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Implementation and Dissemination of Employee Online Presence Applications with Geolocation Features at PDAM Tirta Anom City of Banjar Based on Android

Implementasi dan Sosialisasi Aplikasi Presensi Online Pegawai Dengan Fitur Geolokasi Pada PDAM Tirta Anom Kota Banjar Berbasis Android

Dimara Kusuma Hakim[1], Wildan Maulana Akbar[2]
[1,2,] Informatics Engineering Study Program, University of Muhammadiyah Purwokerto
Jl. Raya Dukuhwaluh, Kembaran 53182, Indonesia.
[1]dimarakusumahakim@ump.ac.id, [2]maulanawildan21@gmail.com

ABSTRACT
Employee attendance in a company is the presence and participation of employees physically and mentally to company activities during working hours. Given the importance of the meaning of a presence, a tool is needed that can manage the attendance process to be more accurate and efficient. Honesty and time discipline are mandatory in the attendance process. Attendance recap is usually done manually, although there are some companies that already use *fingerprint* devices, but there are some problems that can hinder attendance activities. In this case, the creation of an android-based *online* attendance system uses a geolocation system designed with the *Software Life Development System (SDLC)* development method with a *waterfall* model development model and is created using a JavaScript-based framework React Native, *PHP* and MySQL as *a database* The result of this research is the construction of an online attendance application using the Android operating system. Based on the results of the *alpha* test , the interpretation results of 'Very Feasible' were obtained with a value of 88.89% from media experts and a value of 100% from material experts. Meanwhile, the results in the user *beta* test through the questionnaire obtained a value of 95.24% with the interpretation results of 'Very Feasible'. Based on the results of the problem analysis, it can be concluded that the Employee Online Attendance application at PDAM Tirta Anom Banjar City was successfully built by utilizing the *geolocation* feature to overcome problems that occur so that the employee attendance process becomes more effective and reduces inhibition.

Keywords: Employee attendance, geolocation, waterfall

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ABSTRAK
Kehadiran karyawan dalam suatu perusahaan adalah kehadiran dan partisipasi fisik dan mental karyawan dalam kegiatan perusahaan selama jam kerja. Mengingat pentingnya arti dari sebuah presensi, maka diperlukan suatu alat yang dapat mengatur proses presensi agar lebih akurat dan efisien. Kejujuran dan disiplin waktu harus dilakukan dalam proses absensi. Rekapitulasi presensi biasanya dilakukan secara manual, meskipun ada beberapa perusahaan yang sudah menggunakan alat fingerprint, namun terdapat beberapa kendala yang dapat menghambat aktivitas presensi. Dalam hal ini pembuatan sistem presensi online berbasis Android menggunakan sistem geolokasi yang dirancang dengan metode pengembangan Software Life Development System (SDLC) dengan model pengembangan model waterfall dan dibuat menggunakan framework berbasis React Native JavaScript, PHP dan MySQL sebagai databasenya. Hasil dari penelitian ini adalah dibangunnya sebuah aplikasi presensi online dengan menggunakan sistem operasi Android. Berdasarkan hasil uji alpha diperoleh hasil interpretasi 'Sangat Sesuai' dengan nilai 88,89% dari ahli media dan nilai 100% dari ahli materi. Sedangkan hasil uji beta pengguna melalui kuesioner diperoleh nilai 95,24% dengan interpretasi 'Sangat Layak'. Berdasarkan hasil analisis permasalahan tersebut, dapat disimpulkan bahwa aplikasi Absensi Online Pegawai di PDAM Tirta Anom Kota Banjar berhasil dibangun dengan memanfaatkan fitur geolocation untuk mengatasi permasalahan yang terjadi sehingga proses absensi pegawai menjadi lebih baik. efektif dan mengurangi hambatan.
Keywords: *presensi, geolocation, waterfall*

1. Introduction

1.1 Background

Water is a very important and absolutely necessary need by all living things, especially manuisa. In everyday life, it is impossible for humans to be separated from the need for water. Clean water providers are indispensable for people's consumption purposes. Regional Drinking Water Company (PDAM) is one of the regionally owned business units, which is engaged in the distribution of clean water to the community. PDAM is available in every province, regency, and city throughout Indonesia. PDAM as a means of providing clean water is supervised by the executive and legislative apparatus of the local government.

