

Traffic Officers Attendance System Design Using GPS and IMEI Smartphone

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Abstract

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The reduction of traffic congestion level in the capital is not only viewed from the side of road width, vehicle density, and waiting time at the traffic signs but also no less important is the presence of traffic officers who secure every traffic crossroads. Therefore, it takes a system design that can perform online attendance at the traffic officer. This design utilizes a smartphone device that is IMEI (International Mobile Equipment Identity) as an identification officer and GPS (Global Positioning System) as a marker of attendance at the crossing of traffic signs. By using IMEI and GPS is expected to know the position and identity of officers and work time on the officer.

Keywords: attendance, traffic officer, IMEI, GPS

1. Introduction

The development of science and technology in the present increasing rapidly especially in the field of public services. There are many public services today one of them is the public service field in traffic. The number of vehicles in the capital resulted in severe congestion, especially at points of intersection. The reduction of traffic congestion level in the capital is not only viewed from the side of road width, vehicle density, and waiting time at the traffic signs but also no less important is the presence of traffic officers who secure every crossroads road sign.

Currently, agencies that take care of traffic begin to notice the presence of officers who served at the intersection of traffic, one of them requiring officers to document where the officers were on duty at the time. The presence of officers is certainly not spared from the cheats that can be done by the officers, and these frauds often get a slow response from the leadership of the institution so that the lack of good image for traffic officers in the eyes of the community. Therefore, it takes a system design that can perform online attendance at the traffic officer.

Positioning in a traffic intersection becomes important when viewed from the aspect of the user's need to know where he is, such as a traffic attendant who needs to know his position in a street while doing his job. One alternative to the positioning of traffic intersections can be done by utilizing GPS facilities (Global Positioning System) that exist on mobile devices. GPS is a global positioning and navigation system using satellites. [1] Almost everyone has a mobile device in support of their daily

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communication. IMEI (International Mobile Equipment Identity) is a unique number owned by every mobile device that can be used as its identity.[2]

In this journal, IMEI is used as the identity of traffic officers, and GPS technology is a marker of its presence at the intersection of traffic. By using IMEI and GPS is expected to know the position and identity of officers and work time on the officer.

2. Methods

2.1 GPS

GPS (Global Positioning System) is a location determination system based on satellite signals that will generate information in the form of coordinates, latitude, longitude, and location on the map. [3] GPS is an extra-terrestrial positioning method that uses satellites. [4] The system was originally designed for use in several major defense systems in the United States. But in its development, the use of GPS covers various fields of Military, Navigation, Geographic Information systems, and vehicle tracking.

The Global Positioning System (GPS) is used to determine the position of an object above the earth's surface, based on astronomical positions of latitude and longitude. This GPS is a new technology for smartphones integrated with satellites. This GPS is a new technology for smartphones that are integrated with satellites that can provide accuracy from 5 to 10 meters. [5]

2.1.1 Application of GPS on Android Smartphone

Application of Android-based GPS is GPS essentials, this app is available on Android Market or Play Store with paid and free versions.

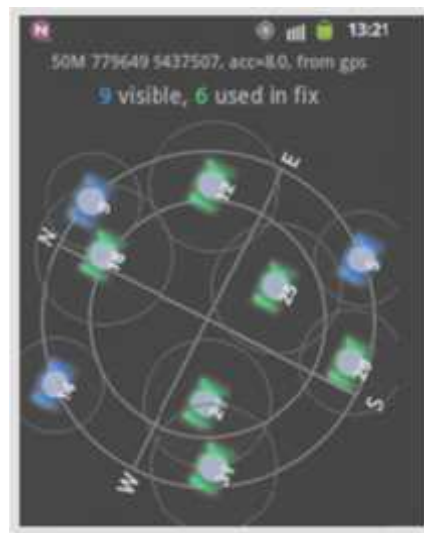


Figure 1. Application of GPS Essentials[3]

This application is used to detect GPS signal captures online for [3]:

1. Find a location, for location and GPS.
2. Internet access, used to read maps and submit bug reports.
3. USB storage content's, to write waypoints and track facilities
4. Read phone addresses and identities, used to assign tags to images on the device.
5. Shooting and video, on devices that have this application camera can provide shooting facilities.

