

Development of Android Based Laboratory Asset Monitoring and Inventory Application

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Abstract—Each laboratory has a person in charge (technician) that has a duty of serving the laboratory in term of operational and maintenance. The main task of a technician is to record and monitor the condition and completeness of laboratory equipment in the laboratory. The data collection process is done by writing a tool request form, therefore mistakes often occur. In this research, an Android-based laboratory asset monitoring and inventory application was made. By using the application, it is expected that technicians become easier to make any duties of reports including report of damaged laboratory equipments, request for reparation, the unavailable practical materials etc simply by using a Smartphone. Testing the application with the Black-Box testing method to investigate the function of each application component whether it is running well or not. The results obtained from the Black-Box test are the functions of each component were running as expected. The case study is conducted for Electrical Engineering Department at State Polytechnic of Ujung Pandang (SPUP)

Keywords— *Andorid, Black-box, Inventory Monitoring, Laboratory, Waterfall.*

I. Introduction

According to the Education Law no. 12 of 2012, Polytechnic is a university that provides vocational education by implementing more practical learning than theory, with a percentage of 70% and 30% [1].

State Polytechnic of Ujung Pandang has a laboratory in each study program. Each laboratory has a person in charge (technician) who is in charge of maintaining the condition of the laboratory. The task of a technician is to record and monitor the condition and completeness of practicum equipment in the laboratory. If there is equipment that is damaged, the technician will record the equipment to be reported to the staff of the equipment and materials procurement department. The data collection

Previously, the same research was made using the web [2], and this study will be developed using android [3], [4], and [5], with the waterfall method and black box testing [6] and [7]. The hope is that this application will make it easier for technicians to carry out tasks

II. Research methods

A. Research Schedule

Research and design of monitoring applications and android-based laboratory inventory is conducted at the Ujung Pandang State Polytechnic (SPUP), Department of Electrical Engineering.

B. Research Stages

Stages or flow of research can be seen in Figure 1.

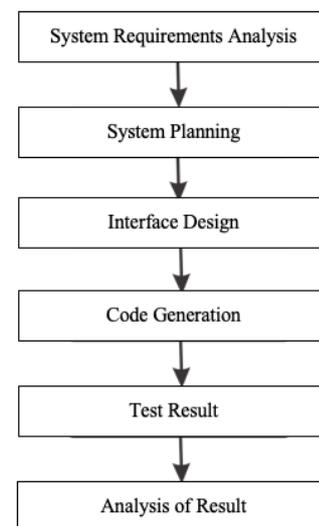


Figure 1. Research flow chart

C. System Overview

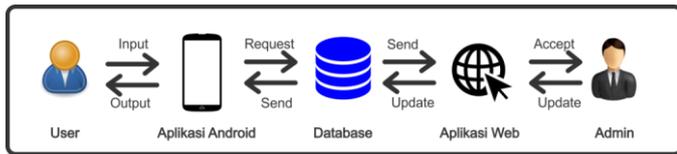


Figure 2. General description of the application system

Figure 2 explains the general description of the application system that will be created, it can be explained that the user opens the application and then enters new data or updates the data. Then the application forwards the data and stores it in the database. The data is then seen by the admin. Vice versa, if there is data that is updated by the admin then the data is stored in the database and can be seen by the user. The user in this case is the technician and head of the laboratory, while the admin in this case is the procurement department. Information on the user side is only information related to what laboratories are responsible, while information on the admin side is data from all existing laboratories.

D. Application Design

1. Use Case Diagrams

This diagram illustrates application users as well as what users can do on the application. In this system, users are required to have an account and log in first to the application, the application user consists of user and admin. As for what can be done by the admin and user can be seen in the following image.