The Tirta Anom Regional Drinking Water Company of Banjar City was established to realize and improve services for clean water needs for the people of Banjar City, carry out development efforts in accordance with functions and increase production in the field of clean water services, as well as being one of the facilities in the efforts of the Banjar City Government to add and support sources of Regional Original Income (PAD). PDAM Tirta Anom Kota Banjar was established based on Banjar City Regional Regulation Number 23 of 2004 dated June 2004.

PDAM Tirta Anom Kota Banjar is currently implementing an employee attendance system with a attendance tool that can be used with fingerprint validation. The problem that arises in practice is that when conducting attendance, the tool takes one to three minutes to validate fingerprints, with more than 150 employees and a limited number of tools causing queues for attendance activities. The tool also has another problem, namely the frequent errors in the attendance tool which causes the risk of data loss or fingerprint validation is not integrated which causes the attendance process to fail. The results of the needs analysis conducted at PDAM Tirta Anom Banjar City with 150 respondents, namely PDAM Tira Anom employees, showed that employees who use Android smartphones reached 99%.

Based on the analysis and problems that have been obtained, I made a solution, namely by designing an Employee Online Attendance with the *Geolocation* Feature on PDAM Tirta Anom Kota Banjar Based on Android. With the designed application, it is hoped that it can make it easier for PDAM Tirta Anom Banjar City employees to help smooth and effective attendance.

1.2 Theoretical Foundations

1.2.1 Android Operating System

Android is an *open source* operating system, developers can modify the operating system to develop. The linux-based android operating system is designed for touch screen mobile devices, but nowadays the android operating system is developing to be used on televisions and tablet computers. Android was originally developed by Android Inc, which later in 2007, Google officially recognized the side in 2005. Currently android has a very large number of communities, nowadays android is the most popular platform for developers, used by 71% of mobile application developers. Primary & Priandika, (2020)

1.2.2 *Geolocation*

Geolocation is a technology of identifying the real-world geographical location of an object, such as a radar source, mobile phone or computer terminal connected to the internet. Geolocation refers to the practice of finding locations that can be accessed in *real time*. Geolocation is often utilized by using a more specific positioning system, not only one coordinate but details such as street address, remote village location and others. Miranda, (2019)Web

1.2.3 Attendance System

Attendance is attendance data collection which is part of the report activities in an institution or school. Attendance is arranged and arranged in such a way that it is easy to find and use when needed by the interested person. The attendance system is a system used by agencies in managing employee attendance online-based, in practice this system is used so that companies can monitor employee productivity from the number of attendance. By monitoring the percentage of employee attendance, the company can assess the increase or decrease in employee productivity. This is important to do because the company will depend on the level of productivity of its employees. Prathivi & Kurniawati, (2020)

1.2.4 *Squencial Development Life Cycle* (SDLC)

SDLC is a software development model, SDLC is the process of developing or designing a software system using models and methods used by developers to develop software systems based on *best practices* or methods that have been well tested. Firmansyah & Udi, (2017).

2. Method

In a study on the Employee Online Attendance Application With *Geolocation* Feature at PDAM Tirta Anom Kota Banjar Based on Android, the author developed the application with the SDLC method with a *waterfall* model. The waterfall model has several processes or stages on the *waterfall* model.

