

Application Model for Information ATM Location Using Location-Based Augmented Reality

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Abstract — Daily business routines increasingly require quick access to information. Such as a person need the information about the location of an Automated Teller Machine (ATM) to make payment transactions. Usually that person do to ask someone or search it on the internet. This paper is about develops a model for ATM location search application. The main purpose of this research is to produce model for search application using mobile device who implement location based augmented reality (AR) method.

The model includes some parts who consist of usage the mobile device's e.g. the camera and Global Positioning System (GPS), processing of captured data and the presentation of processed results into AR-based visual mode.

Keyword - Application Model, Location-Based, Augmented Reality, GPS, Mobile Device.

I. INTRODUCTION

The quick of information access has become a public need. For example suppose a person in an activity suddenly needs information about location of certain bank Automated Teller Machine (ATM) location. This information is needed immediately because of the need to transfer money. During this action will be done is asked directly to anyone who met. Another way to do this is by trying to find information using internet based search technology. Generally the results obtained can not help specifically whether the ATM bank in question exists or not because of the ignorance of someone who was asked or the information presented from the search results on the internet only a general nature that there is a bank or ATM center around the search location.

Augmented reality-based applications have already existed and are created by a bank but this is closed because the information provided is information related to the bank making the application so it is not universal.

This research done by making an application model where the component model contains the basic components that are standard used for system development needs with the aim of

producing location information of an object where in this study is the location of bank ATM.

The developed model will be implemented on mobile devices regardless of the existing platform because the development of this model is still of a general nature.

II. LOCATION BASED AUGMENTED REALITY

2.1 Augmented Reality (AR)

According to Ronald T. Azuma (1997) in his research entitled "A Survey of Augmented Reality", is the incorporation of real and virtual objects in the real environment and this combination will run interactively in real time. The integration of these objects in a three-dimensional mode in which the virtual objects will be displayed (integrated) in the real world. [1]

According to Harits (2010) in a blog posted defines AR is a technology that combines two-dimensional virtual objects and or three Dimensional into a real three-dimensional environment and then projecting the virtual objects in real time. Unlike virtual reality that completely replaces reality, Augmented Reality only adds or complements reality.

2.2 Location-Based Augmented Reality

The definition of LBS according to Virrantasu (2001) is an information service that can be accessed using mobile devices via Internet data communication channel by utilizing the location instruction function owned by mobile device.

Another definition is quoted from Halim, Ismail and Ravana (2008) which says that LBS is a wireless Internet Protocol (IP) service that uses geographic information owned by mobile devices to provide location information to its users.

These two definitions are cited from Abdul Mufti's research (2014) entitled "Augmented Reality BTS Indosat For Mobile Phone Based Android". [5]

2.3 Assisted-Global Positioning System (A-GPS)

Global Positioning System (GPS) draws the information from the web of satellites above the earth. Assisted GPS (A-GPS) draws the information from local based transceiver station (BTS) and enhances the performance of standard GPS in smartphone and other mobile devices that are connected to a cellular network.

According to Fred Zahradnik smartphone device has technology Global Positioning System (GPS) and Assisted GPS (A-GPS). [6]

Meanwhile, according to Nazruddin Safaat, A-GPS calculates the arrival time of an arrival signal sent by three satellites closest to the location of mobile devices. This method provides better accuracy than other methods applied in LBS. Another method is enhanced observe time difference (e-OTD). Accuracy of A-GPS is less than 10meter. while the accuracy of e-OTD is 50m in the calculation of the position of mobile devices used. [3]

III. RESEARCH METHOD

This study uses secondary data where the location of bank ATM data is obtained by using the address shown on the bank's website.

Limitations of the research problem is to use the location of South Jakarta by using the object of the largest private bank and government bank in Indonesia.

The ordinate data used is obtained by using the ATM location address of the bank site. This address will be searched by using google map with the aim of obtaining longitude and latitude values. The value of longitude and latitude will be stored into the database to be part of the detail data owned by the bank on the model of application made.

The Prototype System is a client-server where the client consist of web application and mobile application. The Server

consist of web server, database and main program who used the server-side concept.

IV. RESULT AND ANALYSIS

The model presented by this paper as a mobile application with the capabilities such as 1) search for ATM location in the neighborhood 2) navigation and Augmented Reality (AR) facilities 3) information about condition the ATM.

This paper used an AR setup development for some ATM location in the South Jakarta and use only the largest private bank and government bank in Indonesia.

4.1 System Design

The system starts with GPS mobile device activation to obtain the user's position (mobile device). this stage is the main stage in the operation of the application where the system will determine the position or ordinate to be the reference location of the nearest ATM location.

In this process the A-GPS technique is used by the device to communicate with the cellular network either BTS or Satellite. Through this communication it can be determined the position of the user and the system will search the nearest ATM location to be displayed as AR on the mobile device.

The location of the ATM is stored into detail data. This data is called Point of Interest (POI). According to Hassan A. Karimi, POI is the identity of an object that indicates a specific location. These definition is cited from Tahyudin research. [4]

One of the objectives of the model in this research is to make additional system capability to displaying "ATM status" displayed on the screen. Status to be displayed is ATM in "out of service" or "not out of service".

The model as a result in this study gives the facility for the user in order to perform an active role in updating the data if found ATM condition that is "out of service". This facility is provided as the sub menu "update information" feature that appears in this application.