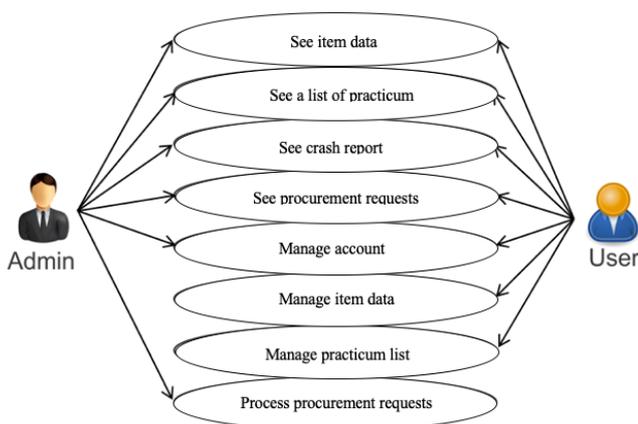


Figure 3. Use case diagram application

2. Activity Diagram

Basically, an activity diagram is an extended flowchart diagram to show the flow of control of one activity to another. This diagram is used for modeling the dynamic aspects of the system. The activity diagram of this system can be seen in the following image.

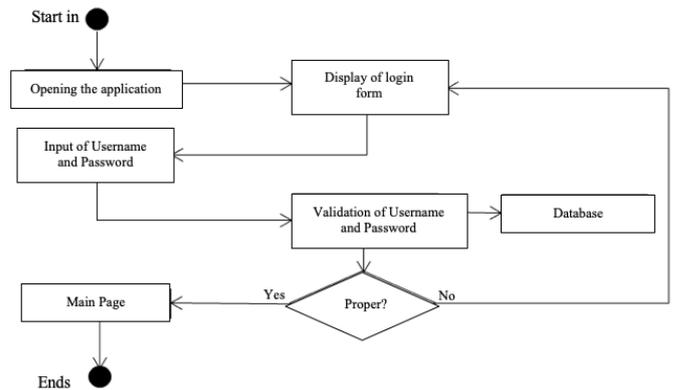


Figure 4. Activity diagram for login

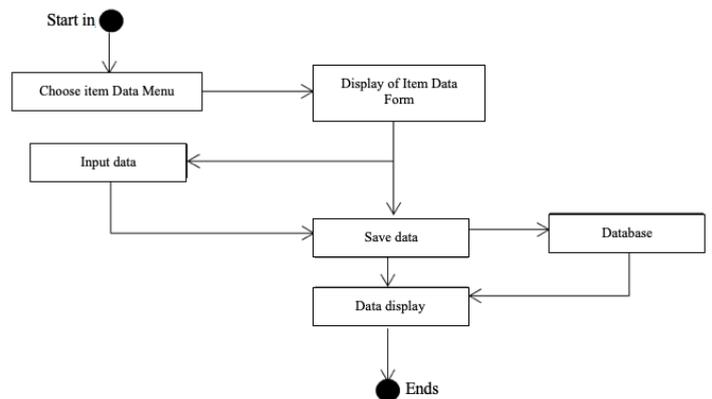


Figure 5. Diagram Activity entering new data

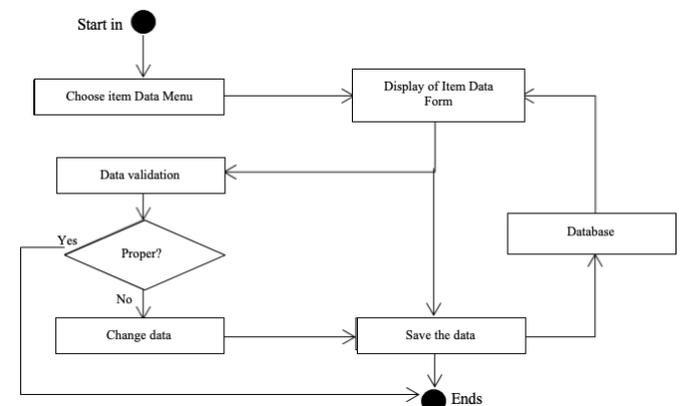


Figure 6. Activity diagram to change data

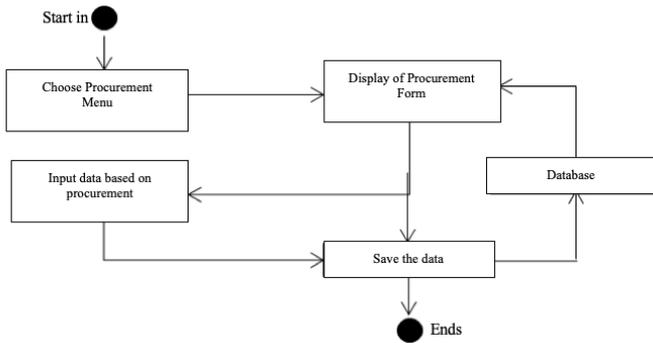


Figure 7. Activity diagram for procurement requests process

