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Digital Presence System UI/UX Optimization Using User Design Thinking

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Abstract

Information technology is essential in increasing the effectiveness and efficiency of various jobs. One of its applications is creating a UI/UX-based digital attendance system for mobile applications and websites that use facial recognition technology. This digital attendance system will provide a unique code to join the company, a summary of attendance reports, and settings for each employee's attendance number. The user interface (UI) is designed to be easy to use, while a good user experience (UX) will keep users comfortable using the application. Poor UI/UX design, on the other hand, can make users feel uncomfortable and leave the application. The UI/UX design process for this digital attendance system was performed using the Figma application and the Design Thinking method. This method consists of five stages: empathize (recognizing user needs), define (defining problems), ideate (generating creative ideas), prototype (making prototypes) and test (testing). The results of the study showed that Figma was influential in helping the design process of an attractive and easy-to-use interface for this digital attendance system.

Keywords : Design Thinking, UI/UX, Face recognition, Prototype, Website, Mobile

1 Introduction

Information technology has progressed very rapidly, so every individual and company needs to develop technological knowledge to make everything easier. In increasing the quality of work of employees in a company, the presence is the main factor in driving the performance and quality of employee performance. Employee performance in a company can run well with the presence of an employee presence information system. The presence of employees is used to record the employee data as a report in the company so that it is easy to search when needed by interested parties [1], [2], [3]. In Hasibuan's statement, an employee has provided services (either in the form of thoughts or labor) and then receives compensation in return or competence, the amount of which has been determined in advance [4].

In a company, attendance is often found to be manually done, which causes inaccuracy in attendance. The disadvantage of doing attendance manually is using paper which results in wastage of paper, many companies do not want to do the manual attendance process because it is not environmentally friendly. Using manual attendance also results in less effective and less accuracy; this is very dangerous when there are employees who deliberately manipulate attendance data so that the employee looks disciplined in coming to work or there is a presence to a friend so that it looks like they are coming to work, but in reality, they are not. Taking attendance manually also takes a long time to manage employee attendance data; HR manages employee attendance data every day, which certainly takes a long time; of course, this is very detrimental to the company because it wastes time. Performing attendance manually is also considered relatively easy and saves more costs because the company does not need to buy unique technology to record employee attendance.

With more rapid technology, some companies have switched to using attendance using fingerprints. Fingerprints are a technology to identify someone using fingerprints; the attendance system using fingerprints is

more accurate than doing attendance manually because no human has the same fingerprints, so it cannot be manipulated [5], [6], [7]. However, the use of fingerprint attendance also has disadvantages, namely the factor of misidentification on the fingerprint machine; this usually occurs because it is not registered correctly in the system or there is a problem reading fingerprints. The physical condition of the user's fingers is also one of the disadvantages of fingerprints; for example, if the user's fingers are dirty with oil, dust, or other things, there can be inaccuracy in reading fingerprints. In addition, several conditions that cause physical changes in the fingers, such as burns, skin damage, or accidents that cause loss of fingers, can also interfere with fingerprint reading. Fingerprint recognition methods have been widely published using various technologies that are getting better and better in terms of accuracy and computing [6], [8], [9], [10], [11], [12]

In overcoming the problem of handing out manual attendance and fingerprints, face recognition technology is the solution to the problem. Face recognition is a combination of machine learning and biometric techniques, where this technology looks not only at the level of accuracy but also at the reliability in operation [13]. The advantage of using a face recognition presence system is that employees only need to expose their faces to the connected camera.to the system, without the need to use cards or swipe fingerprints. This system also provides a high level of accuracy in identifying individuals, reducing the risk of misuse or fraud in the attendance process.