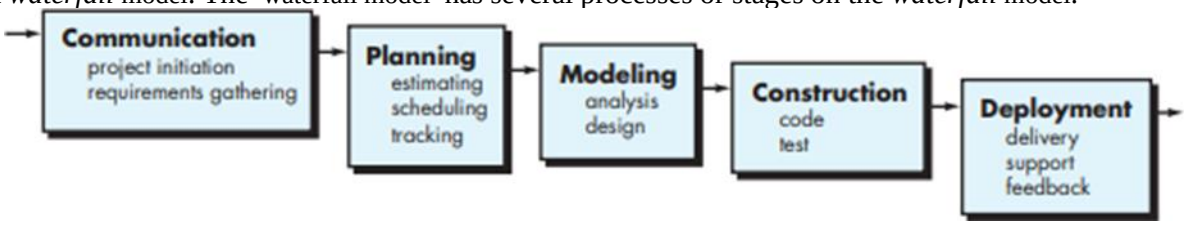


Figure 1 Waterfall Method

1.1 *Communication*

This stage is the project initialization stage such as analyzing the problems encountered and collecting the necessary data, as well as helping to define the features and functions of the application. In this process there are several needs, namely functional needs, non-functional needs and data needs.

1.2 *Planning*

The Planning Stage is a stage to make a plan or analysis that focuses on estimating the technical tasks to be carried out, the risks that can occur, the need for resources such as hardware and software in making the system, the work products to be produced and *tracking* the process of working on the system.

1.3 *Modeling*

This stage is the stage of designing and modeling a system architecture that focuses on designing data structures, software architectures, interface interfaces, and program algorithms. The goal is to better understand the big picture of what will be done. Here is the design created:

a. Business Design
b. *Database* Design
c. *User Interface Design*

1.4 *Construction*

This stage is the process of translating the design form into a code or language form that can be read by machines. After the coding is complete, testing the system and also the code that

has been created is carried out. In the process of calculating the distance, it is carried out by calculating the *user's* location point and the office location point used as the attendance point.

1.5 *Deployment*

This last stage is the stage of software implementation, software repair, software evaluation, and *software* development based on the feedback provided so that the system can continue to run and develop according to its function. This stage is also a testing stage, where the testing stage uses the *Black Box Testing* method.

3. Results and Discussion

3.2 *Communication*

This stage also begins to initialize the project along with the purpose of building the application. The purpose of the application that is built is expected to be able to help the process of recording employee attendance attendance which often experiences obstacles / obstacles such as time inefficiency, frequent *errors* in the attendance fingerprint device. In this process there are several needs, namely functional needs, non-functional needs and data needs. The necessary needs include:

3.2.1 Functional Needs

a. Admin
   a) Admins can *sign in.*
   b) Admins can add permission type data to no-show.
   c) Admins can change the permission type data to non-attendance.
   d) Admins can view no-show permission type data.
   e) Admins can delete the no-show permission type data.
   f) Admins can view employee data.
   g) Admins can add employee data.
   h) Admins can change employee data.
   i) Admins can delete employee data.
   j) Admins can view the recap/attendance history of all employees.
   k) Admins can view the recap/history of all employees' no-show permissions.
   l) Admins can change the identity of the admin profile itself.
   m) Admins can change the admin password itself.
   n) Admins can *log out.*

b. *User* (Employee)
   a) *Users/*employees can *log in.*
   b) *User/*employee can log *out*
   c) *Users/*employees can make attendance attendance.
   d) *Users/*employees can make attendance attendance returns.
   e) *User/*employee can fill in no-show permissions.
   f) *Users/*employees can view attendance recaps/history.
   g) *User/*employee can view recap/history of absentee permissions.
   h) *Users /* employees can *scan* the location where the *user* is located.

3.2.2 Non-Functional Needs

a. Hardware
   a) Intel® Core™ i5 processor -2467M CPU @ 1.60 GHz
   b) RAM 4.00 GB
   c) SSD 128 GB
   d) *Android smartphone* with Android version 11 *Red Velvet Cake.*

b. Software
   a) Windows 10 Pro 64 bit

b) OpenJDK 11
c) Android Studio Chipmunk Version
d) Visual Studio Code
e) NodeJS version 16.15
f) Figma
g) Navicat Premium 15 Essentials

3.2.3 Data Needs

The data needed to build an Employee *Online* Attendance Application with *Geolocation* Features at PDAM Tirta Anom Kota Banjar Based on Android is taken from direct observation from PDAM Tirta Anom Kota Banjar. The data used is employee data including NIP and full name and location coordinate points in the form of *latitude* and *longitude*.