III. Results and Discussion

A. Application Design Results

The results of the design of the Android-based laboratory asset monitoring and inventory application.

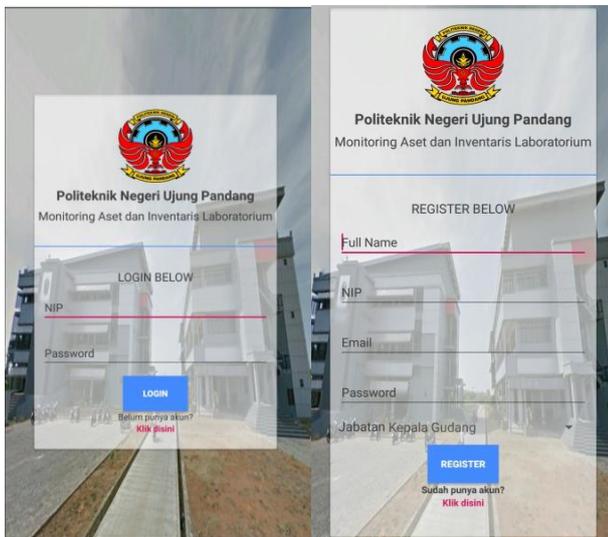


Figure 8. Android user login and registration page

Figure 8 shows the login and registration page on the android application. The data needed by the user to log in is NIP and password. Users who have not registered their NIP must first register.

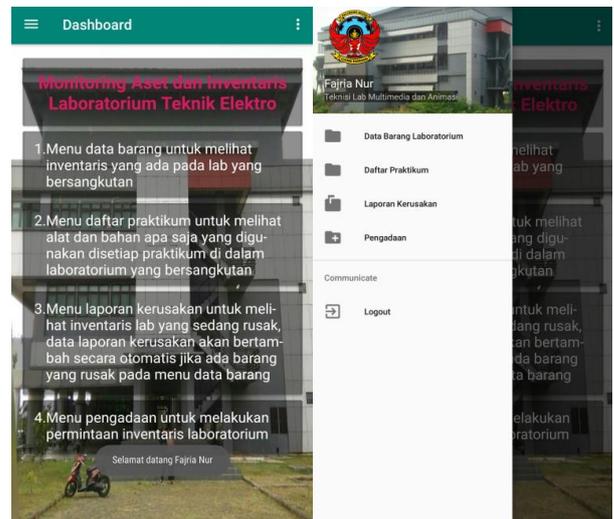


Figure 9. Main page and android application menu

Figure 9 displays the main page on the android application when the user has logged in. On the main page there is a navigation menu that will direct to the next page in accordance with the selected menu.