2.1.2 International Mobile Equipment Identity (IMEI)

Having smartphones or tablets stolen is a serious problem, as it compromises individual privacy and security. So electronic serial numbers were created to give unique identification to mobile devices known as International Mobile Equipment Identity (IMEI) and the MEID (Mobile Equipment ID-a superset of IMEI) of today.[6]

The IMEI is unique to every ME (Mobile Equipment) and thereby provides a means for controlling access to GSM networks based on ME types or individual units.[7] IMEI is unique to every ME (mobile equipment) and uniquely identifies an individual mobile station. The IMEI format is given by Telecommunication standardization authorities and structured by the 3GPP and the structure of IMEI is specified in 3GPP TS 23.003.[6]

2.1.2.1 Structure of IMEI and IMEISV (IMEI Software version):

The IMEI (15 decimal digits: 14 digits plus a check digit) or IMEISV (16 digits) includes information on the origin, model, and a serial number of the device. The model and mobile phone brand are represented by an initial 8-digit portion of the IMEI/SV, Known as Type Allocation Code (TAC) and 7 remaining digits are defined by manufacturer (6 are serial numbers and 1 is check digit). From 2004, the format of the IMEI is **AA-BBBBBB-CCCCC-D**. [6] The format of IMEISV consists of an additional two digits for the Software Version Number (SVN), making the format **AA-BBBBBB-CCCCC-EE** [6].

Now suppose if a phone or other mobile device got stolen by the thief, carriers in some countries can blacklist the IMEI or MEID of the mobile or device so that thief cannot use the phone, and if a police complaint is filed some police forces will require the IMEI number in addition to the phone model for the complaint. To locate the IMEI chip remove the battery and frame of the mobile and the chip should place in front of the SIM card. This chip is known as **RX12** and it's the only one where's written "RX12".

2.1.2.2 Methods of Finding IMEI Number on Mobile Device

To find out the IMEI The number of mobile devices varies from device to device. Standards methods are [6]

- Enter a 5-digit string - * # 06 # on the dial pad and the number will be displayed.
- By removing the battery cover and looking at the empty battery slot for a label noting the IMEI.
- For android from the home screen, press Menu, then setting, then about the phone, and then status. IMEI will be located on the resulting screen.
- IMEI is also printed on mobile phone covering box and bill.

2.1.2.3 Analyze the selection of user IDs

The use of a unique number or ID as the user's primary identifier is needed as a differentiator between users, so there is no uneven data in the system and database.

An ID selection analysis that can be used as a unique code consists of:

1. User's mobile number.

A mobile phone number is a row of unique digit numbers embedded in each user card provider.

2. Physical code of the user's mobile phone (IMEI).

MEI (International Mobile Equipment Identity) is 15 unique codes. This IMEI is used by GSM networks to identify valid devices.

The usage of provider card number as ID will have a problem because every device handphone can change card which also will change the mobile phone number while IMEI phone number cannot be replaced. Of the two unique codes that are most likely to be used as a user, IDs are IMEI.

3. Results and Discussion

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3.1 System Analysis

System analysis aims to identify the system to be studied. This process of analysis is required as a basis for system design. In this study, the system is divided into 2 main processes, namely the process undertaken admin and the process of the user.

3.1.1 Admin

The admin consists of 3 stages of user data storage, location data storage, and checking the performance reports of users.

1. Saving User Data

The process of saving user data aims to store information about the user.

Stages performed in the storage of user data are as follows:

- Enter user data.
- Then the system will store all user data on the user database.
- All processed data is displayed on the user's page

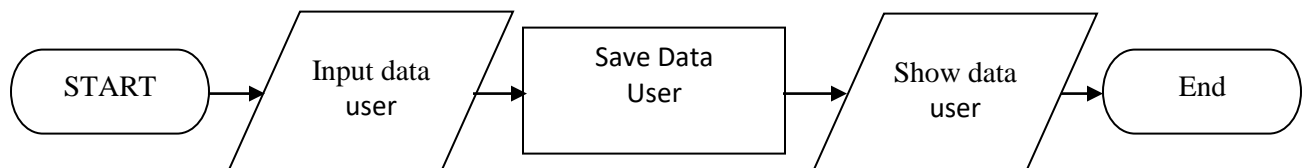


Figure 2. Saving User Data

2. Saving Location Data

The process of Saving location data aims to store information about the location of the user's task. The steps performed in the storage of location data are as follows:

- Enter location data such as id, place name, longitude, latitude, and time tolerance.
- Then the system will store all location data on the location database
- All processed data is displayed on the location page.