3.3 *Planning*

The *planning* stage is carried out to plan the things that must be done to create the application to be built. This stage there are several processes that are divided according to the planned time. The research framework can be seen in Table 1

Table 1. Research Framework

	Types of Activities	Month to month			
		1	2	3	4
1.	Research needs content		☐	☐	☐
2.	Analysis and design stages		☐	☐	☐
3.	Data collection and Application materials	☐		☐	☐
5.	Application creation	☐			☐
6.	System feasibility analysis	☐	☐	☐	
7.	Eligibility analysis for user	☐	☐	☐	

3.4 *Modeling*

3.4.1 Business Design

Use Case

Diagram The Use Case diagram is used as an overview of the access rights and activities that the user is entitled to perform on the application as shown in Figure 2

Figure 2 *Use Case Diagram*

3.4.2 *Database* Design

The *database* design of MySQL uses relationships that connect between tables as follows:

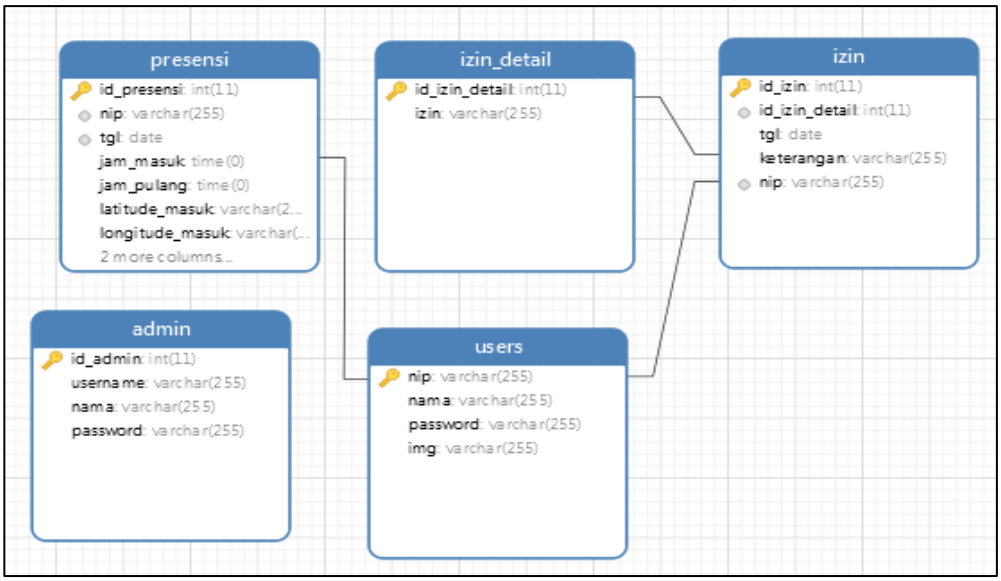
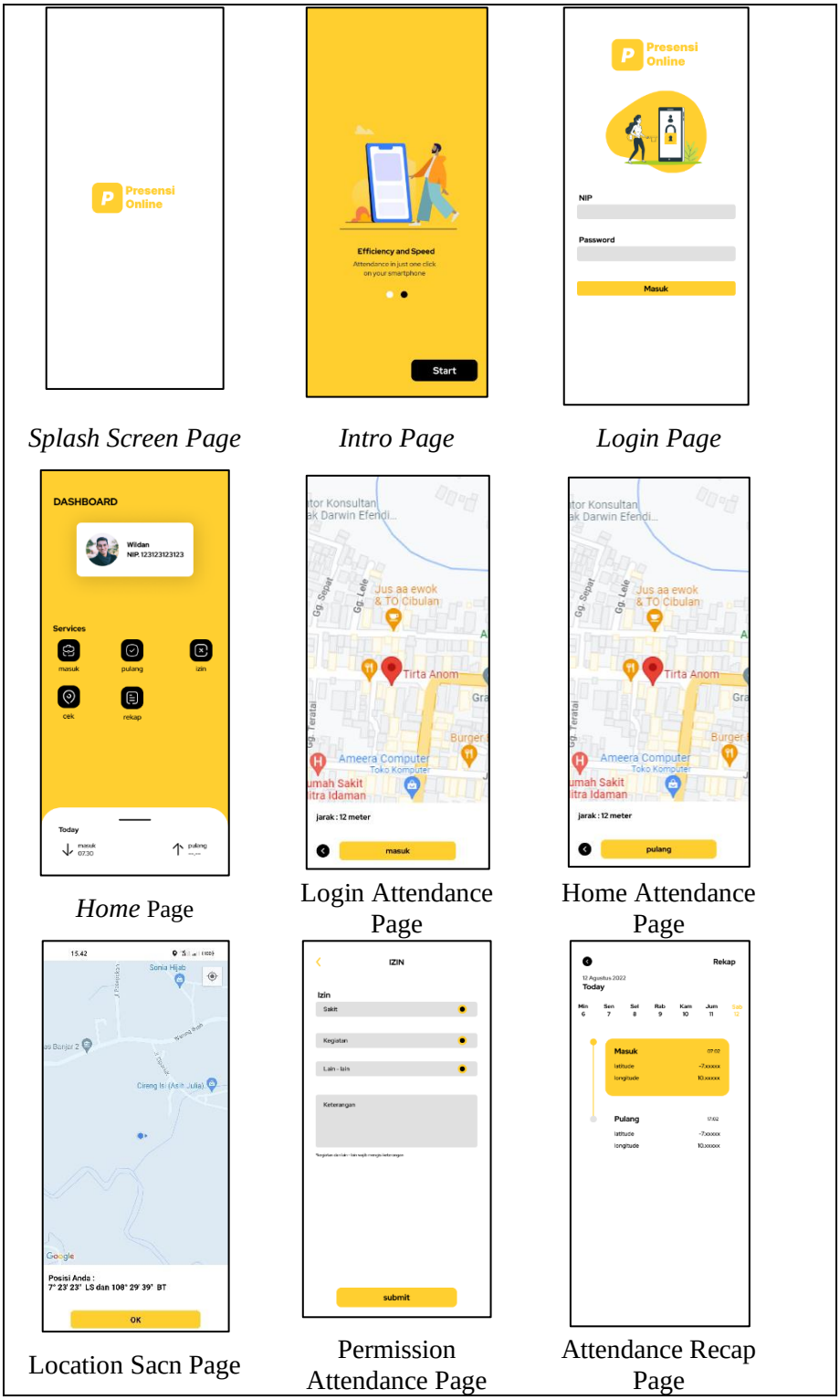