Face recognition is one of the applications of profound learning aspects. Deep learning is a part of machine learning that can build a complex concept from a simple idea. Machine learning and deep learning are currently experiencing rapid development and have spread widely in recent years [14], [15], [16], [17], [18], [19], [20] [21]. Both fields apply algorithms to gain knowledge from the data to increase the accuracy and efficiency of making predictions or decisions. Machine learning often uses statistical methods to understand data, while deep learning relies on neural networks to extract knowledge from large data sets. Face recognition uses various techniques to identify faces, including the Convolutional Neural Network (CNN). CNN is one type of Neural Network used in image classification research. CNN is known to have a higher level of accuracy compared to other image recognition methods such as Eigenfaces and the Local Binary Patterns Histogram (LBPH) [22]. DeepFace is a facial recognition system that uses deep learning to identify and verify faces in images. DeepFace was created to overcome facial recognition difficulties and uses a powerful convolutional neural network (CNN) to extract facial features [23].

In developing an employee attendance system in a company, face recognition is the recommended solution [24]. Given the many benefits of the attendance system, the quality of interface design is a crucial aspect in building a superior attendance system. The user interface (UI) and user experience (UX) design are the most critical elements in optimizing the employee attendance system. Optimization of the UI/UX of this digital attendance system uses design thinking because of the approach or method of solving problems both cognitively, creatively, and practically to answer user needs [25], so that the use of Design Thinking allows users to solve their problems. When the attendance system has a wrong or suboptimal user interface, it can cause user dissatisfaction, errors in data input, and inefficient use. Therefore, it is essential to prioritize UI/UX optimization to ensure a positive user experience. Using Design Thinking can be helpful in solving complex problems by understanding the needs of the users involved, re-thinking the issue in a user-centered way, generating many ideas and applying a hands-on approach in the prototyping process with idea testing [26], [27], [28], [29].

The importance of Design Thinking in developing an attendance system lies in solving problems and its ability to respond to the dynamics of user needs. Through the iterative Design Thinking process, the attendance system can be continuously refined to match user developments and expectations. By focusing on optimized UI/UX, users can quickly and efficiently use the employee attendance system, avoid inconvenience, and increase productivity in daily tasks. As a result, the application of Design Thinking is a strategic step in developing an attendance system and the key to success in creating a satisfying user experience and building trust in the attendance technology applied.

2 Method

The method used to design the UI/UX in the mobile design and the website of the digital presence system uses the Design Thinking method. The Design Thinking approach focuses on user needs. The design thinking approach has five stages, namely: Empathize, Define, Ideate, Prototype, Test [30], as seen in Figure 1..

2.1 Empathize

Empathize is the first stage in the design thinking method. At this stage, we conduct a deep understanding of the user's experience and needs. Empathize is important in this stage because it can help identify user

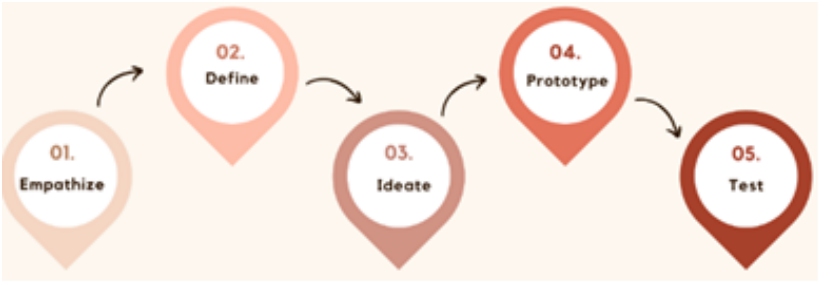

Figure 1: Stages of Design Thinking Method

needs and eliminate assumptions that may arise.

2.2 Define

Define is the second stage after Empathize. This stage aims to formulate the problem or challenge to be solved clearly. The Define stage helps direct design efforts in a more focused and directed direction so that the resulting solution can be right on target and relevant to user needs.

