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Implementation Of The Mapping System For Student Practical Work Locations Using Mobile Gis

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ABSTRACT

In the learning process, students in lectures do not only acquire theoretical material but students are also required to do practical work in companies. Practical work is intended so students can find out real problems in the field, increase knowledge and improve hard and soft skills. In its implementation, students can apply for practical work based on the choice of the location of the intended company, the system that has been running already accommodates the business process of applying for practical work. Still, there is no feature to find out the location distribution of practical work students. This study aims to utilize the API (application programming interface) on the Google Maps API and GPS (Global Positioning System) services to see the distribution of suitable work locations for INSTIKI students. The benefits of research to find suitable work locations for students at STIKI Indonesia are very important, considering that practical work is carried out in all regions in Indonesia, including remote areas. The application is built using mobile and web platforms to assist student users in submitting practical work data and coordinator users in monitoring the distribution of practical work students in several companies where practical work is located.

1. Introduction

Every educational institution has implemented an internship or practical work program for its students. With this work practice, it is expected that students can know firsthand the real situation in the world of work, as well as increase their knowledge and hard skills and soft skills[1][2]. Institut Bisnis dan Teknologi Indonesia or INSTIKI is a computer science college with two study programs, informatics engineering (IT) and computer systems (SK). Both of these study programs have practical work courses, and this course is one of the mandatory courses for students[3]. In 2017 the number of students taking practical work courses was 698 in the Odd Semester 2017/2018 and as many as 480 in the Even Semester 2017/2018. In 2018 there were 896 in the 2018/2019 Odd Semester and 191 in 2018/2019 Even Semester. In 2019, there were 794 in the 2019/2020 Odd Semester and 268 in 2019/2020 Even Semester[4][5]. As the number of students taking practical work courses from year to year raises several problems, one of which is the difficulty of the practical work coordinator in seeing the distribution of student practical work locations because there is no information system developed for this purpose[6][7]. The unavailability of this system can allow students to falsify practical work locations[8].

Looking at the current conditions, smartphone users in Indonesia growing from 2019[9] and reached 370 million in 2022[10]. Android is a smartphone operating system that supports comprehensive connectivity technology and is equipped with GPS (Global Positioning System). GPS (Global Positioning System) is a navigation system that uses satellite signals. GPS allows smartphones to find out the coordinates of the user, which is in the form of latitude and longitude data. With the availability of technology resources, it is possible to build an information system for mapping suitable work locations. It is a combination of mobile GIS (Geographical Information System) and web applications and information that can be visualized on the web[8][11]. The API (application programming interface) facility on the google map service is a free online

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virtual globe map service provided by Google[12]. Google map API is a library in the form of JavaScript that allows programmers to integrate Google Maps into the web[13][14].

This study aims to utilize the API (application programming interface) on the google map and GPS (Global Positioning System) services to see the distribution of suitable work locations[15] for INSTIKI students. The benefits of research to find suitable work locations for students at STIKI Indonesia are very important, considering that practical work is carried out in all regions in Indonesia, including remote areas. This becomes a problem if the location does not match the actual address, so mapping through a map will help provide the address and the exact location position. System build in mobile based and web based.

2. Method

2.1 Geographical Information System (GIS)

Mobile GIS is an integrated technology framework for accessing spatial data and location-based services via mobile devices such as Pocket PCs, Personal Digital Assistance (PDAs), or smartphones. With GPS, Internet, and wireless communication technology capabilities, mobile GIS has great potential and plays an important role in data acquisition and validation [15]. Mobile GIS is an integration of software/hardware working methods for accessing geospatial data and services via mobile devices via wired or wireless networks. Mobile GIS is generally implemented in two main application areas, namely Location-Based Service and Field-Based GIS[16].

2.2 Google Maps API

Google Maps is an online map or open a map online, and it can be done easily through a free service from Google. This service provides an Application Programming Interface (API) that allows other developers to take advantage of this application in their applications[17]. API is documentation consisting of interfaces, functions, classes, structures, and so on to build software[18]. Google Maps API is a service provided by Google to users to use Google Maps in developing applications[19] . The Google Maps API can save time and money in building reliable digital map applications focusing on the displayed data

2.3 System Flowchart

The following is a flowchart of the mobile application for student practical work, which can be seen in Figure 1. The process flow described begins with the student logging in by entering the registered student identity and password, if it fails, it will not be able to enter, and if successful, it will enter the main menu. The student determines the location of the practical work. Then the position is recorded and brought to the student data input page, which consists of the ID, student's full name, the full name of the owner, name of place of business, business address, business photo, name of the business photo, latitude point, longitude point, and filing date practical work. Finally, the data is saved and done.

