The International Conference on Natural Sciences, Mathematics, Application, and Technology (ICON-SMART) Proceedings

Vol I December 2021
E-ISSN xxx xxx
pp. 27-32

GPS Using for Teacher's Attendance in Student's Fieldwork Practices at SMKN 7 Surabaya

Yonatan Widianto [a)], Denny Suhanda and Shendy Susilo

Department of Informatic Engineering, Faculty of Engineering, Widya Kartika University, Surabaya, Indonesia.

[a)] Corresponding author: yonatan.widianto@gmail.com

Abstract. One of the programs for SMK students is to apply the knowledge they have gained, so these students are required to do fieldwork practices, mentioned with PKL, in companies, or partner schools. A student supervising teacher must deliver, guide, and pick them up. The teacher is expected to be able to provide reports from these mentoring activities directly in the field. Often found, students have done administrative reporting, the teacher missed it. The Fieldwork Practices Assistant Teacher Attendance Application, mentioned with ABGUL, is an application that can be used for reporting on mentoring activities by teachers from beginning to end. This application can upload photos, automatic location recording, and report mentoring records. This application is designed by utilizing the global positioning system (GPS) to get the user's current location at the location. This application development uses a prototype approach. The result is that this application recapitulates reporting data as a form of monitoring reporting and student assistance. This includes recording the location during guidance in the field with an accuracy rate of approximately 90%.

INTRODUCTION

GPS (Global Positioning System) is a satellite navigation system consisting of 24 operating satellites. The 24 satellites orbit while transmitting radio wave news signals that are received by the receiver. Android is an operating system used on smartphones and can provide this GPS service. This service provides the existence of the position of a location based on the latitude and longitude coordinates. The coordinate points use Geocoding, which is the process of storing location identification based on the coordinates of the GPS. The capabilities of this GPS service will be utilized in recording reporting.

According to the explanation of Indonesian Law Number 20, 2003, Article 15, vocational education is secondary education that prepares students especially to work in certain fields. Vocational education consists of Vocational High School, and Vocational Aliyah Madrasah. Vocational Education's characteristics are as follows.

- Vocational education is directed at preparing students to enter the reals.
- Vocational education is based on the needs of the world of work.
- The focus of the content of vocational education is emphasized on mastering the knowledge, skills, attitudes, and values required by the world of work
- The real assessment of student success should be on "hands-on" or performance in the world of work
- A close relationship with the world of work is the key to successful vocational education.

The principles of Vocational Education are as follows: vocational education will be efficient with its training environment which is a replica of its working environment. Education will be effective if a person is trained with the same job tools applied in the workplace. The characteristics and principles of this education exist at the 7th State Vocational High School (SMKN 7) in Surabaya, East Java. This is reflected in the existence of a fieldwork practice program (PKL) for students in companies or in partner schools. Teachers as academic supervisors are tasked with dropping off, guiding, and picking up their students at the street vendors. Students and teachers are obliged to make reports. Students make reports about their internship activities and teachers make reports about their mentoring. The students are orderly in doing so, but not for the teachers. This problem really needs an application to help the negligence of teachers. The thing that became the basis for the negligence of these teachers was because the person concerned only remembered after being billed by the Administration in his reporting.

The PKL Assistant Teacher Attendance Application (ABGUL) is an application that can be used for reporting on mentoring activities by teachers from beginning to end. This application can upload photos, automatic location recording, and report of mentoring records. This application is designed by utilizing the global positioning system (GPS) to get the user's current location on location.