2.3 Ideate

Ideate is the third stage in the Design Thinking method. This stage focuses on generating ideas or creative concepts that can be the basis for solutions to previously defined problems. Ideate aims to create various alternative creative solutions before entering the Prototype creation stage. This approach helps to ensure that the design process is not fixed on a single idea but opens opportunities for more innovative and effective solutions.

2.4 Prototype

In the Prototype stage, the ideas generated in the propose stage are translated into a concrete form that can be tested. Prototyping is essential for validating ideas and avoiding the risk of creating a complete solution before fully understanding how it will interact with real users or environments. This stage helps to reveal potential problems and refine the solution before moving on to the larger implementation stage.

2.5 Test

The trial or Test stage is the fifth stage in the Design Thinking method. At this stage, the prototype that has been created is tested by users, and the results are used to make further adjustments and improvements. The test stage is critical to ensure the resulting solution is effective and acceptable to users. This process opens up further refinement and innovation opportunities before the solution is widely implemented. A mobile application and a website-based admin dashboard are the systems to be built. The following is a Flowchart of the digital attendance system.

In the digital attendance system that will be developed, there are 3 users: super admin, company admin, and employees. Employees can participate, ask for permission to be absent, and join the company using a unique code input. Furthermore, the company admin can manage employee data such as employee data CRUD. In addition, employee administrators can send invitations to employees so that they can join the intended company. The super admin is part of the digital attendance system application maker. The flow of attendance in the digital attendance system can be seen in Figure 3.

The stages of work that will be carried out focus on creating a website for a digital attendance system to manage data for employees who have attended. However, user interface and user experience designs will be created for mobile devices and websites. In addition, it will ensure that this digital attendance system website is designed to provide optimal comfort and usability for users, both via mobile and website. Thus, every step in the creation process will be based on user-friendly design principles to ensure user experience and efficiency. The following is the flow diagram of the digital attendance system in the website section.