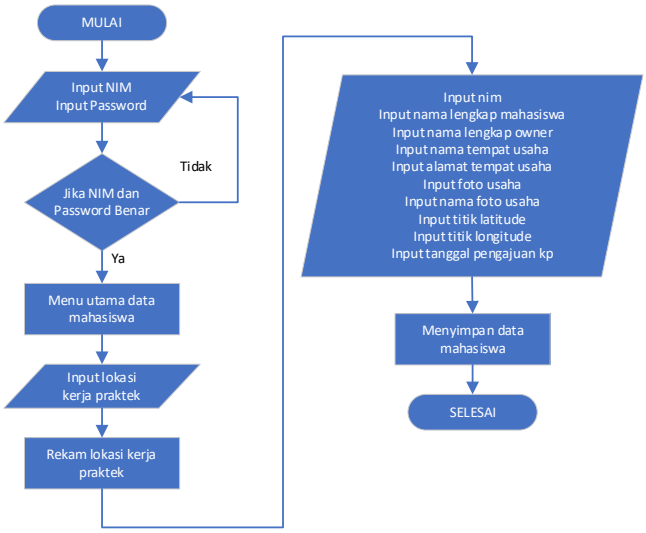

Figure 1. Flochart of Mobile Application

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The following explains the flowchart from the web application side, which can be seen in Figure 2. In Figure 2, it is explained about the flow of the coordinator in viewing the location data for the distribution of students who take practical work based on a certain period (school year). The location data for the distribution of practical work students will be displayed in a map form with the help of the Google Map API (application programming interface) service for mapping the distribution of suitable work locations.

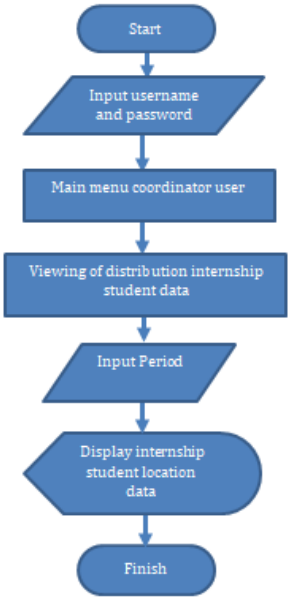

Figure 2. Flochart of Web Application

3. Result and Discussion

3.1 Problem Identification and Data Collection

The data collection stage was conducted using interviews and observation methods to identify and formulate problems[20][21]. Interviews were conducted with the coordinator of INSTIKI's practice and final project to determine students' business processes in submitting work data. Data on practical work students each semester is obtained from internal data from the archives of the practical work division and the final project. Then the observation process is carried out to observe the process of submitting practical work and monitoring data on students who carry out work practices.

3.2 Analysis Of The Running System

At the analysis and design stage of the system to be built based on pre-existing problems, there is a student practical work system design. The analysis of the system is described with a use case diagram[22][23] that can be seen in Figure 3 below.

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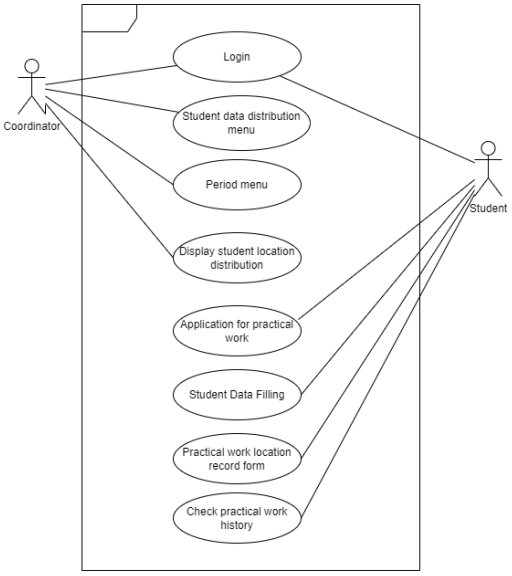

Figure 3. Usecase Diagram Of Practical Work Student System

There are two actor entities (users) in which there is a use case diagram consisting of:

a. Coordinator
   The coordinator is the highest level user in the system who has full access to systems that interact with use cases: student data distribution menu, period menu, display student location distribution.
b. Student
   Student user can interact with use cases : application for practical work, student data filling, practical work location record form

3.3 System Interface

In the implementation of the system, there is a user interface page divided into a mobile-based interface and a web view.

a. Mobile-Based Application Interface

1) Mapping Pages for Student Practice Work Locations
   On the mapping page, students will automatically map the practical work location based on where the student's current position is. The latitude and longitude points will automatically be recorded and then taken to the complete practical work data page. Here's how it looks can be seen in Figure 4.

