Mobile Smart Presence Design On Regional Government Using Spiral Model

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Abstract Attendance is an important routine that employees do before starting and leaving work. In addition, attendance is one of the benchmarks in measuring employee's discipline. Employee's discipline can affect employee's performance appraisal. Discipline is also one of the references in the process of salary increases, promotions, demotions, and dismissal of employees. The attendance recording process can be implemented on smartphone devices. In this article, the author designs a smart presence system with spiral model. The spiral model stage that focuses on the approach to the client makes the system built according to the client's wishes. Evaluations from staff and users are also very helpful in improving the presence system in subsequent developments.

***Index Terms*— Employee Discipline, Smart Mobile Presence, Spiral Model, System Design.**

I. INTRODUCTION[1]

Attendance is one important thing in measuring discipline. Attendance or attendance is one of the routines performed by employees before starting and leaving work. Attendance can also be used as a measure of the performance of an employee in local government. Performance appraisal is one of the references for the process of salary increases, promotions, demotions, and dismissal of employees [1]. The work performance appraisal approach is a method of appraising employee performance by combining assessments of work targets and work behavior of employees [2]. By utilizing information technology, personnel can easily assess employee performance.

Smartphones today are mandatory for everyone. There is no limit to the use of smartphones because smartphones can help user daily activities. Activities ranging from entertainment to activities related to common interests such as business, work meetings, and so on can be presented by smartphones [3]. Some smartphones also have cameras that are capable of capturing images on the front and back. This facility can be used as a tool to develop information technology. With the price of smartphones decreasing every year, it is also a factor in how easy it is for people to own them [4]

Implementation of systems in information technology has been regulated in Instruksi Presiden Nomor 3 Tahun 2003. Utilizing information technology in realizing good governance is important for local governments [5]. IT Governance is a structure of relationships and processes that can guide an organization to achieve its goals and by taking into account the risks and results obtained through the use of information technology [6]. In addition to facilitating reporting, information systems can support the main tasks and functions of government. The application of information systems is also very helpful in terms of effectiveness and efficiency in the reporting process. With the existence of an integrated system can help the government in implementing e-government.

The presence system is one of the tools in supporting government to implement electronic government. This design uses a spiral model in building a presence system. The spiral model approach is able to assist the team in identifying needs both in terms of organization and technology selection [7]. The working process using a prototype can clarify the needs desired by the client. In addition, the design with a spiral model that can be used during the life of the presence system so that it is able to adjust to existing rules.

II. METHODOLOGY

The methodology used in designing this presence system is the spiral method. The spiral process model is a process model that combines the iterative nature of the prototyping

process model with controlled and systematic aspects of the waterfall model. This modeling process provides the potential for rapid development of incremental versions of the software. The spiral process model develops software through release incrementally [8]. The spiral method consists of six stages, namely communication, planning, risk analysis, engineering, construction and release, and customer evaluation.

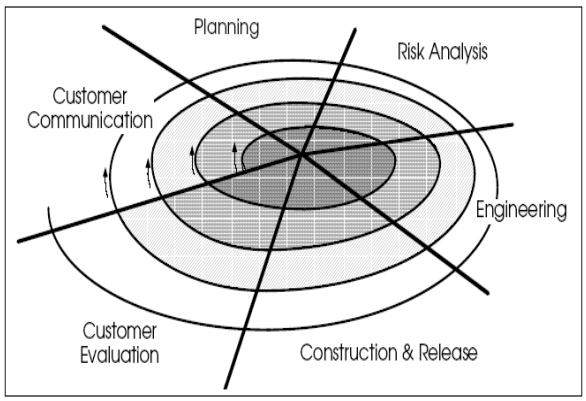

Fig. 1. Spiral Model

Figure 1 is the spiral model stages used in the development of the presence system. The stages in the spiral model are:

1) Customer Communication

Build communication with customers about the needs of the system to be built.

2) Planning

Defines resources, runtime and system information.

3) Risk Analysis

Identifying risks, both management and technical.

4) Engineering

Build a representation of the system.

5) Construction and Release

Build and test systems and provide services to customers.

6) Customer Evaluation

Receive feedback from customers.

III. Result and Discussion

A. Customer Communication

The purpose of communication is to get the needs of the system to be built. At this stage, communication is carried out with policy makers regarding the needs of the presence system to be built. Communication is done to get the current flow and define the path to be built. The results of the communication will be used as the basis for developing a mobile presence application.