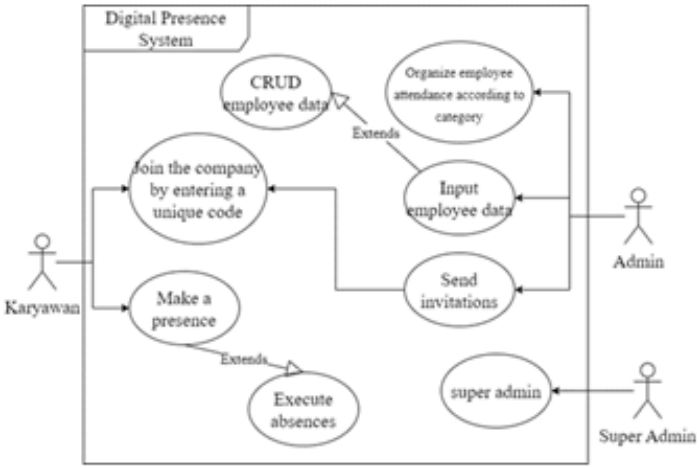

Figure 2: Use Case Diagram

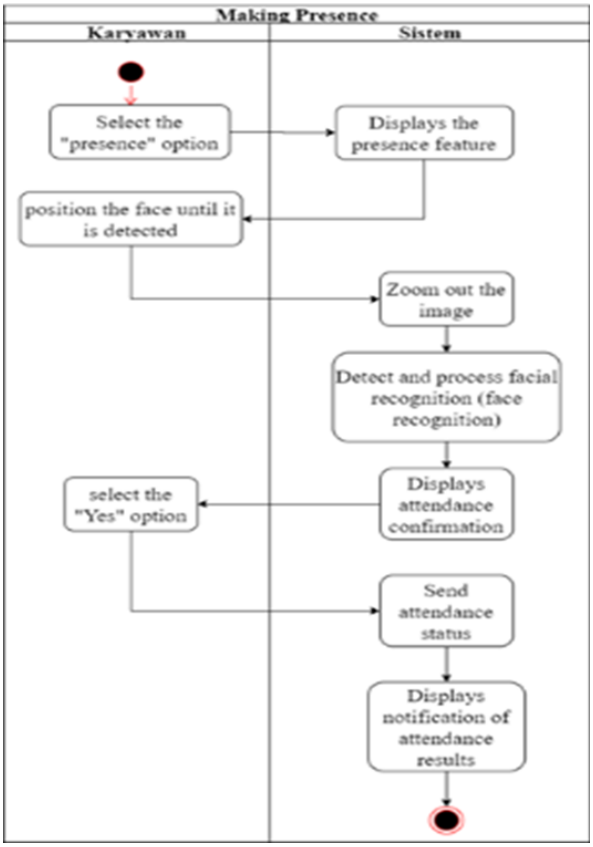

Figure 3: Activity Diagram for presence

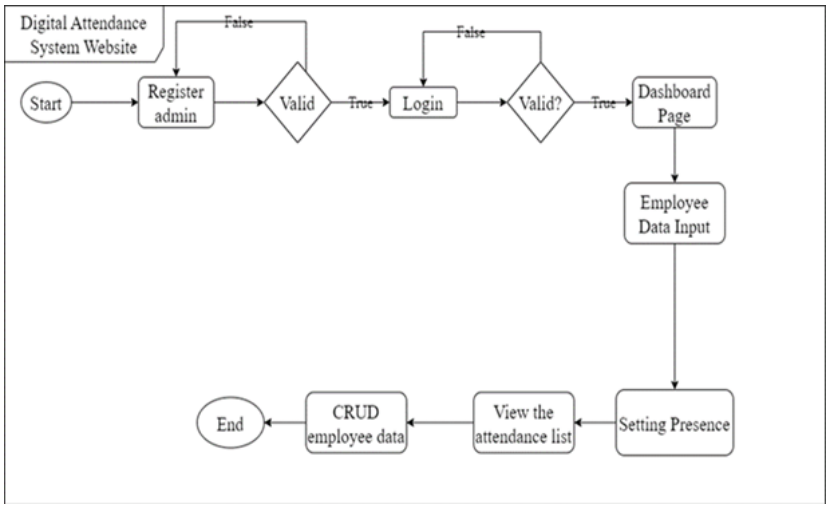

Figure 4: Digital Presence Flowchart

3 Results and Discussion

The following are the results and application of the Design Thinking method in designing UI/UX on mobile and digital presence system websites.

3.1 Empathize

The Empathize stage is intended to support understanding problems or needs from the target perspective by conducting research before detailing the problem (Define) and developing solution ideas (Ideate). Empathize begins by providing users with an understanding and description of the UI/UX design challenges. The target users of the digital attendance system are general employees or will be implemented in all companies with employees, but this development will be implemented in Information Technology students at the Malang State Polytechnic and company employees.

Empathize will begin by distributing questionnaires and conducting direct interviews with students in the Malang State Polytechnic and company employees in the Information Technology department. From these questionnaires and interviews, it is hoped that support will emerge regarding user problems or needs. Furthermore, the digital attendance system will be designed initially and the rough design will be returned to users to ensure their understanding and assess whether the initial design is feasible to proceed to the next stage.

Table 1: Question List

No	Lists
1	Have you ever used an attendance system application before?
2	Opinions about the design of the digital attendance system application that will be created?
3	Have there ever been any incorrect input or difficulties in inputting data?
4	What kind of system is needed?

3.2 Define

In this stage, describe the problems generated so that they can be grouped into several categories. The first step is to detail the points of objection (pain points) in the Define stage. Next, compile and group pain points in a structured manner in the Structured Paint Points Analysis frame and identify the core of the problem. After understanding the core of the problem, design a solution using the How-Might We Question technique.