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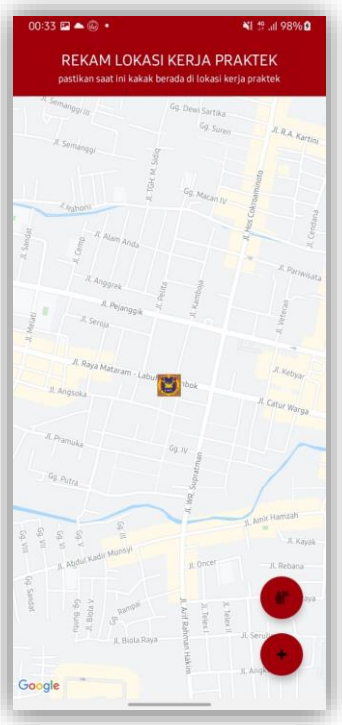

Gambar 4. Practice Work Mapping Locations

2) Practical Work Data Filling Page
On the data entry page, students will fill in practical work data where the student's identity, latitude point, longitude point, and submission date will be automatically stored in real-time. The data that must be filled in manually by students consists of the student's full name, the owner/company owner, owner's phone number, company name, company address, photo upload, and photo name. The following display can be seen in Figure 5.

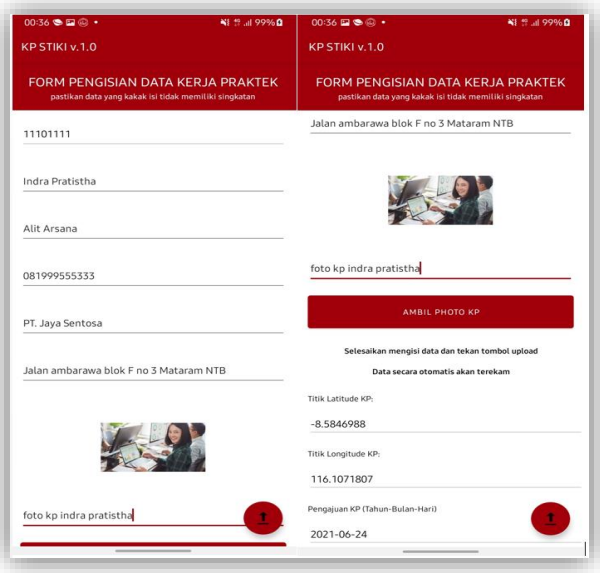

Figure 5. Practical Work Data Filling Page

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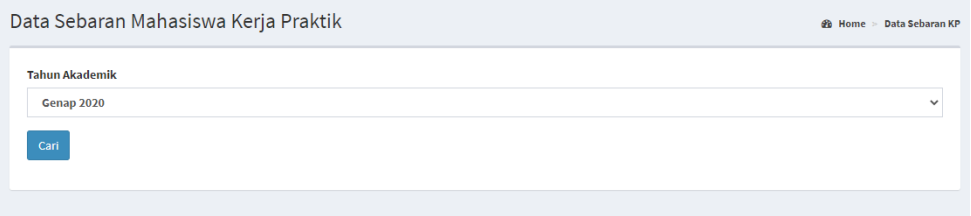
3.2 Web View Application Interface

The practical work coordinator uses the web page to view data on the distribution of the location of students who are taking practical work according to a certain period (school year). Location data is presented in the form of a map.

a. Page View Distribution Data

This page contains fields in a drop-down menu to select the period or academic year for which you want to see the data on the distribution of practical work. The following display can be seen in Figure 6.



Gambar 6. Page of View Distribution Data Work Practice Student

This page involves using the Google Maps API. To access the Google Maps API, a password is required, called an API Key. In simple terms, the API Key can be interpreted as program code which is an interface or liaison between the application or web that we create with the functions found on maps.google.com. For example, when accessing the maps function can be seen on Figure 7.