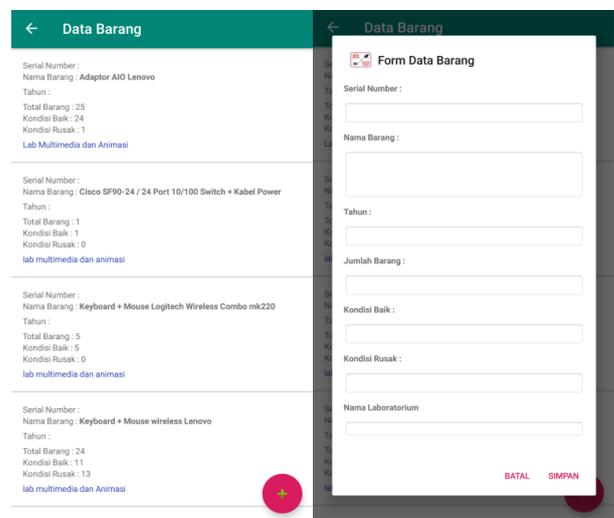


Figure 10. List of inventory and data added forms

Figure 10 displays a list of laboratory inventory data items and a form display if you want to add data. The data list of goods displays the serial number or code of goods, name of goods, year of procurement, total goods, good number of goods, number of damaged goods and name of laboratory where the goods are stored.

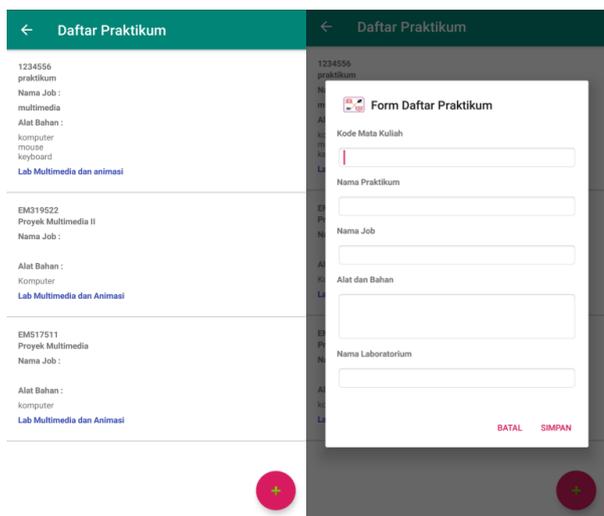


Figure 11. List of practicum and data added forms

Figure 11 displays a list of practicum done in the laboratory and the form display if you want to add practicum data. The practicum list displays the course code, course name, practicum name, material used, and name of the laboratory where the practicum is conducted.

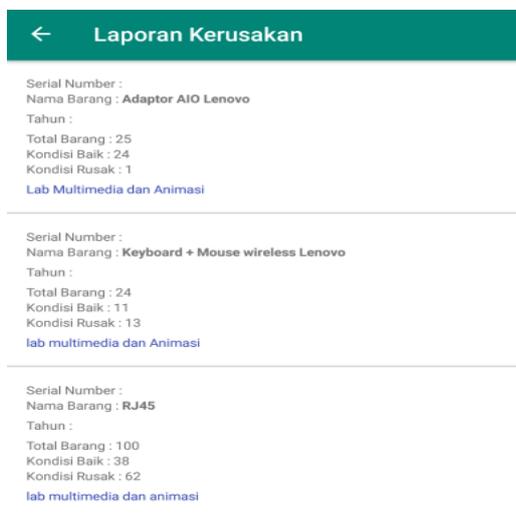


Figure 12. List of inventory damage reports

Figure 12 displays a list of laboratory inventory damage reports, where the data contained in the damage report is laboratory inventory data that is currently damaged.

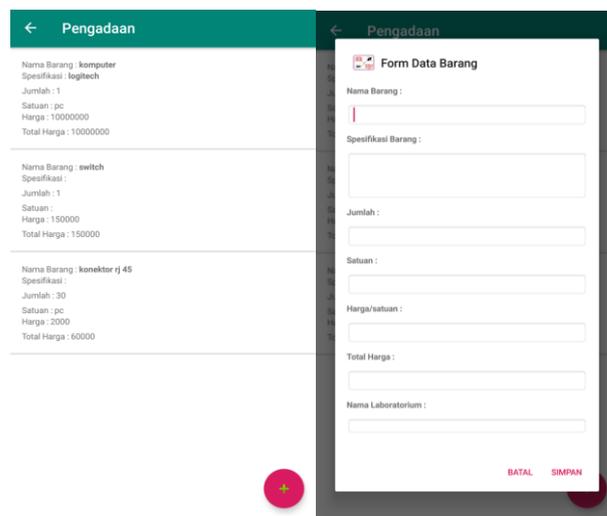


Figure 13. List of procurement and data added forms

Figure 13 shows a list of laboratory inventory procurement requests and a form display if you want to add data. The procurement request list displays the name of the item, the specifications of the item, the number of items needed, the unit of goods, the price of the unit item, the total price of the whole item, and the name of the laboratory where the inventory will be stored.

