forth. Mobile devices that can be used can include PDAs, smartphones, and laptops.
- The second component is a communication network. This component serves as a connecting line that can transmit data sent by users of its mobile devices and then sent to the service provider, and then the results of the request sent back by the service provider to the user.
- Positioning Components (Pointer Position / Location). Each of the services provided by the service provider will usually based on the position of the user who requested the service. Therefore we need a component that serves as a processor / processor that will determine the user's position at the time of service.
- LBS service provider is a component that provides a variety of services that can be used by users. For example, when the user requesting the service in order to know the current position, then the application and direct service providers to process the request, ranging from counting and determining the user's position, find the street, looking in the Yellow Pages of data according to demand, and many others.
- Data and content providers, service providers do not always save all data and information processed. As an example of geographic data bases and the location could have been derived from government-owned agencies or well data of the company / business / industry could have come from the Yellow Pages, as well as other data provider company.

III. DESIGN AND METHODS

The system used in this application is focused on making the earth coordinates on mobile devices. In taking the coordinates, using GPS system. To get a map and route, the system uses the Google Map API's[9] to provide parameters earth coordinates. After sending these parameters to GoogleMap server, then the server will reply GoogleMap to be static map (image). In these searches, the system sends two coordinates of the earth as the starting address and destination address, then the server will reply GoogleMapDirection be data in the form of JSON that the next system will parsing the data and displayed to the user.

In this application provides location information elementary school, junior high schools and high schools.

The search is distinguished by its parameters. Distinguishing parameters such as color images, the location coordinates and detailed information.

A. Design Diagram

In the search application system design is made into the form of a process model, namely:

1. Design Use Case Diagram

The application development process, involving interaction between the user and the system. In the use case diagram illustrates how the flow of the interaction between the user and the system. The interaction between the user and the system there are four main cases: Start, Help, About, and Exit. Use case diagrams can be seen in Figure 1.
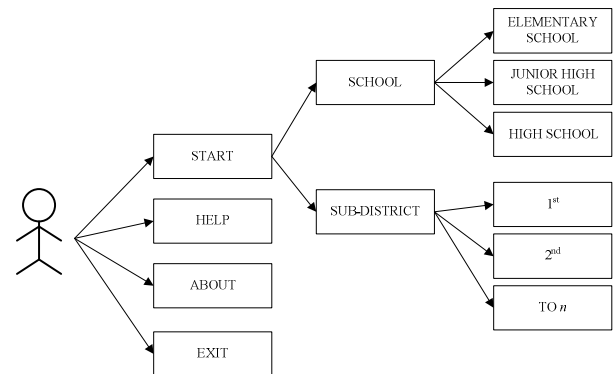

Figure 1 Use Case diagram

2. Design Activity Diagrams

In this application system, there are several activities: Start, Help, About, and Exit. Activity diagram of this application can be seen in Figure 2. The flow of activities beginning with the initial state to the initial appearance of the application.

From the beginning of the next application to the activity menu. On the menu there are several activities simultaneously activities described with fork. Fork is an option on the main menu. On the main menu there are several options, namely Start, Help, About, and Exit. By the time the user selects the Start menu, then it will go to the next sub menu categories namely elementary school, junior high, and high school.

On the map, there is a marker that represents the location of the school and information about the school which appears when the user presses the key marker. Info raised is the name of the school, and information about the school.
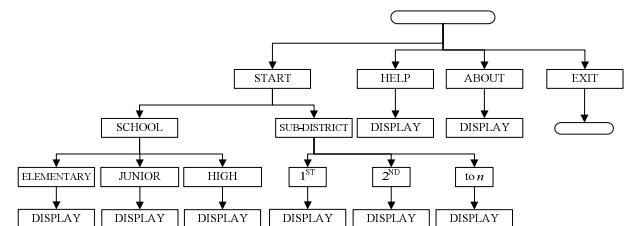

Figure 2 Activity Diagram

B. Design of General Application

In the process of making this application, the first thing to do is to create UML diagrams, and proceed with the drafting interface (GUI). The next step is making the application program using NetBeans and Java. To use the database offline School is Data Database, performed the testing process by compiling an application program using NetBeans. If the process is successful, compilation package is then performed so that the application can be implemented on a Java based phones. General Application Design Stages can be seen in Figure 3 below:
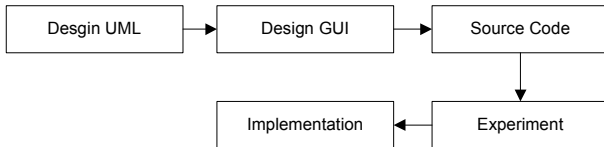

Figure 3. Stages of General Application Design

This application is an application that serves to conduct a search of the school on J2ME devices. To perform a search, the application is using Location Based Services (LBS).