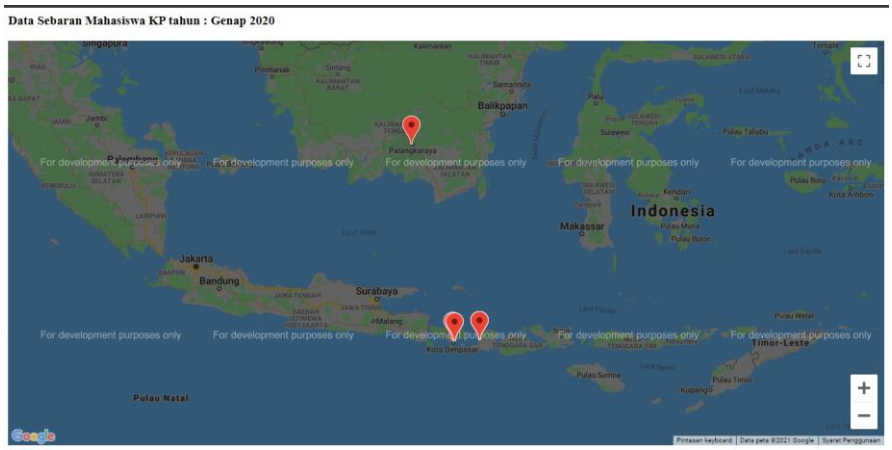


Figure 7. Data on the Distribution of Practical Work Locations

4 Conclusion

From the analysis, design and development results, and implementation, it can be concluded that an application for mapping the distribution of practical work locations has been successfully built with the help of the Google Map API (application programming interface) service. The application is built using mobile and web platforms to assist student users in submitting practical work data and coordinator users in monitoring the distribution of practical work students in several companies where practical work is located.

References

[1] D. Aswita, "Merdeka belajar kampus merdeka (MBKM): inventarisasi mitra dalam pelaksanaan magang Mahasiswa fakultas keguruan dan ilmu pendidikan," in *Prosiding Seminar Nasional Biotik*, 2022, vol. 9,

