Journal of Computer Networks, Architecture and High Performance Computing
Volume 6, Number 3, July 2024
https://doi.org/10.47709/cnapc.v6i3.3979

Submitted : 3 June 2024
Accepted : 19 June 2024
Published : 1 July 2024

Design of an Android-based Troubled Gas Detection Tool Report Application at PT. Saka Tunggal Mandiri Jaya

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ABSTRACT

Inspections are carried out to check objects to ensure that they meet certain standards. Laboratory officers have difficulty in the reporting process requested by the head of the section quickly, because officers must compare all gas detection device data. And laboratory officers sometimes leave the completeness of other supporting devices. So that each equipment officer has difficulty determining which units are damaged or repaired. Application research methods include literature study analysis, interviews, observations, while the development method used is the waterfall model. The design of the application displayed uses the android platform, the software used in building the application is android studio with the java programming language, while MySQL as a database. The purpose of this research is to provide information needed by PT Saka Tunggal Manadiri Jaya in improving product quality. The results achieved at the end of the study are the application of the gas detection device problem report in providing characteristic inspection information, making it easier for users to obtain inspection report information searches along with product items produced in accordance with the provisions and standards of inspection control of one very important component. By utilizing android-based technology through mobile devices. In order to find out the types of inspections in quality control either functional or tool change.

Keywords: Inspection; Detection; Laboratory; Waterfall Model

1. INTRODUCTION

Gas detector is a tool that can detect gas in a room, a type of gas cylinder leak detection device, namely with an automatic control system that can make it easier to handle around gas leaks (Fauziyah, Harliana, & Gigih, 2020). Meanwhile, according to (Firdaus, Ahmad, & Anggono, 2020) gas is a phase of matter in very tenuous molecular bonds at certain temperatures, gas has the ability to flow and can change shape.

PT Saka Tunggal Mandiri Jaya is a company engaged in the oil and gas industry, both domestic and international. One of the business opportunities that is always developing in the mining equipment industry and oil and gas services to optimize the global market is gas detection equipment. An integrated detector automatically provides information on the state of an event or condition that can be applied to agencies in need. The laboratory is used to test and examine the quality and quantity of each data sample. All tools in each laboratory to facilitate management such as tool availability information, tool presence information and tool condition information in the laboratory (Kristiyanto, Widhyaestoeti, & Primasari, 2020).

The problem that often occurs is that officers have difficulty in presenting reports requested by the head of the section quickly, officers must compare all data, and the information system provided to the head of the section only uses email. In detailing the condition of each piece of equipment, officers have difficulty determining which units are damaged and require repair, because field sampling officers and laboratory officers find units of equipment that are damaged. In fact, it is often hampered due to errors in reporting gas detection problems when making inspections or officers sometimes leave other supporting equipment.

Based on the description above, an application is needed to report the problem of gas detection equipment at PT Saka Tunggal Mandiri Jaya by implementing an android-based information system that is run via a smartphone. According to (Jocom, 2017), a smartphone is a type of cellphone that has higher capabilities than ordinary cellphones. Smartphones have been categorized as a small computer that can process data, search (browse) and others. Smartphones have now penetrated into all aspects of life, so that people have been spoiled with tools that can provide convenience in carrying out daily activities. One of them is an android-based smartphone. Android is an operating system based on linux. Android provides an open platform (open source) for developers to create their own applications. Based on the description above, an application is needed entitled the design of an android-based problematic gas detection device report application at PT Saka Tunggal Mandiri Jaya. Where to implement a system

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that is used as a media tool from the information program in making it easier for laboratory officers to report gas detection device problems, so as to get detailed information from each device given to laboratory officers accurately.

Based on the description above, we can identify the problems that exist as follows, among others: Laboratory officers have difficulty in the process of reporting problematic gas detection devices, it will extend the time needed to complete the report to the head of the section, because officers must compare all gas detection device data. The head of the section only uses email in the inspection reporting process, so that each equipment officer has difficulty determining which units are damaged or repaired. The expected objectives of this research are as follows: Building a mobile application that facilitates the process of reporting problems with android-based gas detection devices at PT Saka Tunggal Jaya Mandiri. Provide detailed and accurate information services. Implementing the needs of an android-based gas detection device problem reporting system.