B. Planning

The planning stage uses the results of communication with policy makers regarding needs and observations regarding current conditions. These needs are analyzed so that the number of resources can be determined to support application development. This stage also determines a target time in the execution of the application. Data collection is carried out to obtain employee data and report data that will be implemented into the online presence system.

C. Risk Analysis

Risk analysis is carried out by several experts who are competent in their fields. Experts identify risks in both management and technical terms. Experts will also continue to supervise and oversee the development of presence applications so that risks can be controlled.

D. Engineering

1) Needs Analysis

The needs analysis is divided into functional needs and non-functional needs. Functional requirements are the main requirements that must exist in presence applications. Meanwhile, non-functional needs are the supporting needs of the presence application. Table 1 shows functional requirements and table 2 shows non-functional requirements.

Table 1 Functional Requirements

No.	Aspect	Requirements
1.	Device	Access anytime and anywhere via the internet
2.	Data	Integrated with SIMPEG
3.	Data	Able to recognize faces
4.	Data	Able to accept presence data
5.	Data	Capable to manage schedule data
6.	Data	Capable to manage presence data
7.	Interface	User friendly mobile based design

Table 2 Non-Functional Requirements

No.	Aspect	Requirements
1.	Device	Can access on all mobile devices
2.	Interface	Display attendance schedule notification

2) Data Flow Diagram (DFD)

Data flow diagram (DFD) are used to represent the flow of the system from the presence application. There are two entities in the depiction of DFD in the presence application. Each entity sends data to the online presence application. DFD level 0 in Figure 2, the employee entity sends scan log data and receives information from the system. The admin entity configures schedule data and receives information from the system.

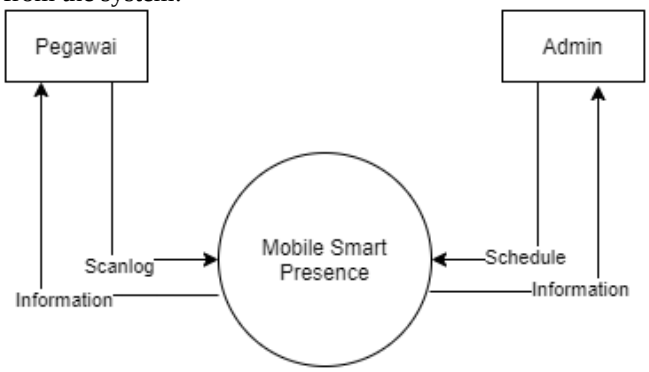

Fig. 2. Context Diagram

At DFD level 1, there are four processes in the presence application. Admin manages schedule data for employees. Employees can do face registration, scan in and scan out.

Face data is stored in the employee data store. Employee attendance data will also be stored in the scanlog table. DFD level 1 can be seen in Figure 3.

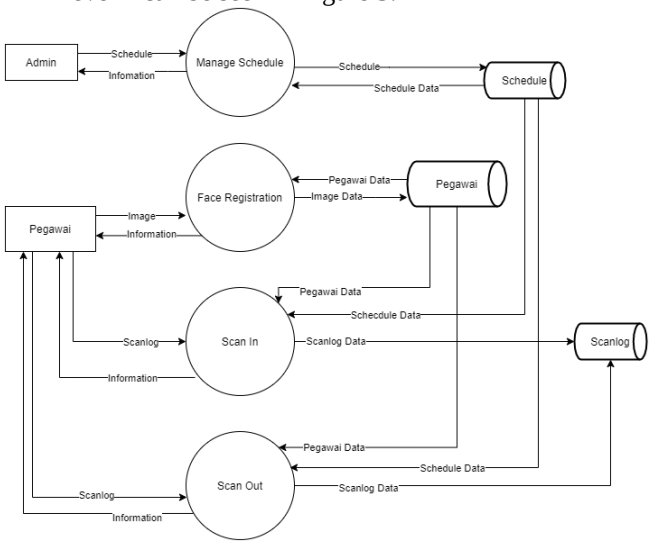

Fig. 3. DFD Level 1

3) Entity Relationship Diagram (ERD)

The design of the relationship between the data in the presence system database is done by using the Entity Relationship Diagram (ERD). ERD is the basis of building a database in the presence system. There are three tables, namely the employee table, schedule table and scanlog table. In an ERD representation, employees can have multiple schedules and schedules have multiple scan logs. Figure 4 is an ERD design in the presence system.