This feature is expected to provide information that is always up to date on the condition of ATM so that prospective users can take a decision to determine which ATM will be used because the conditions can be used.

4.2 Menu Design

The application menu design is made with a minimalist look and menu but performs the functionality that suits the needs of the user considering the application used on mobile devices.

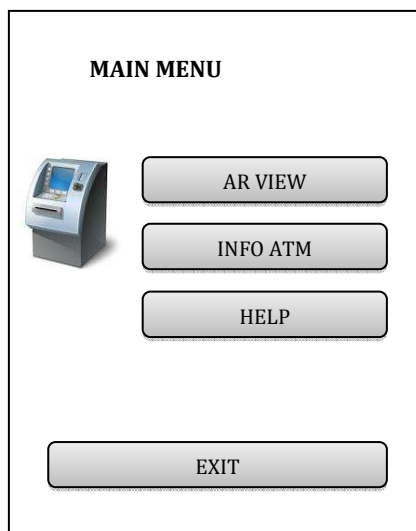


Figure 1. Application Design – Main Menu

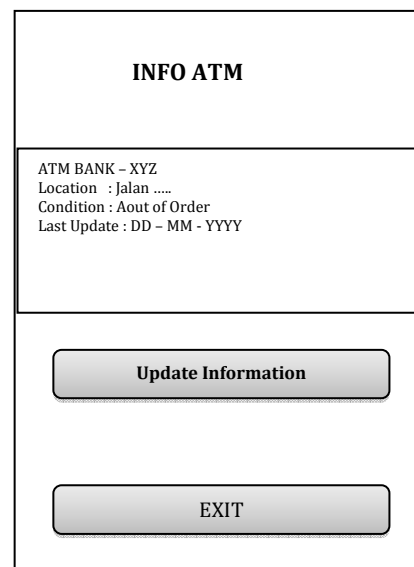


Figure 3. Application Design – ATM Information

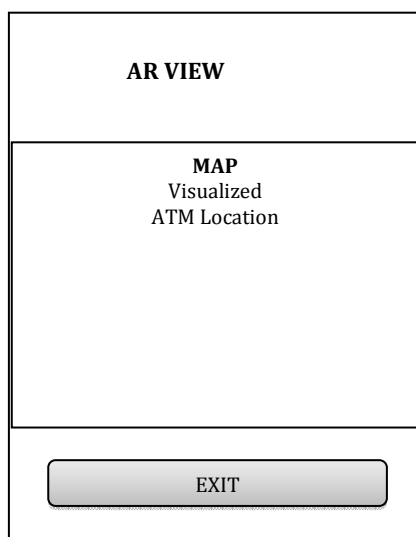


Figure 2. Application Design – AR Map of ATM Location

Figure 1 shows the main menu of the application that contains 3 functions. First option is “AR view” as the result of the system after knowing the position of the mobile device used. The second is “ATM information” which is display the ATM in the nearest location along with “out of service” or not. The last menu is a “Help” facility if the user requires an application's guide guide.

Figure 2 is "AR View" which is displayed into ATM position map which has the nearest location. The ATM location is displayed with a "baloon" as it is commonly seen in the google map.

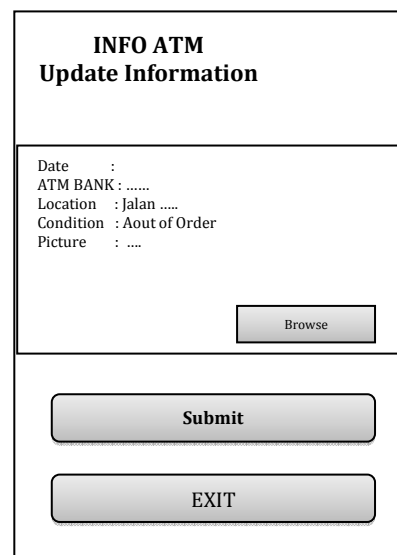


Figure 4. Application Design – Update ATM Information

Figure 3 display the nearest ATM Information. An important part of this view is the existing ATM status information shown with the "Condition" label.

Figure 4 display the update feature of existing ATM information if an "out of service" condition is found. Additional feature of this facility is the user can add picture ATM condition. Upload process can do by taking picture and upload along with updating data through keystrokes to “Browse” to send images.

4.3 Database Design

Database design this model is made consist of two tables, namely "location table" and "Info table".

The Location Table contains details Bank containing location code, name, address, latitude, longitude and description. The Info table contains the location code, name, condition, date, picture.

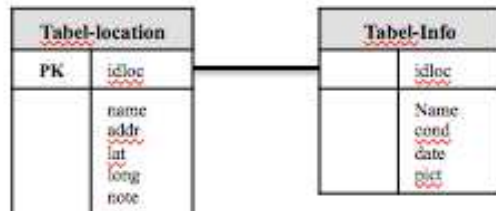


Figure 5. Logical Database Design

V. CONCLUSION

The result from this research has been finished the model and successfully implemented as the prototype the mobile AR with LBS for information about location ATM include the information about the condition. In further development this model is expected can be further refined by adding shortest path algorithm for searching location and also the mechanism to prevent the fake information from the user.

VI. ACKNOWLEDGMENT

The author would like to thank Perbanas Institute (ABFII - Perbanas), especially, the Research and Community Service that support for research funding and all the research activities.

Finally, I would like to thank to the anonymous reviewers who gave input and correction for improving this research.

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