2. LITERATURE REVIEW

Related research has a function to expand and deepen the theory that will be used in the research study to be carried out. The following is related research on gas detection systems including: Research conducted by Mifza Ferdian Putra, Awang Harsa Kridalaksana and Zainal Arifin. Published by Mulawarman University with the title Mulawarman Informatics journal volume 12 number 1 February 2017 ISSN: 1858-4853, with the title Design Build LPG Gas Leak Detection Tool with Microcontroller-Based MQ-6 Sensor Through Android Smartphone as Information Media**.** The role of LPG gas is very important for human life both in households and in industry. However, gas can have a negative impact, especially if it is not known that there has been a leak from the LPG gas cylinder or storage area. The cause of leaking gas cylinders can occur due to leaks in hoses, tubes or regulators that are not installed properly and gas cylinders that are distributed are of poor quality or physically damaged. To produce a design of an LPG gas cylinder leak detection device using an MQ-6 sensor as a gas sensor and an ethernet shield as a module on the arduino uno microcontroller to connect the arduino with the internet network. The way this tool works is, when the MQ-6 sensor detects LPG gas, the sensor will send data to the microcontroller on the arduino to be given a response in the form of turning on the fan, buzzer as an alarm and this tool can send analog gas data information to an android smartphone using the cayenne plaltform via the internet network (Putra, 2017). Research conducted by Defnizal, published by Universitas Putra Indonesia YPTK with the title Komtek Info journal volume 6 number 1 June 2019 ISSN: 2502-8758, with the title Application of Fuzzy Logic to the Indoor C4H10 Gas Detection System as a Medium for Displaying Android-Based Hazards and Graphical User Interface**.** The impact of the danger that can be caused by a gas leak needs to be made a gas leak detection device using an MQ5 sensor and the status of the danger level is displayed through an android application. Creating a tool that can detect gas and be able to provide visual information via a smartphone so that the existence of this tool can help in handling problems if there is gas in the room. As well as making it easier for users to know the level of gas levels and the level of danger of gas leaks. There are 3 (three) levels of danger, namely safe, normal and danger. If gas levels are high and in danger status, the system will provide information on the android application in the form of a display of gas levels, danger levels and alarms. The use of fuzzy methods in the system is applied to explore knowledge and decision making, so that the application of fuzzy methods helps in calculating the level of danger of gas leakage effectively and safely for use with maximum results in determining the level of danger. the resulting output results can be information on the danger of gas leakage (Defnizal, 2019). Research conducted by Rimbawati, Heri Setiadi and Ridho Ananda published by Muhammadiyah University of North Sumatra with the title Electrical Engineering journal volume 4 number 2 June 2019 ISSN: 2598-1099, with the title Design of LPG Gas Cylinder Leak Detection Tool Using MQ-6 Sensor to Overcome Fire Hazard**.** The LPG gas leak detection system uses an ardunino nano microcontroller, MQ-6 sensor, buzzer, LED, and 18650 battery as a power supply in the circuit. in this system using sensors is an object as an indicator or input in reading gas levels. Negligence in installation and slow handling when there is an LPG gas hose leak can trigger a fire. Therefore, a tool is designed to detect LPG gas leaks and can speed up handling when an LPG gas leak occurs. This system is based on a microcontroller in charge of managing the entire system, the MQ-6 sensor as a detector of LPG gas leaks, the buzzer sound will be a warning sign of danger from gas leaks. LPG gas cylinders can be categorized as amaan when the output voltage on the sensor exceeds 12 milli volts. However, if the output voltage on the sensor exceeds or is equal to 13 milli volts, then the gas cylinder can certainly be dangerous (Rimbawati, 2019).

Design

Design is the process of defining something that will be done using a variety of techniques and involves a description of the architecture and component details as well as the limitations that will be experienced in the process

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(Mahyuni, Sharipuddin, & Martono, 2017). Meanwhile, according to (Siregar, Handika, & Melani, 2018) Design is defined as the application process of various techniques and principles for the purpose of defining a device, process or system in sufficient detail to enable realization to control the design process.