Figure 3 *Database* Relationships

3.4.3 *User Interface Design*

At the stage of making a system design, what is done is to determine the overall system architecture which will be implemented from the results of the analysis process that has been carried out in the previous stage. Created design

that is, in the form of *a mock-up* of the application to be created. The software created to create this application design is Figma. The following is the result of the design design that has been made in figure 4



Splash Screen Page | *Intro Page* | *Login Page*

Home Page | Login Attendance Page | Home Attendance Page

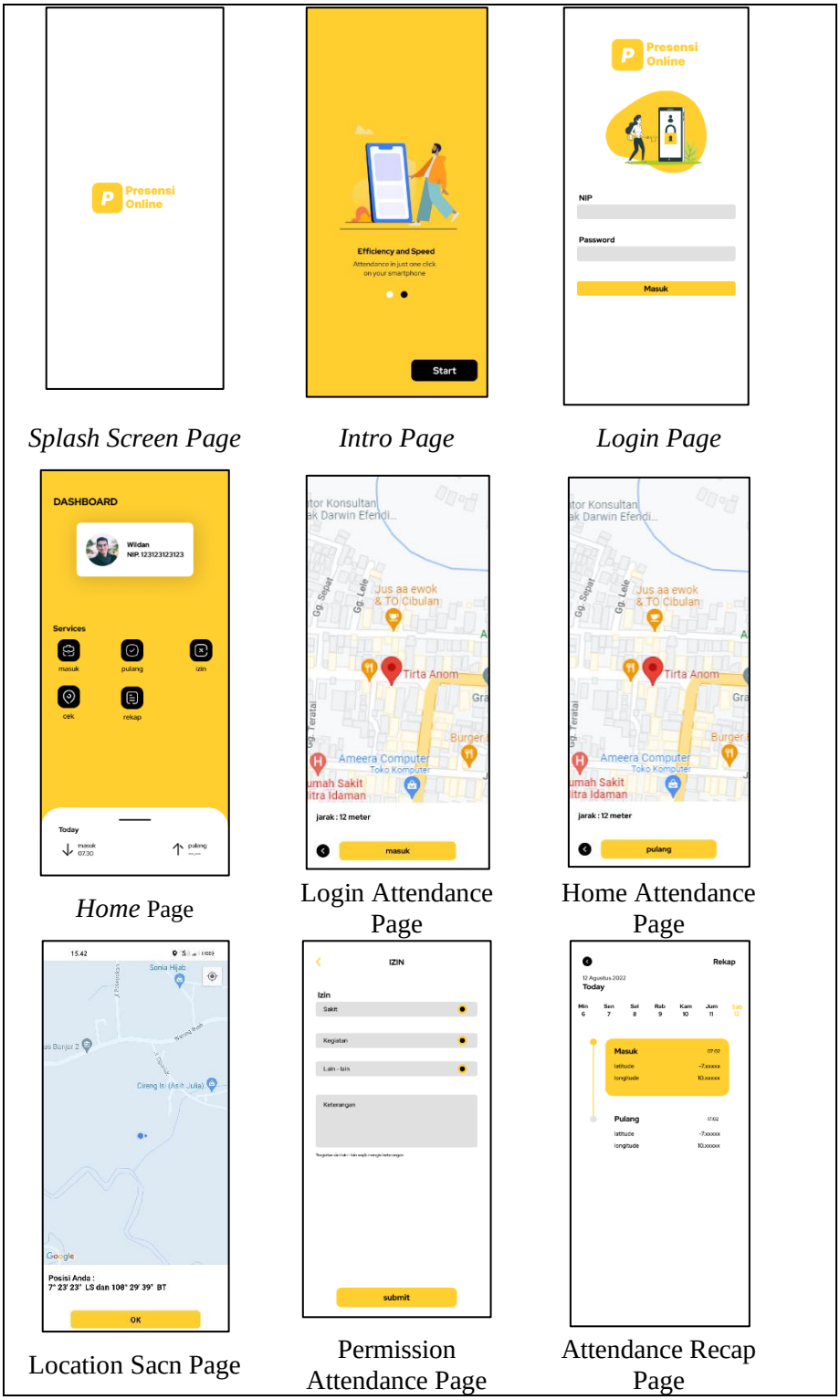
Location Sacn Page | Permission Attendance Page | Attendance Recap Page

Figure 4 Design Results

3.5 *Construction*

Here are the results of the android interface shown in figure 5

5



Splash Screen Page | *Intro Page* | *Login Page*

Home Page | Login Attendance Page | Home Attendance Page

Location Sacn Page | Permission Attendance Page | Attendance Recap Page

Application Design

3.6 *Deployment*

This last stage is the stage of software implementation, software repair, software evaluation, and *software* testing so that the system can run according to the design that has been carried out. The testing phase uses the *Black Box Testing* method.

The application testing process can be seen in the following table:

3.6.1 Main Page Testing

The main page testing process can be seen in Table 2

Table 2 Main Page Testing

No.	Testing	Expected results	Test Results	Status
1	*Sceen Splash* Page	The application can display a *Splash Screen* page every time *a user* opens the application and is displayed for 3.5 seconds	The application displays the *splash screen* page for 3.5 seconds and the conditioning is successfully performed	Succeed
2	*Login Page*	Applications can send authentication data to the server for validation of data availability performed by the API on the server side	The application can send data in the form of NIP and password as a condition of the authentication process to log into the application	Succeed
3	Intro Page	The application is expected to display the *intro* page after and display the page only once when the user opens the application	The app can display the *Intro* page only once	Succeed