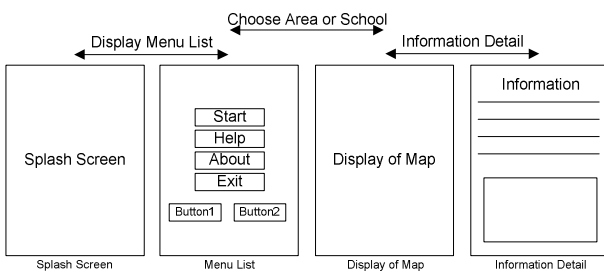In general, for the design of the design of this application is as figure 4:

Figure 4. Overview Applications

After successfully through the compilation stage, then the application is running in the emulator[10]. Example display on the emulator as follows:
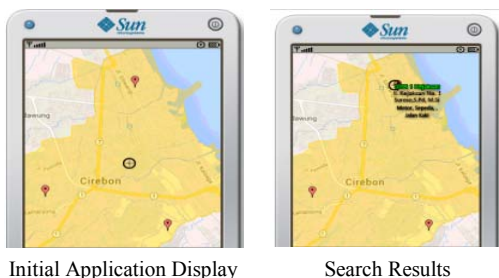

Initial Application Display   Search Results

Figure 5. Display on the emulator

The next process is to implement the application by installing an application on a mobile device that has a Java-based features such as the minimum:

- Module Location Based Service, which will be required to determine the user's position using GPS integrated with mobile devices. GPS will provide the coordinates of the position of the earth in the form known as longitude and latitude.
- Module Google Map API, which will ask questions that can be used as a reference for the user in finding direction, path and location of the location of the school.

C. Requirements Hardware and Software

1) Hardware

In this application, hardware is classified into two stages, as shown in Table 1.

TABLE 1. HARDWARE

No	Stages	Hardware	Specification
1	Development	PC / Laptop	Lenovo B490
		RAM	4 GB DDR3
		Hard disk	500GB SATA
		Processor	Intel Core i3
2	Implementation	Mobile Device	Nokia X2, C6

2) Software

In this application, the software classifies into two stages, as shown in Table 2.

TABLE 2. SOFTWARE

No	Stages	Software
1	Development	IDE NetBeans 6.7
		JDK 1.6.0_16
		Emulator WTK 2.5.2
2	Implementation	Device Conf. CLDC 1.1
		Device Profile MIDP 2.0

IV. RESULT AND DISCUSSION

A. Running Applications

This app has been tested on a Java-based mobile phone namely, the Nokia X2 and Nokia C6. Display application is designed to facilitate the users. When installed on the phone, the application icon will appear in the application menu.

When the user opens the application, it will display a SplashScreen about 5 seconds. Then the user will enter the main menu. At the main menu, there are several applications such as the Start menu, Help, About, and Exit. Application users can choose the Start button which is used to select the sub menu pages search that is based on the "school" and based on "sub-district". When selecting a sub menu will enter the school next sub-menu button image are elementary, junior high, and high school. If the user presses one of the buttons of the image, then the application will display a map of where the user. Is in the folder where the user and the schools are characterized by the marker image as can be seen in Figure 6. And then it shall appear the information about the selected school.
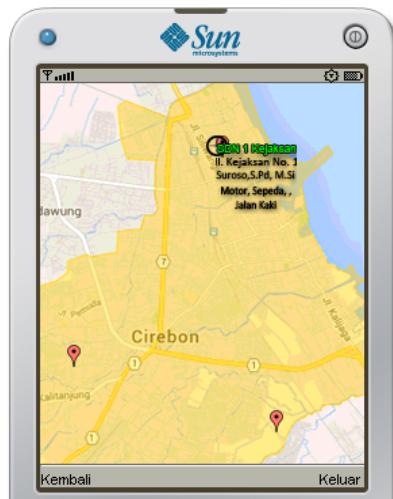
Application test results

Figure 6. Display on the emulator

B. Testing

At this testing stage, there are two things that do as seen in Table 3.

TABEL 3 TESTING SYSTEM

No	Test/Procedure/ Steps	Results	Status
1	Displays a list of the location of the school	Users can view a list of the location of the school along with the details.	OK
2	Looking from the current position to the destination location	Users can view maps and routes from the user's position to the intended location of the school	OK

CONCLUSION

School location search application with a case study in the city of Cirebon using LBS. This application is addressed to people who want to know the location of schools, educational institutions, and government agencies in the field of education. This application is designed to enable the public to know the location of the nearest school with the user's location.

This application, created using NetBeans and Java programming language. Java is very flexible and can be used on a variety of hardware platforms and easy to use.

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