Application

Application is an application, storing something, data, problems, work into a means or media that can be used to be applied into a new form. As well as a tool that functions specifically and integrated according to its capabilities, the application is a computer device that is ready for the user. (Siregar, Handika, & Melani, 2018).

Problem Report

A problem report is a tool that can be used as an effective information and communication material. Reports as an important source of information for identifying problems in a form of accountability or something needs to start from news, information or notification (Putra, 2017).

System

The system comes from the Greek systema which means unity or a group. There are two groups of approaches in defining the system, namely those that emphasize the procedure and those that emphasize the components or elements (Nurcholish, 2018).

Gas Detection Device

Gas detector is a tool that can detect gas in a room, a type of gas cylinder leak detection device, namely an automatic control system that can make it easier to handle around gas leaks (Fauziyah, Harliana, & Gigih, 2020).

Android

Android is a Linux-based operating system used for mobile phones such as smartphones and tablet computers. Android provides an open platform for developers to create their own applications that are used by various mobile devices. Android is an application developed with the java programming language (Sonatha, Azmi, & Suryani, 2017). One of the most widely used operating systems today is android. This is supported by several large vendors, such as samsung, htc, motorola, and LG that use the operating system in the various gadgets they produce. So that makes android more popular faster than other smartphone operating systems (Defni & Rahmayun, 2018).

3. METHOD

The system development method used is the waterfall model. According to (somesrville 2021), According to to (somesrville 2021), analyze the development so that the system can meet the needs including: to analyze the development so that the system can meet the needs including: Requirement Analysis and Definition, System and Software Design, Implementation and Unit Testing, Integration and System Testing, Operation and Maintenance. The system development method used is the waterfall model. The methodology used includes analysis methods and system development methods with the following details:

1. Literature Study: Data or information collection techniques by studying journal books, as well as research that contains concepts and theories that will be used as the basis for the application of application design.
2. Observation Analysis: Observation is carried out by directly replacing the activities and activities carried out by the employees of PT Saka Tunggal Mandiri Jaya, so that it can be analyzed what is needed.
3. Interview Analysis: This type of data collection method is carried out by directly asking questions that have been prepared beforehand for sources at PT Saka Tunggal Mandiri Jaya.

The following is a diagram of the framework in this study.

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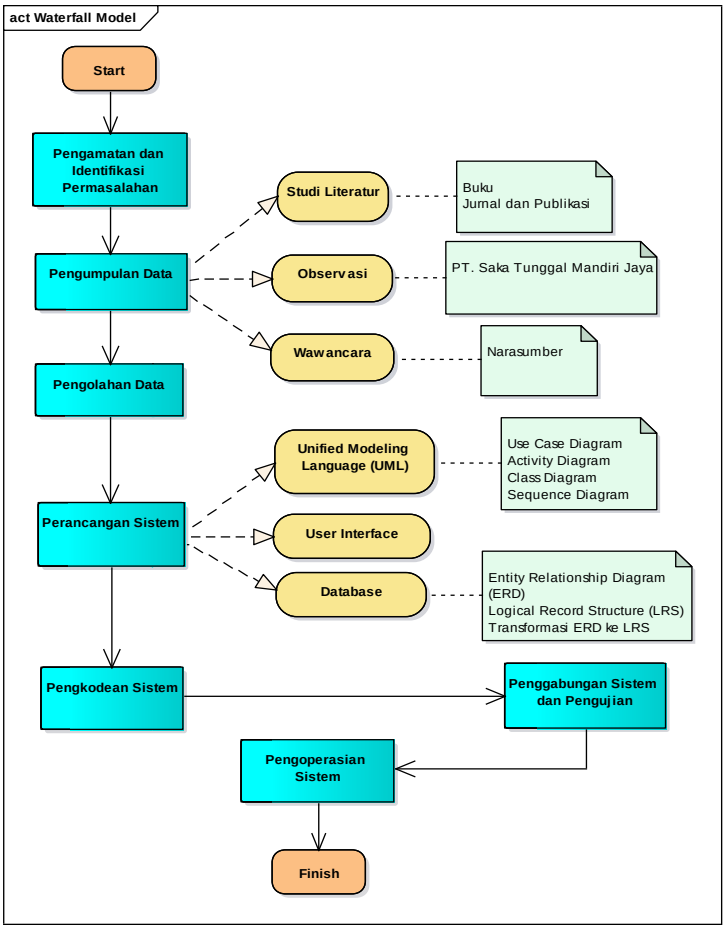