Table 2: User Requirements

No	Requirements
1	Flexible use
2	There is a unique code to join the company
3	Can see the attendance history
4	Can ask for permission to be absent
5	Input using excel
6	Can set the number of employee attendance

3.3 Ideate

After analyzing the pain points, look for as many solution ideas as possible to produce the best ideas arranged based on the How-Might We Question formulated previously. Furthermore, the ideas collected are ideas for what features will be applied to the design of the digital presence system using a Wireframe mockup.

Figure 5: Wireframe 1 of User Karyawan

3.4 Prototype

The prototype stage has entered the design execution stage. The following is a Prototype display on the employee user section using the Figma application (Figure 9). The initial page for employee users is to log in and register employee data. This page is the initial stage before employees and users join the targeted company (Figure 10). The signup page is used for employee users to register personal data that is not yet in the database so that when they have finished signing up, they will be directed to the signup page to be able to join the company. On the login page, enter the registered email and password. If you do not have an account, you can first register and then log in to enter this attendance system application (Figure 11).

On the login page, if you forget your password, select forgot password and then enter the previously registered email. After entering the email, select confirm mail to send a code before entering a new password,

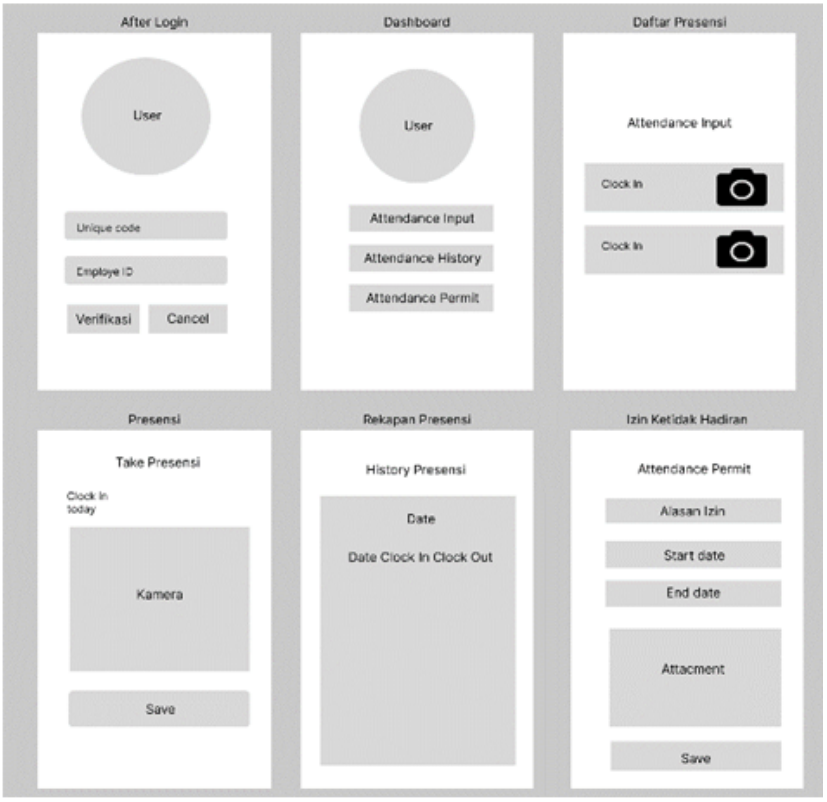

Figure 6: Wireframe 2 of User Karyawan

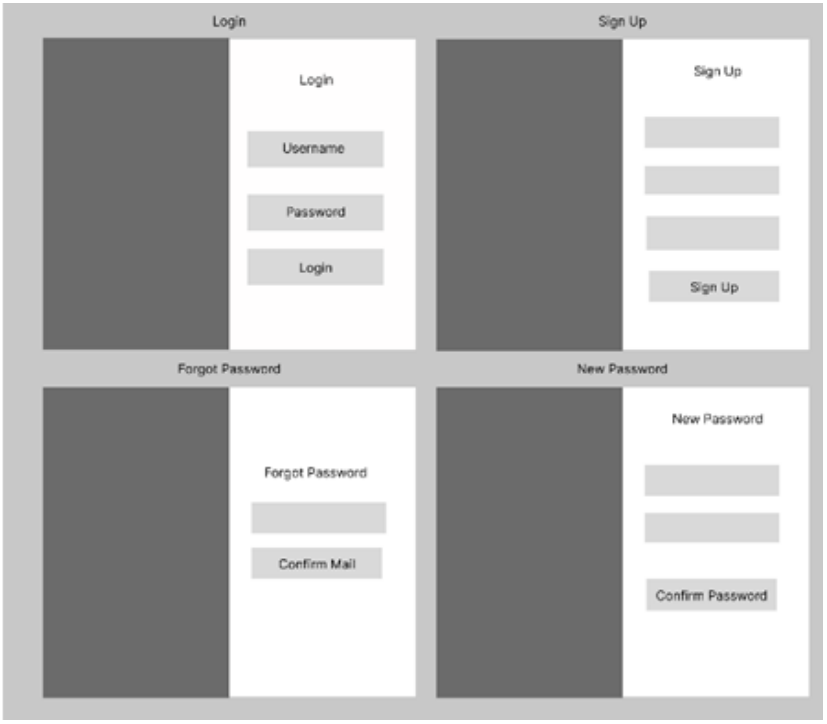