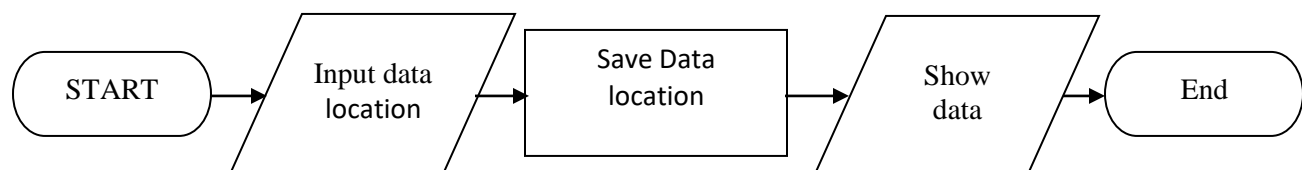


Figure 3. Saving Location Data

3. Checking User Performance Reports

The process of checking the user performance report aims to find out information about the user's performance. The steps performed in checking the user performance report are as follows:

- Enter user id.
- Then the system will retrieve data on the user database and performance database.
- Select the date the user reports to see.
- Then the system retrieves the data according to the selected date on the performance database.
- Finally, the system displays a user performance report according to the date selected by the admin.

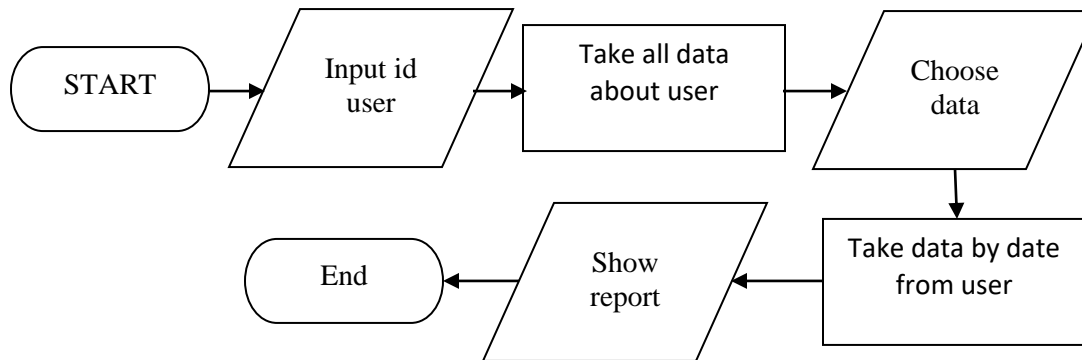


Figure 4. Checking User Performance Reports

3.1.2 User

In this system, the user will perform a location search by selecting the option button to locate the user's main page. The stages of the process the user performs are as follows:

1. User checks the location.
2. Then the user saves the photo where the user is located.
3. Then the user saves the user working time.
4. The system displays user performance results

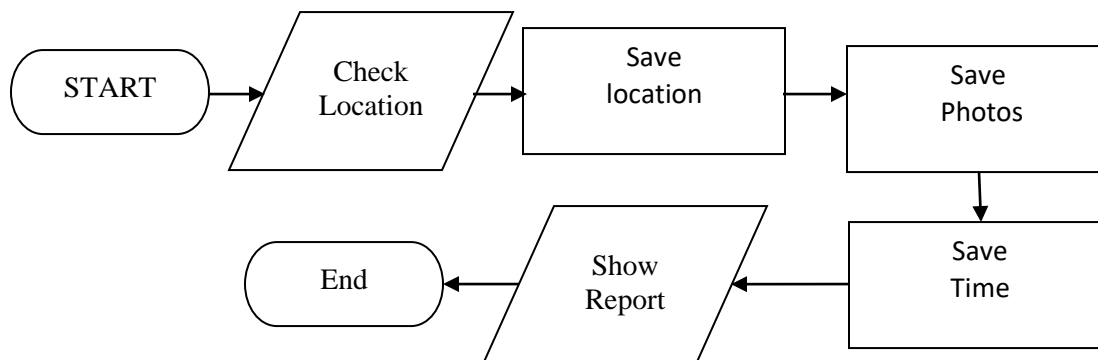


Figure 5 Checking User Performance Reports

3.2 System User Interface Design.

The design of the system user interface serves as the initial foundation in designing the system interface display. In this discussion, the interface for the user of the system on the user's more mobile device, among others, the login interface, locate the location, select the location, the duration of the job. In the admin, there is interface design such as user input interface, location input, and reports.