RESEARCH METHODOLOGY

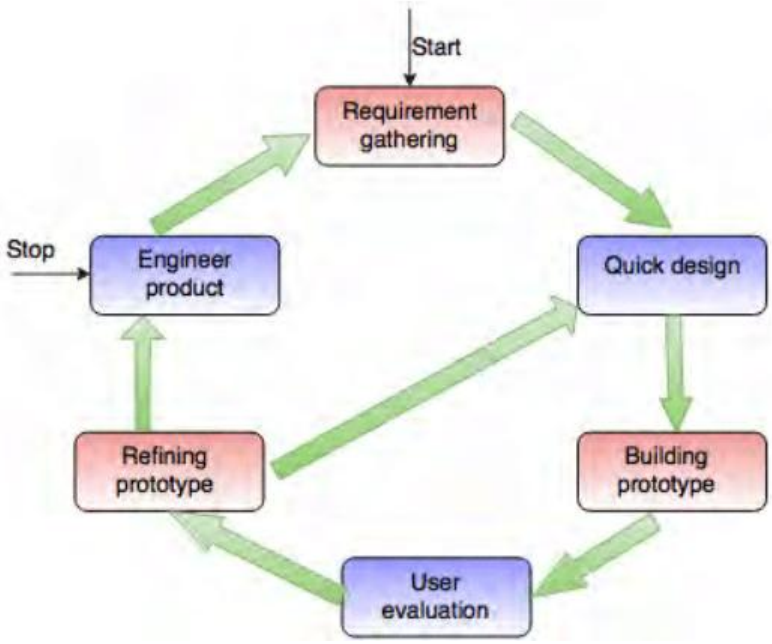

FIGURE 1. Prototype Approach

Requirements Gathering

In many cases, the system owner is less careful in finding various alternatives in developing the system. This is possible because the owner of the system is already quite bothered with the affairs of using the system by carrying out the mission and vision of the system. In fact, there are various possibilities in its development. There are various techniques for gathering system requirements. What is used in gathering needs in solving the problem is as follows.

- Interviews
  The team from SMKN 7 was represented by the Public Relations Team. Which they have sent representatives who understand the system requirements. The interview process was conducted via video conference call. This method was carried out considering the development of the system in the midst of the Covid-19 pandemic. Several questions in the interview were conducted to obtain information on their needs. The main thing that was obtained was that the field work practice supervisor missed reporting when conducting on-site guidance.
- User Observation
  While on the observation of this user, it was found that the system user reported this activity after arriving at school. Of the many teachers, the results of observations from the Administration said there were as many as 75% who did so.
- Brainstorming
  This technique is one of the effective techniques in gathering needs. System owners who have been confused in finding solutions to their problems, this is one way. The equipment used when using this technique is a whiteboard and empathy maps.

Quick Design

Quick design is a stage that is passed after the system requirements are known. The aspect that is considered is the input and output of the system. It focuses on what the user needs rather than detailed planning. This strongly

supports the development of a prototype. Based on this understanding, after getting what they need, the development team immediately develops the system block immediately. The system block is described as follows.

- The supervising teacher who is guiding the field takes pictures or photos of himself while on location using his gadget. The device used can be a laptop or smartphone.
- Storage of photos or images in this application. When the report is saved as a form of reporting, the GPS service is requested to be activated by the user, either automatically or manually. If it is not activated manually, then the reporting data cannot be reported and saved into the system.
- Reporting data is stored in the database. This is needed further for the purposes of processing data into good information. This information is used by the Administration as one of the performance reports from the supervising teacher. This includes recording the location of the implementation of guidance to students.
- Processing of this information is still presented in the application.
- This system has 2 kinds of users, namely Administration and Teachers. The administration has a role in issuing guidance assignments to students who practice fieldwork. This assignment was well received by the teacher, the teacher provided guidance in the field.

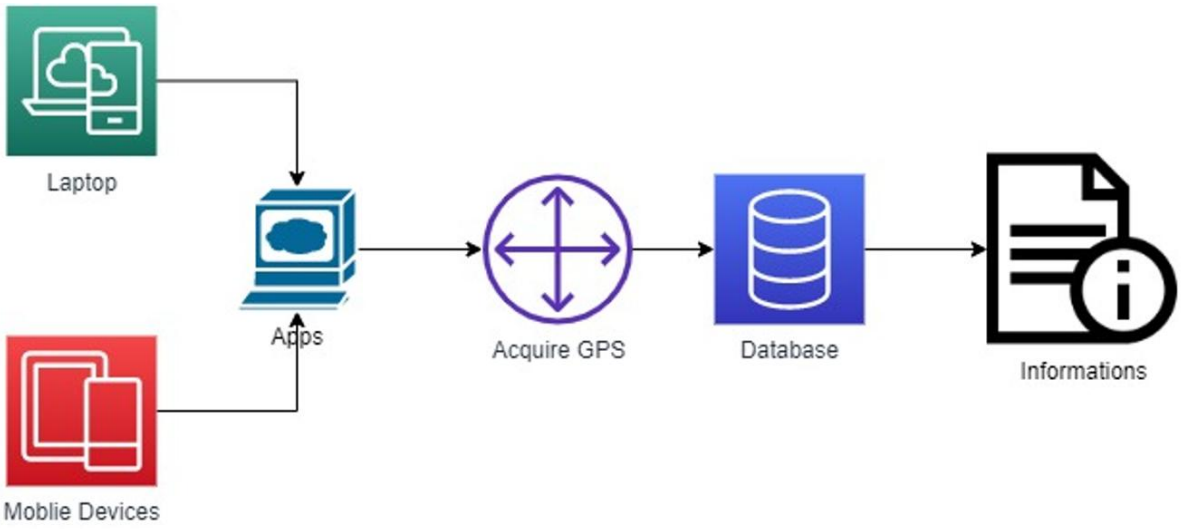

FIGURE 2. Block System

Building Prototype

In developing the prototype, the development team chose to use a web-based application. Here are the advantages and disadvantages of web-based applications.