3.6.2 ***Home*** Page Testing

The Home Page Testing Process can be seen in Table 3

Table 3*Home* Page Testers

No.	Testing	Expected results	Test Results	Status
1	Select the login attendance menu	The application is expected to be able to display the login attendance page	Apps can display sign-in attendance	Succeed
2	Select the home attendance menu	The application is expected to be able to display the return attendance page	Apps can display return attendance	Succeed
3	Select the permission attendance menu	The application is expected to be able to display the permission attendance page	The app is able to display a permission attendance page	Succeed

4	Choose the check location menu	The application is expected to be able to display a location check page	The app is able to display a location check page	Succeed
5	Choose the recap menu	The application is expected to be able to display a recap page	The application is able to display a recap page	Succeed
6	Choose the *logout* menu	The application is expected to be able to perform the *logout* process	The application is capable of *logging out*	Succeed

3.6.3 Attendance-Related Action Testing

The process of testing attendance-related actions can be seen in Table 4

Table 4 Attendance-Related Action Testing

No.	Testing	Expected results	Test Results	Status
1	Conducting an incoming attendance	The application is expected to be able to retrieve *user* location points, display maps, calculate distances and send data to the server	The application is able to retrieve *user* location points, display maps, calculate distances and send data to the server	Succeed
2	Conducting a homecoming attendance	The application is expected to be able to retrieve *user* location points, display maps, calculate distances and send data to the server	The application is able to retrieve *user* location points, display maps, calculate distances and send data to the server	Succeed
3	Perform attendance permits	The application is expected to be able to send data in the form of types of permissions and information to the server to be saved to the *database*	The application is able to send data in the form of permission types and information to the server to be saved to the *database*	Succeed
4	Check your location	The application is expected to be able to take the point where *the user* is located and display it on the map	The application is able to take the point where *the user* is located and display it on the map	Succeed

5	View recaps of reviews and permissions	The application is expected to be able to retrieve data according to the date selected to be displayed in the application on the recap menu	The application is able to retrieve data according to the date selected to be displayed in the application on the recap menu	Succeed

3.6.4 Testing On Admins

The admin testing process can be seen in Table 5

5 Testing On Admins

No.	Testing	Expected results	Test Results	Status
1	*Login Page* Testing	The admin page is able to send data from a *form* filled out by the admin to then be sent to the server and perform a data search in the *database*. If the data exists, then the admin can enter the admin panel	The system is able to send data for *login* and successfully check the availability of data in the *database*	Succeed
2	Data Page Type Izin	The page is capable of displaying the entire data and can display several *buttons,* each of which serves to add, change and delete data	The system is capable of displaying all data and can perform all functions or features	Succeed
3	Employee Data Page	The page is capable of displaying the entire data and can display several *buttons,* each of which serves to add, change and delete data	The system is capable of displaying all data and can perform all functions or features	Succeed
4	Permission Application Page	The page is able to display data on permit applications made by employees and can make changes to the licensing status data displayed through the *modal form*	The system is able to display all data and perform functions of an action that is executed	Succeed
5	Permissions Recap and Attendance Recap Page	The page is able to display all employee consent recap and attendance recap data	The system is able to display all employee permit and attendance recap data	Succeed

6	Admin Profile Page	The page is capable of displaying two *forms*. *The* first form is useful for displaying admin identity information data as well as *a* form and the second *form* for changing *passwords*	The system is able to display the identity of admin information and is able to make *password* changes	Succeed

4. Conclusions

The conclusion drawn in this study is that the Employee Online Attendance application at PDAM Tirta Anom Banjar City was successfully built by utilizing the *geolocation* feature so that it can overcome problems that occur so that the employee attendance process becomes more effective and reduces inhibition.

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BIBLIOGRAPHY

Eisenman, B. (2016). Learning React Native: Building Native Mobile Apps with JavaScript. In *O'Reilly Media*.

Fali, A. O. (2017). GPS Reading Accuracy on Android for Location *Based Service* (Case Study: High School Location Information in Palembang). *Journal of Computer Science and Agri Informatics.* Vol 4. No. 1.

