Implementation Reserve Geocoding on Mobile Application

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ABSTRACT: Reverse geocoding is the conversion of coordinates into an address that allows you to find an address. In this study, the coordinates in question are latitude and longitude points on a mobile device that uses an Android-based operating system. The default feature of Android devices for obtaining latitude and longitude data is Assisted - GPS (Global Positioning System) while the tool for processing latitude and longitude data in order to obtain location and place names from the Assisted - GPS (Global Positioning System) data that has been obtained is the nominal API. .org. the stages of work in the research are making a flow system, designing a system with use case diagrams, designing a database, coding, implementing it on android based and web based. The results of this study are that using Cordova can be an alternative for making Android-based mobile applications without the need for the relatively heavy Android Studio program if it is run on standard or low specification hardware, 2). With this mobile absence application, it is able to make it easier for employees to take attendance when outside the office with information about working or out of town service, 3). With this application it can be a means of facilitating superiors in assessing employee performance, 4). With this application can handle the problem solved.

KEYWORDS: Android Mobile, GPS, Reserve Geocoding, Presence Employee.

INTRODUCTION

Employee discipline can be assessed, one of which is through the level of attendance at the office or place of work. Companies also of course have their own standards for the attendance of each employee. Therefore, an attendance system is implemented so that there is recording and evidence of whether or not an employee will be present. This employee attendance system is an important factor affecting the overall profitability of business operations and prospects for future growth.[1]

Absence is the first activity carried out at the start of work in a company. With attendance, the HRD section or an extension of Human Resource Development in a company can monitor the attendance of its employees.

There are many attendance systems that companies can choose from. If previously attendance was done manually, some time ago there was also a trend for fingerprint attendance systems. But in fact, both manual and fingerprint attendance have drawbacks that are quite difficult for both employees and companies, manual and fingerprint attendance systems require employees to come to the office.[2], [3]

So far, PT. Three Main Strengths still use the fingerprint attendance system. PT. Three Main Strengths is a company located in Surabaya. engaged in the building construction sector. The construction that is carried out is not uncommon in the Surabaya area alone, companies often carry out construction outside the city of Surabaya. As long as employees are working outside the city, they must contact HRD via Whatsapp to report as a substitute for fingerprint attendance which they cannot do with a photo. HRD parties still have to enter data into the employee absence table. This work is very ineffective and often employees commit fraudulent reporting by stocking their photos one day as material for reports the next day.

PT. Three Main Strengths really need an online attendance system that can be accessed via a smartphone. In addition to geocoding capabilities that allow companies to know the location of employees, online attendance can also be done by sending a photo of yourself. The location and time of taking photos can be known automatically thereby minimizing the possibility of manipulating employee attendance.

LITERATURE REVIEW

This chapter will explain previous studies as the basis for research:

A. Reverse Geocoding

Reverse geocoding is the conversion of coordinates into an address that allows you to find an address.[4] In this study, the coordinates in question are latitude and longitude points on a mobile device or in this study it can be called an android. By utilizing

the built-in features on Android, it is hoped that this application will be able to obtain coordinates from the Android device for further processing to find out the name of the location and place of the employee who is attending.

The default feature of the android device intended to obtain latitude and longitude data is Assisted - GPS (Global Positioning System) while the tool for processing latitude and longitude data in order to obtain location and place names from the Assisted - GPS (Global Positioning System) data that has been obtained is Nominatim.org API.

1.   Assisted - GPS (Global Positioning System) is the result of the development of the previous generation of GPS system technology. Where A - GPS is believed to be able to better handle location determination by adopting the TTFF (Time To First Fix) system or the speed of determining position for the first time. Previously, GPS only received signals from satellites orbiting the earth to determine a position from a GPS. receiver (android), Unlike A - GPS which determines the location other than satellites orbiting the earth A - GPS also determines the location with the help server. The help server will provide additional information to the receiver set that can assist in location calculations. This is very useful compared to old GPS technology which may have difficulty getting satellite signals directly.[5][6]

   The mobile operator network here acts as a help server for A-GPS because often BTS towers have GPS receivers and these GPS receivers will continuously download information from satellites orbiting the earth. The data that has been provided by the BTS tower can then be provided by an Android mobile device to identify location points in the form of latitude and longitude.