Advantages

- Cost.
  A web-based version of the application can support a wide variety of operating systems. The time required is not much compared to mobile application development.
- Change
  Web-based applications can be updated at any time. And every user can access the same and latest version.
- Customization
  Many develop application-based systems because they are easy to customize. In addition, the security is better and safer.
- Download Requirement
  No special application download required. Web Browsers can directly access in order to interact directly with web-based applications.
- Platform support
  All operating systems support the use of this web-based application. The appearance of the application can adapt to the platform used, such as Windows, IOS, MacOS, Android, and other Operating Systems. However, it still requires a web browser.

Disadvantages

- Performance
  Regarding the performance of this web application, the bigger the application, the slower the performance. This is compared to desktop-based applications.
- Security
  Security is a major issue, because this web application can be accessed anywhere. This makes this data ubiquitous. This is the vulnerability of web-based application security.
- Availability
  Unavailability on Apps Store or Play Store. Although on the internet, only certain people know this application.
- Web Problems
  This application is completely dependent on the website. If the website is down, the application cannot be opened.
- Internet Addiction
  Dependence on the internet, making this application there must be a new internet this application can be opened and used.

This choice is based on the fact that the web application is easy to develop and does not require special installation on the device used. Simply connect to the internet and this application can be used. The GPS system is the main key in the acquisition of object positions. The coordinate data delivery system is based on the point of the GPS location, at the coordinate point where we activate the GPS with Function Call. GPS will send data in the form of the coordinates of the location of the GPS.

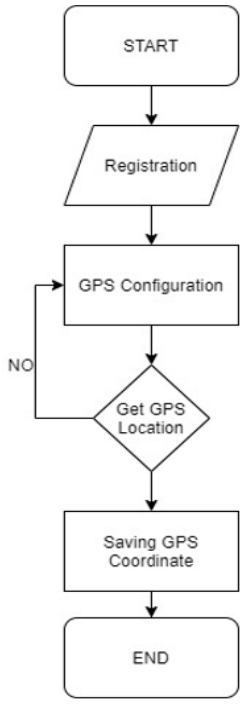

FIGURE 3. GPS Location Recording Flowchart

FIGURE 4. Information of GPS on Google Maps Flowchart

User Evaluation

The prototype developed by the team can be directly evaluated by the user.

Refining Prototype

The results of the evaluation of system users, there are application improvements. Fixed application due to a bug in the application. If there is no improvement, then this application is considered as a result of application development and as needed.

Product Engineer

At this stage, the product has been accepted by the system owner and is ready to be used in real cases. If there is further system development, it is carried out back to the initial stage, namely gathering requirements.

TABLE 1 . Table of Comparison of GPS and Google Latitude and Longitude

Location	Google Latitude	Google Longitude	GPS Latitude	GPS Longitude	Hasil
Gembong Tebasan 25 Surabaya	-7.2574719	112.7520883	-7.245160	112.749080	0,01
Universitas Widya Kartika	-7.2606202	112.7943272	-7.270720	112.811570	0,01
Balai Kota Surabaya	-7.2592055	112.7470786	-7.221930	112.728120	0,02
SMKN 7 Surabaya	-7.251347240420383	112.73121979465463	-7.251310	112.730530	0,001

RESULTS

This section describes the process of making applications and configuring the GPS system and analyzing the results of the test. Of all the applications made, this will be tested to find out how far the success rate of using GPS as a form of recording teacher attendance during field guidance. This test is carried out on the accuracy of the Tracker that will be generated by this application.

The results of the comparison between the detection results from Google Maps and GPS with an average difference of 0.01 or more than 90%.

CONCLUSION

After testing and evaluating the results of the tracking position system based on GPS coordinates using a smartphone, it can be concluded that:

1. This system functions properly using the coordinates generated by the GPS tracker tool
2. Tracking Position based on coordinate data that will be processed by Geolocation.
3. The function of this system can make it easier for GPS Tracker users to more easily track the teacher's whereabouts when conducting guidance in the field either by using a smartphone or laptop.
4. The weakness of this position tracking system application is that there is no real-time movement at the tracking point, this system is only able to track the position based on the coordinates generated by the GPS Tracker.

REFERENCES

1. Atthari. Jurnal Infomedia (2017)
2. Fahlivi, M. Ridha, and Atthariq. Jurnal Infomedia (2017)
3. E. Firmansyah. Pemanfaatan Global Positioning System (GPS) untuk Menghitung Luas Tanah. Informan's. (2016)
4. E. Ronald. Proceedings of the 5th UPI International Conference on Technical and Vocational Education and Training (2018)
5. I. Sommerville. Software Engineering Ninth Editon (Addison-Wesley. 2011)
6. B. Bennet. Accurate Distance Calculation Using GPS while performing Low Speed Activity. (Departemen of Computer and Information Science, University of Oregon. 2018)