Fali, A. O., Desy, S. S., Dieka and Dieka, M. R. Location Based Service For Information Publication Using GPS On Android-Based Mobile Phone. *Electrical Engineering, Computer Science and Informatics.*

Firmansyah, Y., & Udi, U. (2017). Application of SDLC Waterfall Method in Making Web-Based Academic Information System Case Study of Al-Habib Sholeh Islamic Boarding School, Kubu Raya Regency, West Kalimantan. *Journal of Informatics Technology and Management*, *4*(1). https://doi.org/10.26905/jtmi.v4i1.1605

Hidayat, D. K., & Harjanta, A. T. J. (2019). Design and build an Android-based Geographic Information System (GIS) application for the nearest mosque in Semarang City using the Geolocation Method and Haversine Formula. *Journal of Transformatica*, *17*(1), 34. https://doi.org/10.26623/transformatika.v17i1.1253

Miranda, F. R. (2019). Android-Based Application Development Using Google Maps For A Guide To Telecommunication Tower Location, Case Study Pt. Telkom Along. *Journal of Informatics*

Management, *9*, 36–43.

Nurkholis, & Sobarnas, M. A. (2020). The application of geolocation in the attendance of facilitators of government labor-intensive programs spread throughout Indonesia. *INFOTECH : Journal of Informatics & Technology*, *1*(2), 116–126. https://doi.org/10.37373/infotech.v1i2.69

Pratama, B., & Priandika, A. T. (2020). Location Based Service Information System Bandar Lampung City Chips Center Based on Android. *Journal of Information Technology and Systems (JTSI)*, 1(1), 81–89. http://jim.teknokrat.ac.id/index.php/sisteminformasi

Prathivi, R., & Kurniawati, Y. (2020). The class attendance system uses facial recognition with the Haar Cascade Classifier method. *Symmetrical: Journal of Mechanical, Electrical and Computer Science Engineering*, *11*(1), 135–142. https://doi.org/10.24176/simet.v11i1.3754

Rahadian, D., Hamdani, N. A., Gunawan, R. H., Bariyah, S. H., & Purwanti, Y. (2021). Development Attendance PTI based on android with Quick Response code. *IOP Conference Series: Materials Science and Engineering*, *1098*(3), 032094. https://doi.org/10.1088/1757-899x/1098/3/032094

Santoso, K. I., & Rais, M. N. (2016). Implementation of the Geographic Information System for Tourism Areas of Temanggung Regency Based on Android with Global Positioning System (GPS). *Scientific Journal of Informatics*, *2*(1), 29–40. https://doi.org/10.15294/sji.v2i1.4526

Sibarani, N. S., Munawar, G., & Vishnuadhi, B. (2018). *Android App Performance Analysis of Java and Kotlin Programming Languages. In Proceedings of Industrial Research Workshop and National Seminar*. *9*(December).

Sonata, F.-. (2019). Utilization of UML (Unified Modeling Language) in Designing Customer-To-Customer E-Commerce Information Systems. Journal of Communication *: Journal of Communication, Media and Informatics*, *8*(1), 22. https://doi.org/10.31504/komunika.v8i1.1832

Tjan, E. K., Prasetyo, D. H., & Handani, F. (2021). Making Android-Based Mobile Apps by Utilizing Geolocation for Monitoring Student Learning Processes. *KELUWIH: Journal of Science and Technology*, *2*(1), 1–8. https://doi.org/10.24123/saintek.v2i1.4047

Tresnawati, Shandy and Pratama, A. (2021). *Attendance Application With Web-Based Geolocation Method (Study Kasus_ PT. Codepolitan Integrasi Indonesia).pdf*. *01*(02), 49–53.

Widiastuti, N. A., & Azizah Widiastuti, N. A. (2018). Android-Based Geolocation Technology with K-Means Method for Mapping MSMEs in Jepara Regency. *Journal of Business Information Systems*, *8*(2), 218. https://doi.org/10.21456/vol8iss2pp218-224