Figure 7: Wireframe 3 of User Admin

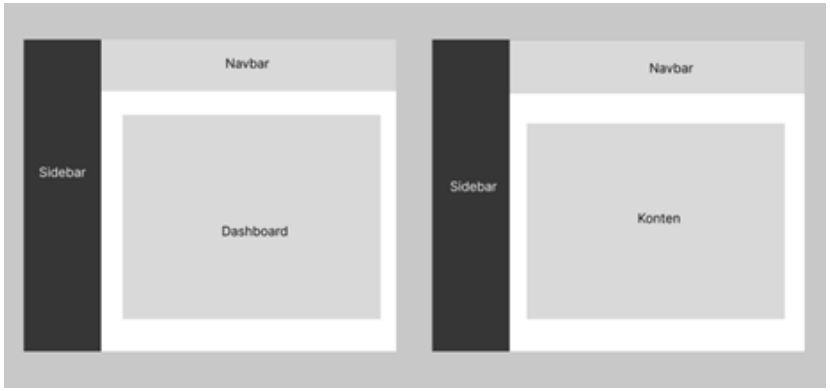

Figure 8: Wireframe 4 of User Admin

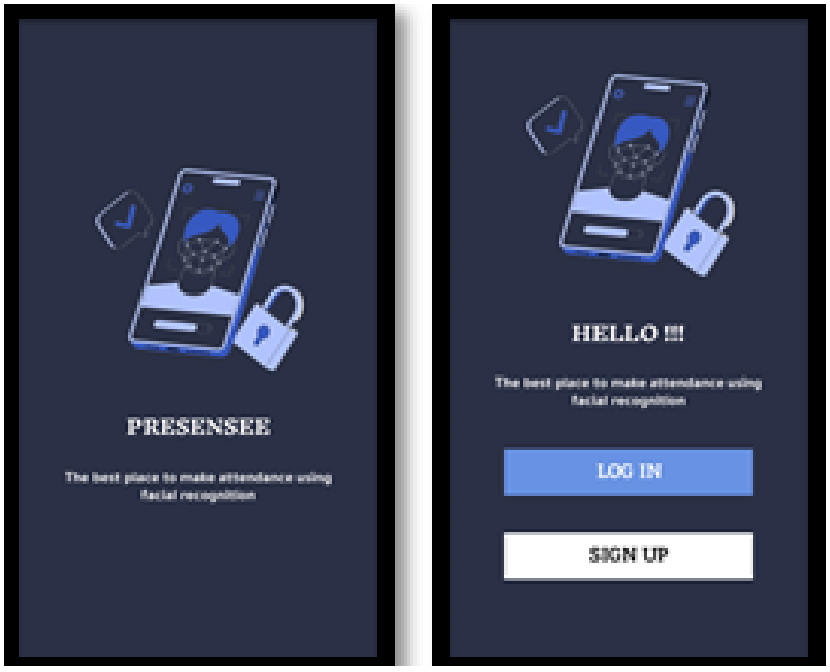

Figure 9: First Page

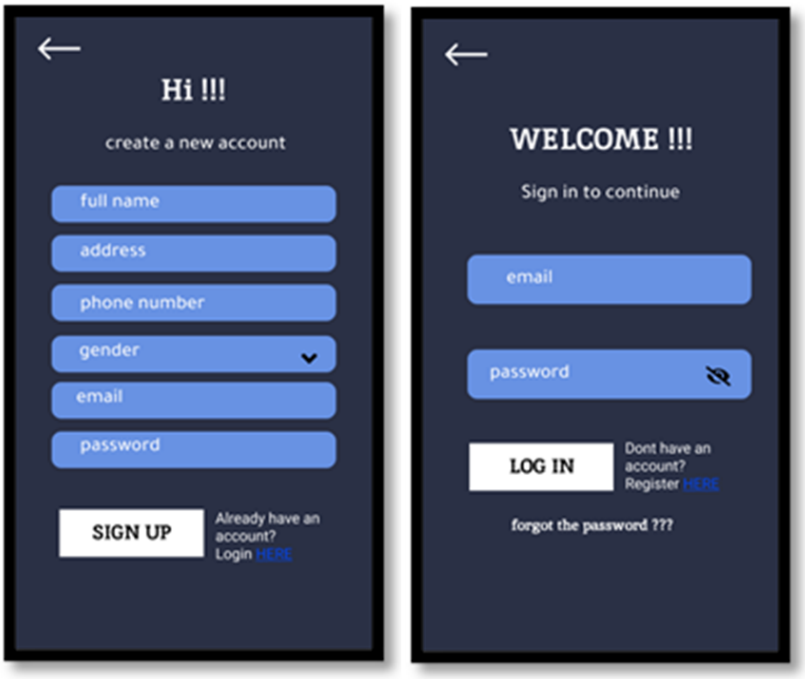

Figure 10: Login and Sign up pages

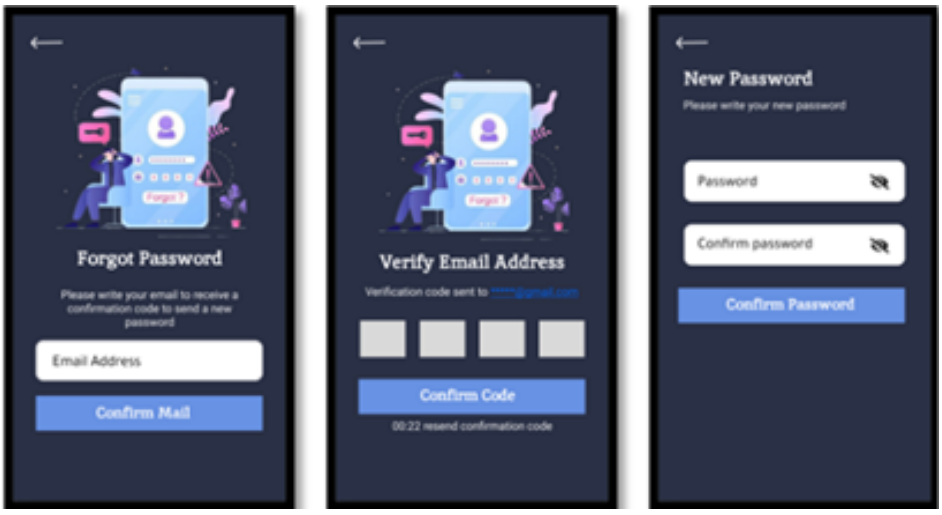

Figure 11: Forgot Password Pages

then the email verification page will appear after confirming the email, and then the employee user will enter the code that has been sent to the email that was previously registered. Then, the new password is displayed after the employee user has correctly entered the code sent to the email. The employee user enters a new password according to the wishes of the employee user himself. After completion, you will be directed to the login page to enter the email address and password that have just been created.