2.   API (Application Programming Interface) or in language it can be interpreted as an application programming interface. What it means is a set of interfaces (whether in the form of functions, methods, or it could be an endpoint URL) that we can use to develop applications, either on one platform or on multiple platforms. By using the API in making an application project, the application project can be quickly worked on by programmers or what can be referred to here as writers. Because by using the API the author does not need to create functions, methods or endpoint URLs from scratch. Nominatim.org API is one of the free API services provided on the internet. The nominatim.org API itself is an API that handles latitude and longitude data into location and region name data according to the explanation provided by nominatim.org in the usage documentation.[7]

B. Android

According to Safaat, Android is an operating system for Linux-based mobile phones. Android was originally developed by Android, Inc., with financial support from Google, and then Google bought Android in 2005. Generally, the interface that is carried by Android is a screen that displays several menus and applications that can be touched directly to operate. Apart from an interface that can be considered futuristic, Android also has a service store that has many applications that can be downloaded for free. And Android is also the most popular mobile operating system today.

To make Android-based applications, tools are needed for the development process. One of them is the Android Software Development Kit (Android SDK). Inside the Android SDK there are several tools including debuggers, software libraries, emulators, documentation, sample code and tutorials to make the developing process easier. The programming language that is often used in the Android application development process is Java. Apart from the Java programming language, Android can also be developed with several programming languages such as C++, Go, Kotlin, and recently Android can be developed with the Dart programming language.

C. Website

Website is a collection of pages that are used to display text information, still or moving images, animation, sound, and/or a combination of all of them, both static and dynamic which form a series of interrelated buildings, each of which is connected by a network of pages.[8][9]

Website has 2 characteristics, namely static website and dynamic website. What is meant by a static website is a website with content or content contained in it that has a fixed (static) value that cannot change according to the wishes of the user. An example of a static website is a company profile website where the website only displays information - information that is fixed and does not change. Meanwhile, what is meant by a dynamic website is a website with content that can change (dynamic) that can interact with input entered by the user directly. An example of a dynamic website is an online store website where the content contained on the website can change its value according to the user's wishes. And the changed values are usually stored in a database connected to the website. Websites that will display employee location data that will be accessed by HRD are including dynamic websites. Because the value contained therein varies depending on the location of the employee making attendance. To make a nice website, you need the

appropriate programming language. In this study, the authors used 2 programming languages to build a dynamic website, namely the PHP programming language and the Javascript programming language.

D. PHP

PHP (Hypertext Preprocessor) is a web programming language in the form of scripts that can be integrated with HTML. While HTML itself is a text formatting language for documents on computer networks which are often referred to as the world wide web.[10]

PHP is also often referred to as a server-side programming language because the PHP programming language functions as a data processor from a database engine so that it can be displayed on a dynamic website page so that data can be read by users without the need to open the database directly.

For writing from the PHP programming language itself, it has rules that it must start with the script <?php and end with ?> and stored in the form of a file with the extension .php. For writing PHP programs, you can use a text editor tool on the operating system used. The author uses the Visual Studio Code text editor as a tool for writing PHP code which can be downloaded for free on the Internet. In order for the PHP program to run as it should, a Web Server is needed. Understanding of the Web server itself is a software that provides data services that function to receive requests from HTTP or HTTPS from a browser.
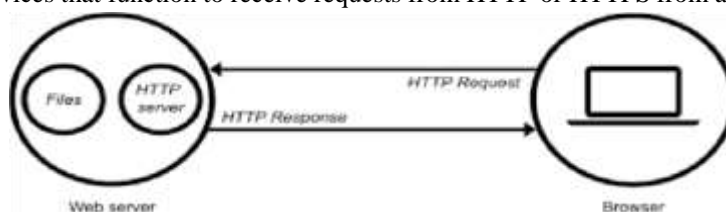
Fig 1. Web Server

In developing dynamic websites using the PHP programming language, the author is facilitated by the existence of a PHP framework. PHP has many types of frameworks, one of which is the PHP Laravel framework. What the author uses in making an attendance monitoring application, which will later be accessed by the HRD section.

Framework is a set of libraries organized in an architectural design to provide speed, accuracy, ease and consistency in application development. Laravel is a designation of a PHP framework that has the concept of MVC in its application development.[11] The MVC concept in question is a concept that separates program logic (Controller), database queries (Model), and website application views (View) in the project folder so that project files are more organized and neat and easy for the coding process. The advantages of using the Laravel framework in working on a website application include:

a. The Laravel framework is free, to use it users can download it via the composer application.
b. Rich in features, Laravel provides ready-to-use features so users don't have to build them from scratch. An example is the login system, by default Laravel has prepared this feature and users just have to modify it according to their needs.
c. Interesting documentation, apart from providing complete documentation, documentation is also displayed on a website that looks attractive and responsive.
d. There is a Command Line, uniquely the Laravel framework has command line commands that can be run in the terminal / CMD to speed up the work on application projects.
e. An active community, with the community making it easier for users to discuss programs if they have problems when using the Laravel framework.
f. Lots of Libraries, provided libraries make project work faster and less time consuming