no. 2, pp. 56–61.
[2] K. D. P. Meke, R. B. Astro, and M. H. Daud, "Dampak Kebijakan Merdeka Belajar Kampus Merdeka (MBKM) pada Perguruan Tinggi Swasta di Indonesia," *Edukatif J. Ilmu Pendidik.*, vol. 4, no. 1, pp. 675–685, 2022.
[3] W. G. S. Parwita and N. W. S. Saraswati, "Pengembangan Sistem Monitoring Tugas Akhir dan Kerja Praktek STMIK STIKOM Indonesia," *S@ CIES*, vol. 7, no. 1, pp. 47–53, 2016.
[4] I. K. A. G. Wiguna, D. P. D. K. Dewi, and I. G. I. Sudipa, "Implementasi OLAP pada Data Kerja Praktik dan Tugas Akhir Menggunakan Framework Modular Cube JS," *INFORMAL Informatics J.*, vol. 6, no. 3, pp. 142–153, 2021, doi: https://doi.org/10.19184/isj.v6i3.27614.
[5] I. G. I. Sudipa, I. M. D. P. Asana, I. K. A. G. Wiguna, and I. N. T. A. Putra, "Implementation of ELECTRE II Algorithm to Analyze Student Constraint Factors in Completing Thesis," in *2021 6th International Conference on New Media Studies (CONMEDIA)*, 2021, pp. 22–27.
[6] P. Hendikawati and N. Hidayati, "Persepsi Mahasiswa Terhadap Sistem Aplikasi SIMPKL Pada Implementasi Kegiatan Praktek Kerja Lapangan Menggunakan Analisis TAM," *J. TAM (Technology Accept. Model.*, vol. 10, no. 2, pp. 74–82, 2019.
[7] A. H. Jatmika, A. Zubaidi, A. Z. Mardiansyah, A. Hernawan, and I. G. P. W. Wedashwara, "Pengembangan Sistem Informasi Manajemen Praktek Kerja Lapangan Berbasis Web Untuk Meningkatkan Layanan Administratif Program Studi Teknik Informatika Universitas Mataram Di Era Pandemi Covid-19," *J. Begawe Teknol. Inf.*, vol. 2, no. 2, 2021.
[8] S. Mely, "Pengembangan Sistem Informasi Geografis Untuk Pemetaan Lokasi PKL Mahasiswa Informatika Menggunakan Metode Agile." Institut Teknologi Telkom Purwokerto, 2021.
[9] W. P. Sari and L. Irena, *Komunikasi kontemporer dan masyarakat*. Gramedia Pustaka Utama, 2019.
[10] A. Purwanto, "TRAINING ON SOCIAL MEDIA UTILIZATION FOR COMMUNICATION POLITICS TO CONSTITUENTS IN THE ASPIRATION HOUSE OF MUHAMMAD NUR PURNAMASIDI, JEMBER REGENCY," *UNEJ e-Proceeding*, pp. 193–201, 2022.
[11] I. K. A. G. Wiguna and K. N. Semadi, "SISTEM INFORMASI MANAJEMEN PENGELOLAAN DATA BENCANA BERBASIS WEB DI BPBD KOTA DENPASAR," *J. Teknol. Inf. dan Komput.*, vol. 5, no. 2, 2019.
[12] N. L. W. S. R. Ginantra *et al.*, *Basis Data: Teori dan Perancangan*. Yayasan Kita Menulis, 2020. [Online]. Available: https://kitamenulis.id/2020/10/08/basis-data-teori-dan-perancangan/
[13] C.-H. Tsai, S.-C. Tsai, and S.-K. Huang, "REST API Fuzzing by Coverage Level Guided Blackbox Testing," in *2021 IEEE 21st International Conference on Software Quality, Reliability and Security (QRS)*, 2021, pp. 291–300. doi: 10.1109/QRS54544.2021.00040.
[14] A. Dincer and B. Uraz, *Google Maps JavaScript API Cookbook*. 2013.
[15] I. B. G. Sarasvananda, I. G. M. N. Desnanjaya, and Y. Dewi, "Klasterisasi Sebaran Kasus Covid-19 Di Kota Denpasar Menggunakan Algoritme K-Means," *J-SAKTI (Jurnal Sains Komput. dan Inform.*, vol. 5, no. 2, pp. 565–574, 2021.
[16] T. Tijaniyah, A. Herlina, and S. Sulistiyanto, "Mobile Gis Sebaran Pabrik Gula Di Provinsi Jawa Timur," *Metik J.*, vol. 2, no. 2, pp. 53–57, 2018.
[17] B. R. Rompas, A. A. E. Sinsuw, S. R. U. A. Sompie, and A. S. M. Lumenta, "Aplikasi Location-Based Service Pencarian Tempat Di Kota Manado Berbasis Android," *J. Tek. Elektro dan Komput.*, vol. 1, no. 2, 2012.
[18] M. Faya and N. Fiftin, "Pemanfaatan Google Maps API Untuk Pembangunan Sistem Informasi Manajemen Bantuan Logistik Pasca Bencana Alam Berbasis Mobile Web (Studi Kasus: Badan Penanggulangan Bencana Daerah Kota Yogyakarta)," *Sarj. Tek. Inform.*, vol. 1, no. 1, pp. 164–165, 2013.
[19] R. H. Simanjuntak, H. Tolle, and R. K. Dewi, "Pengembangan Aplikasi Mobile Geotagging Fasilitas Tanggap Darurat Bencana Alam Menggunakan Algoritma Polylines sebagai Pencarian Rute Terdekat," *J. Pengemb. Teknol. Inf. dan Ilmu Komput. e-ISSN*, vol. 2548, p. 964X, 2019.
[20] B. H. Hayadi, I. G. I. Sudipa, and A. P. Windarto, "Model Peramalan Artificial Neural Network pada Peserta KB Aktif Jalur Pemerintahan menggunakan Artificial Neural Network Back-Propagation," *MATRIK J. Manajemen, Tek. Inform. Dan Rekayasa Komput.*, vol. 21, no. 1, pp. 11–20, 2021.
[21] D. S. Maylawati, W. Darmalaksana, and M. A. Ramdhani, "Systematic design of expert system using unified modelling language," in *IOP Conference Series: Materials Science and Engineering*, 2018, vol. 288, no. 1, p. 12047.

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

[22] G. Reggio, "A UML-based proposal for IoT system requirements specification," in *Proceedings of the 10th international workshop on modelling in software engineering*, 2018, pp. 9–16.
[23] L. Cavique, M. Cavique, A. Mendes, and M. Cavique, "Improving information system design: Using UML and axiomatic design," *Comput. Ind.*, vol. 135, p. 103569, 2022.

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.