Figure 12: Company User Join Pages

This page is used to join the target company. When you have previously joined a company, a list of the company will appear. If you have never joined a company, select "Enter unique code to join the target company." Next, you are directed to join the company by entering the unique code that has been owned by the company and entering the employee ID of the employee. After that, select verification to join the target company.

3.5 Test

In the final stage, testing and evaluating the product for consumer users will change the results, improve the problems, and better understand the product of the digital attendance system. The testing was carried out on 10 employees and 1 admin user.

Table 3: Question lists

No	Questions
1	Have you ever used an application similar to this Digital Attendance System Application?
2	If you have used a similar application, please mention it.
3	If you have used a similar application, what is your experience with the similar application?
4	If you have used a similar application, how does this Digital Attendance System Application compare to the applications you have used?
5	What do you think about the color palette used in the UI/UX design of the digital attendance system?

There is no evaluation of the appearance of the digital presence website system on the admin user. The following in Table 4 are the results of the Prototype test on employees.

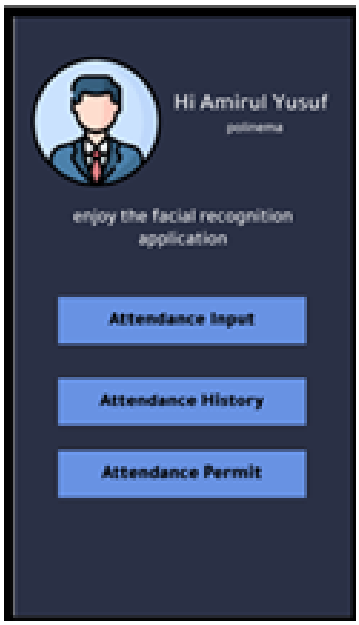

Figure 13: Dashboard Page

Table 4: Test Results

No	Design Page	Test Results
1	Login Page on Admin user	Tampilan inputan terlihat seperti button
2	Use of Language	Konsisten dalam penggunaan Bahasa
3	Use of Writing	Konsisten dalam penggunaan tulisan
4	Colors on the application	Penggunaan warna yang terlalu gelap

After receiving feedback from potential users that the Prototype design that was tested still has shortcomings that need to be fixed. Here is one of the views of the Prototype design that has been fixed.

4 Conclusion

Based on the description above regarding the UI/UX design of the digital presence mobile system and the creation of a digital presence system website using the Figma application, it is concluded that the Figma application is good and helps the author in the process of designing the appearance of the digital presence system website with an attractive and easy-to-use User Interface. Collaboration features and the ability to work in real-time are Figma's advantages, which UI/UX Designers widely use designers in creating website design prototypes and other similar fields. In addition, website design using Design Thinking can be used to create UI/UX designs that focus on user needs. The application of the method starting from the Empathize, Define, Ideate, Prototype, and Test stages in the design of the mobile UI/UX and the digital presence system website is felt to be very helpful in creating designs and producing Prototypes that are by user expectations. The results of the prototype design that was created also went through a direct testing process, which involved interviewing 10 employee users and 1 admin user. While the application of the Design Thinking method in the UI/UX design of the mobile and digital presence system website is currently at the Prototype trial test stage, there are plans for further development. The next step is to implement the Usability Testing method in the testing process. This will help determine whether the website meets user expectations and any shortcomings will be identified and improved on in the UI/UX of the website of the mobile and digital presence system, demonstrating a commitment to continuous improvement and quality assurance.

Figure 14: Modification of Sign up and Login pages prototype

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