METHOD AND DATA

Research design is needed to make the research process orderly and directed. In this study, the authors used a descriptive research type. The authors make observations and analyze everyday phenomena that occur in the object of research. From the analysis material, the authors design and manufacture the system as a response to the problems that occur. The following is the flow of research conducted in this study, described in Figure 1.
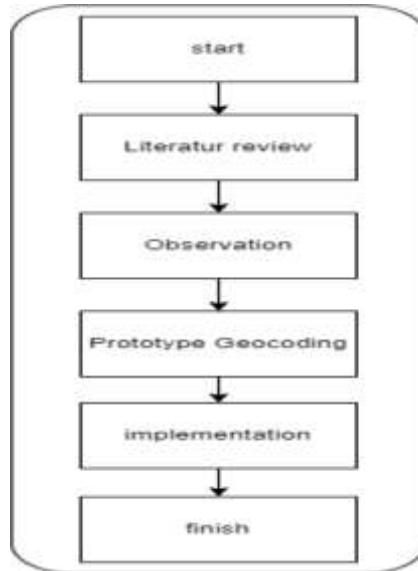
Fig 2. Flow Research

RESULTS AND DISCUSSION

Design is the main stage for building an application. With design we can study and analyze the objects that will be developed into a complete application. So that the application can run according to the flow set by the author, who in this case is also a developer, the author hereby uses several system flow design system references.
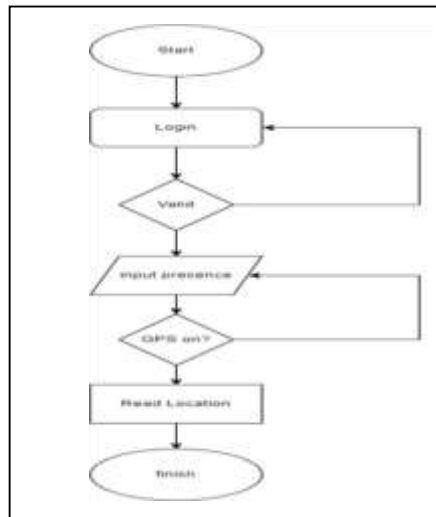
A. System Flow

Fig 3. Flow Prototype

B. System Design

System design is an overview and schematic of the system to be built. At this stage of system design will be discussed about system design using use case diagrams.
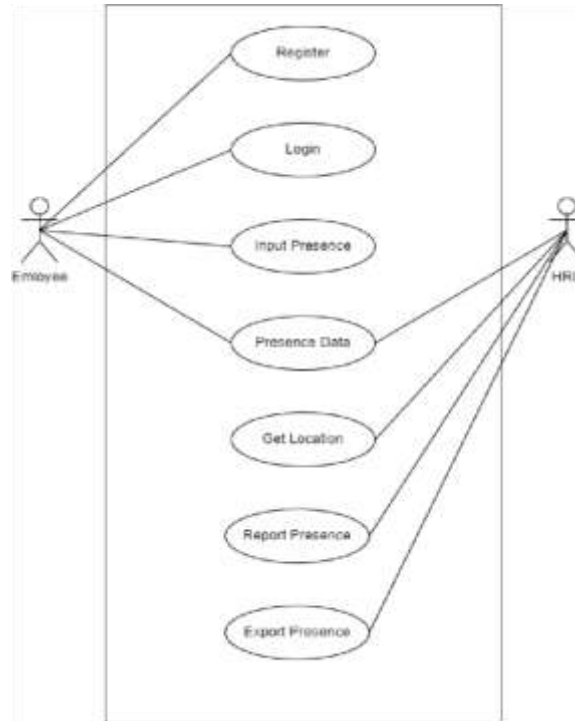
Fig 4. Use Case Diagram System