1. Login User Interface Design

In the design of the login user interface, there are 2 Textbox is the username to enter the user ID and password to enter the keyword. Then there is 1 Login button

Login
<input type="text" value="Username"/>
<input type="password" value="Password"/>
<input type="button" value="Login"/>

Figure 6. Login User Interface Design

2. User Interface Design's Search Locations

In the searching location interface, GPS will search for the nearest location of the user. The user will select the location where the user will work.

Search Location
<input type="button" value="Location A"/>
<input type="button" value="Location B"/>
<input type="button" value="Location C"/>

Figure 7. User Interface Design's Search Locations

3. User Interface Design's Take Photo

In the photo capture interface, there is a camera screen that will capture selfie user photos at location and photos of the state of the location where the user works. There are 3 Buttons are Capture, Delete, Upload.

Take Photo
<input type="text" value="Camera"/>
<input type="button" value="Take"/> <input type="button" value="Delete"/>
<input type="button" value="Upload"/>

Figure 8 User Interface Design's Take Photo

4. User Interface Design's Duration Work

In the design of the work duration interface, there is a running time. There is 1 logout button to send the user's duration of operation

Duration Work
-- hour -- Min. -- Sec.
Logout

Figure 9 Interface Design's Duration Work

5. Admin Interface Design's Data Input

In the design of the data input interface, there is 4 Textbox that is ID employee, IMEI mobile, No.Hp, Email. 4 buttons save, update, delete and cancel.

Header			
ID User			
IMEI Mobile			
Num. Hp			
Email User			
Save	Update	Delete	Cancel

Figure 10 Admin Interface Design's Data Input

6. Admin Interface Design's Input Location

In the design of the data input interface, there are 5 Textbox namely ID, Name Location, Longitude, Latitude, and Tolerance. 4 buttons save, update, delete and cancel.

Header			
ID			
Location Name			
Logitute			
Latitude			
Tolerance			
Simpan	Update	Hapus	Cancel

Figure 11 Admin Interface Design's Input Location

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7. Report Admin Interface Design

In the design of the Print Report interface, there is 1 Textbox in the User ID. 2 buttons see and cancel.

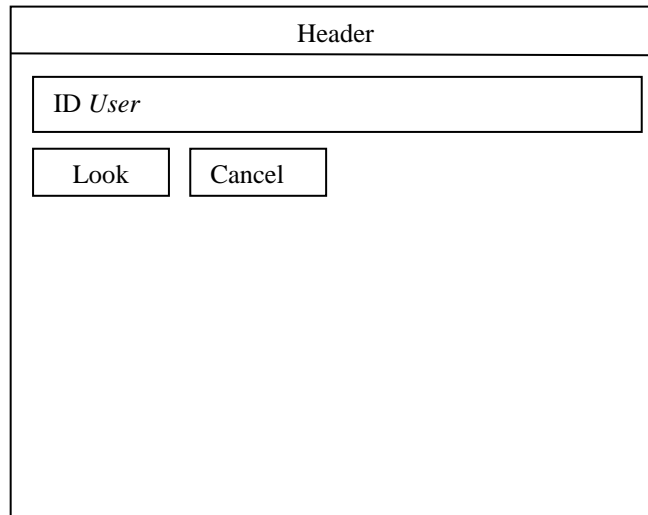


Figure 12 Report Admin Interface Design

4. Conclusions

During this system running on traffic officers still use the manual system so that less effective and efficient. So requires an integrated attendance system using an attendance information system. With the new attendance system more effectively and efficiently in the attendance of traffic officers. The design of this system is expected to know the position of the presence of officers and the duration of work time of traffic officers on the daily report of traffic officers

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