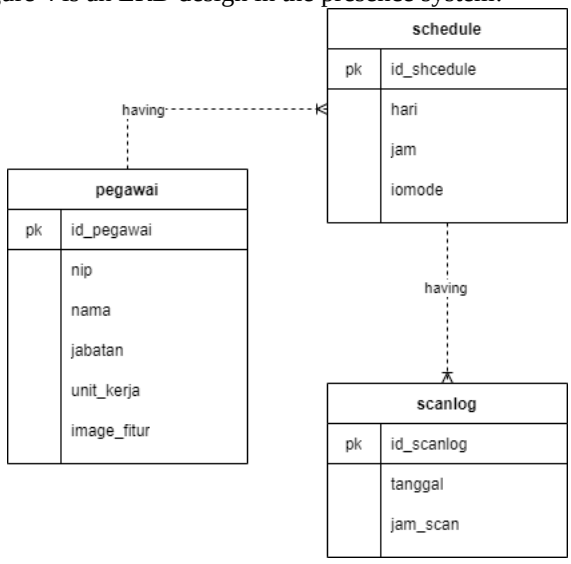

Fig. 4. ERD

4) User Interface Design

This stage is the design stage of the mobile presence system display design. The application page is designed according to the needs, the data flow design on the DFD and the data entity design on the ERD. The design of the interface design uses a mockup which can be seen in the following figures.

Figure 5 shows the interface of the login page. On this page, the employee will enter NIP as the username and password. If the employee enters the wrong username and password, the application will not allow the employee to enter to the homepage.

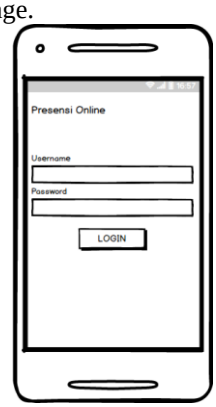

Fig. 5. Login Interface

After a successful login, the employee will be directed to the main page. On the home page there are several menus, namely registration, scan in, scan out and logout. The following is the interface of the home page in Figure 6

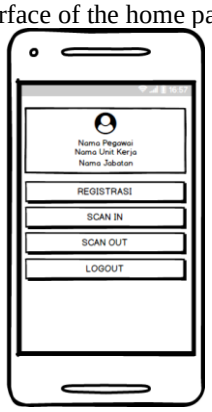

Fig. 6. Home Interface

If the application is opened initially, employees will be asked to register their faces. This page will ask employees to register faces ten times. Figure 7 is a display interface of the registration page.

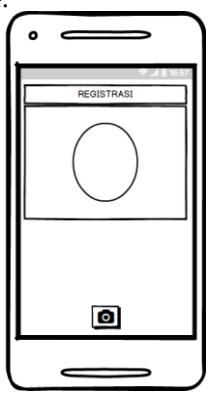

Fig. 7. Registration Interface

This scan in interface is a page to record employee attendance. This page will capture faces and recognize the faces that have been captured. If the face is recognized, the application will display a message that successfully recorded attendance. This scan page can be seen in Figure 8.

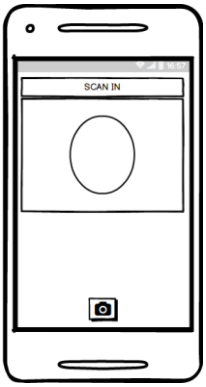

Fig. 8. Scan In Interface

Figure 9 is the interface of the scan out page. Looks like the scan in page, the scan out page will capture faces and recognize employees' faces. If the face is recognized, the application will display a message that successfully recorded attendance.

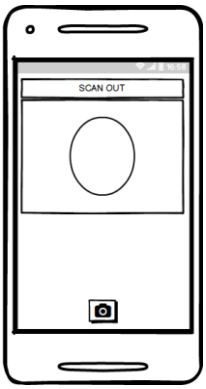

Fig. 9. Scan Out Interface

E. Construction and Release

Construction is carried out after the application has met the requirements previously designed. Furthermore, the construction results in the form of a prototype will be tested in several stages. The following is a prototype image of the mobile presence application.

F. Costumer Evaluation

The evaluation was carried out using a questionnaire. The questionnaire will be implemented into the presence system so that data can be accessed easily and real-time. Furthermore, the evaluation results will be used as the basis for improvement for further development.

IV. CONCLUSION

From the results of the mobile smart presence design using a spiral model, this model is very suitable for system development in government because it can adjust to existing regulations. The spiral model focuses on the approach to the client that makes the system built according to the client's wishes. The support of experts in the team to analyze the risk is able to convince the client with the stages in the spiral model. Evaluations from staff and users are also very helpful in improving the presence system in subsequent developments.

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