C. Data Design

Data design is explained using class diagrams. Class diagrams describe the structure of the system in terms of defining the classes that will be made to build the system. Each class has attributes and methods or operations. The following is the class diagram on the system:
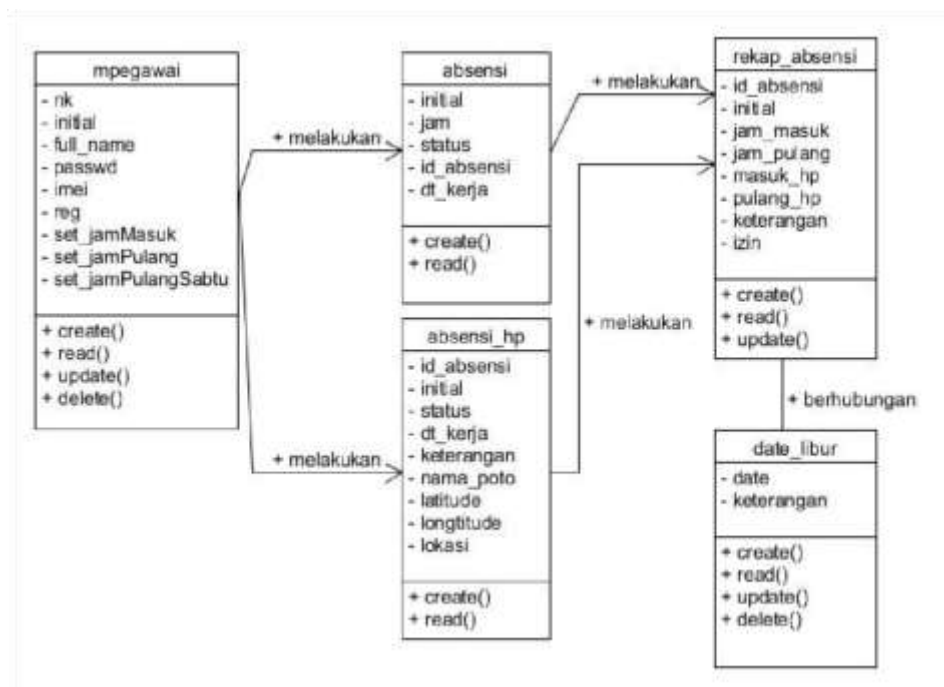
Fig 5. Class Diagram System

D. *Implementation*

After we discussed the design above, now is the time to implement the program. Which is implemented in the form of mobile apps and websites. The first application that will be studied by the author is the implementation of mobile apps. Where the program is realized in the form of an application that makes it easier for users to carry out their activities.

1. Implementation on Mobile

Users of this application are employees who will take presence like the image we will present:

Fig 6. Dashboard User

After a successful login, employees will be presented with a dashboard page and take attendance by taking photos on the spot in real time by first activating the mobile GPS. Photo taking activity can be seen in Figure 7
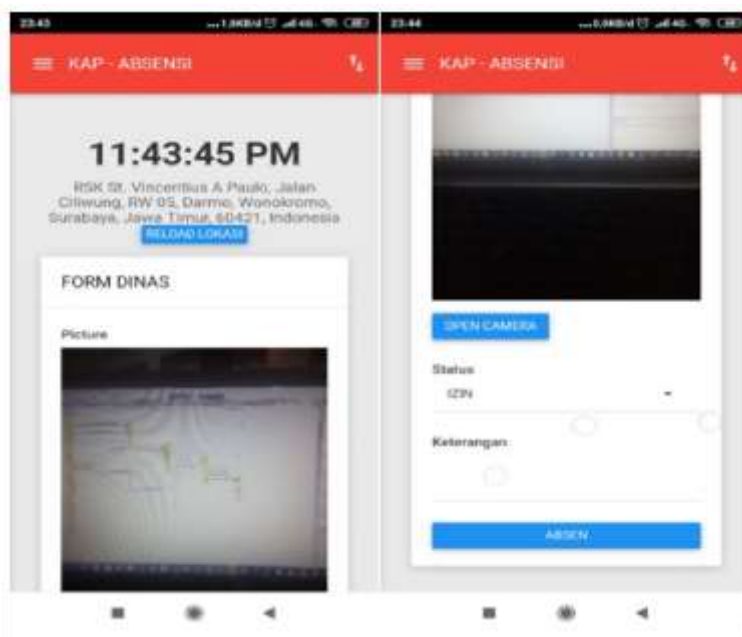
Fig 7. Take poto and get location