B. Application Testing Results

Tests conducted on the application are black-box testing and application compatibility testing. Black-box testing is done to test application functionality. The results of black-box testing can be seen in Table 1.

Table 1. Black-box application test results

Testing	Test Scenarios	Expected results	Test result
Icon application	Click the application icon on the user's Android device	Displays the Splash Screen layout	Valid
Login page	Fill in the NIP and Password forms then press the Login button	Can log in and direct to the next page	Valid
	Press the "click here" button	Navigate to the registration page	Valid
Registrati on page	Fill out the form on the page completely then press the Register button	Data is stored and can be used to log in to the application	Valid
	Press the "click here" button	Navigate to the login page	Valid
Main page	Login successful	Displays the dashboard page	Valid
	Press the button on the top left or swipe right on the left side of the application	Display the navigation menu and user identifier (name and title)	Valid
Edit Profile Page	Press the Edit Profile button on the top right of the application	Displays the profile page of the user who is currently logged in	Valid
	Change data then press the save button	Profile data changed	Valid

Laboratory Goods Data menu page	Pressing the Laboratory Goods Data menu on the navigation menu	Displays a list of data items in the laboratory concerned	<i>Valid</i>
	Press the Add Data button at the bottom right of the page	Displays blank forms to add new data	<i>Valid</i>
	Press and hold on one of the data	Showing options to change or delete data	<i>Valid</i>
	Press Change Data on the options	Display item data forms and update existing data	<i>Valid</i>
	Press the save button on the form	Data details change according to changes made	<i>Valid</i>
	Press Delete Data on the selection	The selected data is deleted and no longer appears	<i>Valid</i>
Practicum List menu page	Pressing the Practicum List menu on the navigation menu	Displays a list of practicum data carried out at the relevant laboratory	<i>Valid</i>
	Press the Add Data button at the bottom right of the page	Displays blank forms to add new data	<i>Valid</i>
	Press and hold on one of the data	Showing options to change or delete data	<i>Valid</i>
	Press Change Data on the options	Displays the practicum list form and updates existing data	<i>Valid</i>
	Press the save button on the form	Data details change according to changes made	<i>Valid</i>
Testing	Test Scenarios	Expected results	Test result
Practicum List menu page	Press Delete Data on the selection	The selected data is deleted and no longer appears	<i>Valid</i>
Damage Report menu page	Pressing the Damage Report menu on the navigation menu	Displays a list of data for laboratory items that have damage	<i>Valid</i>
Procurement menu page	Pressing the Procurement menu on the navigation menu	Displays a list of procurement requests needed by the relevant laboratory	<i>Valid</i>
	Press the Add Data button at the bottom right of the page	Displays blank forms to add new data	<i>Valid</i>
	Press and hold on one of the data	Showing options to change data or finish	<i>Valid</i>
	Press Change Data on the options	Display the procurement form and update existing data	<i>Valid</i>
	Press the save button on the form	Data details change according to changes made	<i>Valid</i>
	Press Done on selection	The selected data no longer appears	<i>Valid</i>

Compatibility testing is testing the system and application interface display on several different android

devices. In this study the application was tested on 3 different android devices. Application compatibility test results obtained are the application runs in accordance with the expected function.

iv. Conclusion

Based on the results of the design of the monitoring application of assets and laboratory inventory that has been made, it can be concluded that all functions of the buttons, menus and systems in the application run as expected, that is, it can monitor assets and laboratory inventory properly so as to facilitate campus laboratory technicians in State Polytechnic of Ujung Pandang to report damage to goods or make a request for procurement of laboratory equipment and materials by accessing Android applications and web applications.

Acknowledgement

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