2. Implementation on Webiste

The website view can only be accessed by. admin In this case only hrd can access. The display after implementation is as follows:
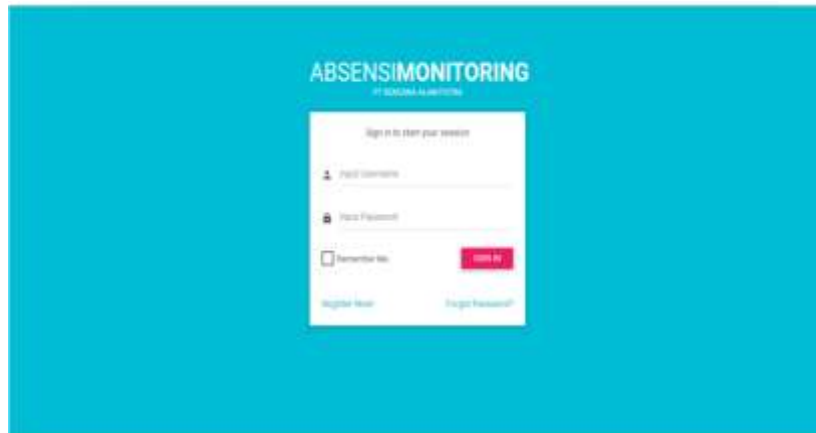
Fig 8. Login page
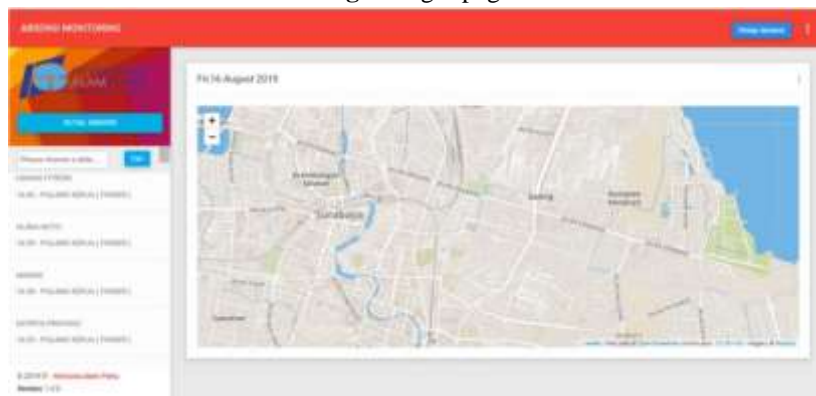
Fig 9 . Dashboard administrator

After HRD has successfully logged in to the system, the dashboard page will appear first, as shown in Figure 9. With this system, HRD can view details of each employee's attendance as shown in Figure 11 and see the location of each employee as shown in Figure 10.
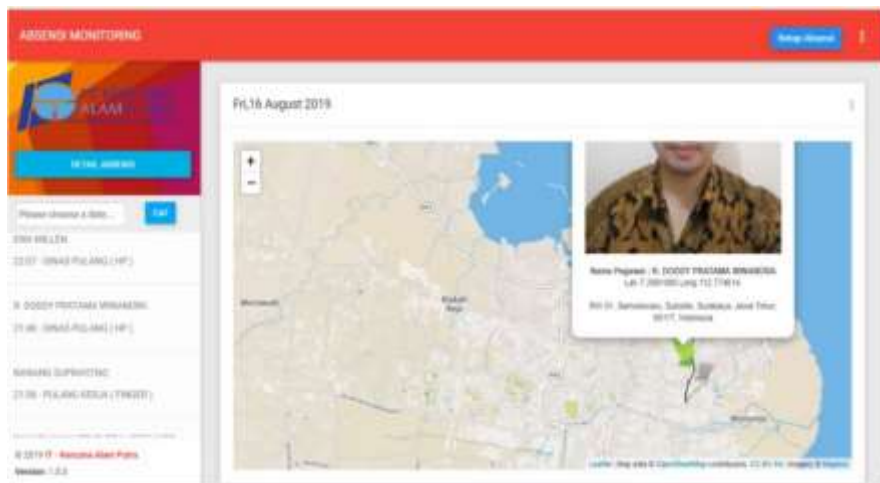

Fig 10. Location employee

Fig 11. Detail presence

As for the company's monthly report, it can be seen in Figure 12 and the company can see the details of the time and location of the employees according to their activities.

Fig 12. Rekapitulation presence

CONCLUSION

1. After the authors conducted research on the application of reverse geocoding for mobile attendance applications at PT. Three Main Strengths, the writer can conclude as follows: 1). Using Cordova can be an alternative for making Androidbased mobile applications without the need for the relatively heavy Android Studio program if it is run on standard or low specification hardware, 2). With this mobile absence application, it is hoped that it will make it easier for employees to take attendance when outside the office with information about work or out of town service, 3). With this application, it is hoped that it will become a means of facilitating superiors in assessing employee performance, 4). With this application is expected to handle the problem solved.

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