Fig. 1. Framework Diagram

4. RESULT

The results of the research are designed to be able to use the android-based gas detection device problem report application, it requires a minimum of several specifications that support the application process, including hardware and software. As well as conducting evaluation results by testing the system using black box and white box.

Hardware Specifications

The following hardware specifications for users and admins, among others:

a. User
   1. Android-based mobile device
   2. Random access memory (RAM) 512MB
   3. 30MB memory freespace capacity
   4. Cellular data network or Wi-Fi

b. Admin
   1. A personal computer or laptop
   2. Intel® Core™ 2 duo processor 2.4 GHz
   3. Random access memory (RAM) 4GB
   4. 350GB hard disk
   5. Internet network

Software Specifications

The following software specifications for users and admins, among others:

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a. User
1. Android operating system with minimum version 7.0 (Nougat)

b. Admin
1. Windows 10 64-bit operating system
2. XAMPP, MySQL database, android studio and JDK 8
3. Mozilla firefox or google chrome browser

Application Implementation

At this implementation stage is the application of the application of the results of the existing system design to achieve the desired goal. Implementation carries out commands that are structured from start to finish.

1. App Splash Screen



Fig. 2. Application Spalsh Screen Display

Figure 2 is the initial splash screen display of the program that looks temporarily before entering the login form, by displaying a logo of the gas detector problem report application.

2. Login Form



Fig.3. Screen Display of Application Login Form

Figure 3 is a view of the login form which is the main gate to enter the application or main menu. Users enter the nik and password that has been stored in the database.

3. Main Menu

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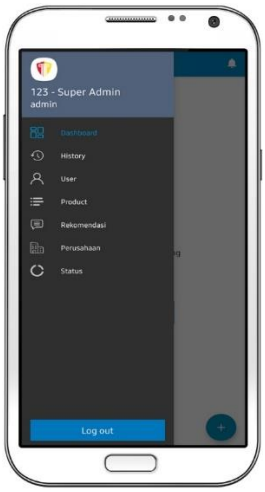


Fig.4. Main Menu Screen Display

Figure 4 is the main menu page which has several menu category options to perform the main functions of the gas detector problem report application, such as the dashboard menu or create inspection, history menu, user menu, product menu, recommendation menu, company menu and status menu.

4. Inspection Menu

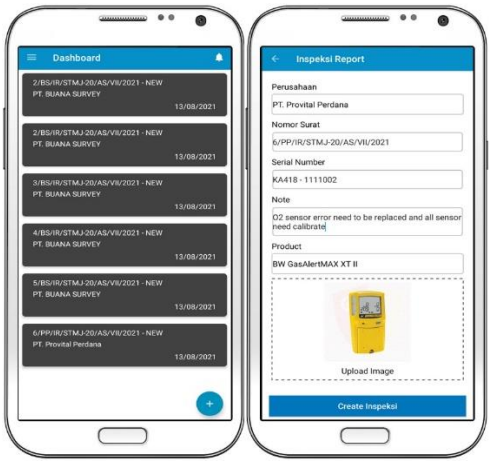


Fig.5. Inspection Menu Screen Display

Figure 5 is the inspection menu page which involves tests, checks and measurements made based on certain characteristics related to the product. After performing the inspection the user clicks on the dashboard menu, then selects one of the company name lists, on the next page the information displayed on the inspection report form consists of company name, letter number, serial number, note, product and upload image. Then the user clicks the create inspection button, it will automatically return to the company list page on the dashboard menu, the inspection aims to prevent problems caused by low quality and reduce complaints.

5. History Menu

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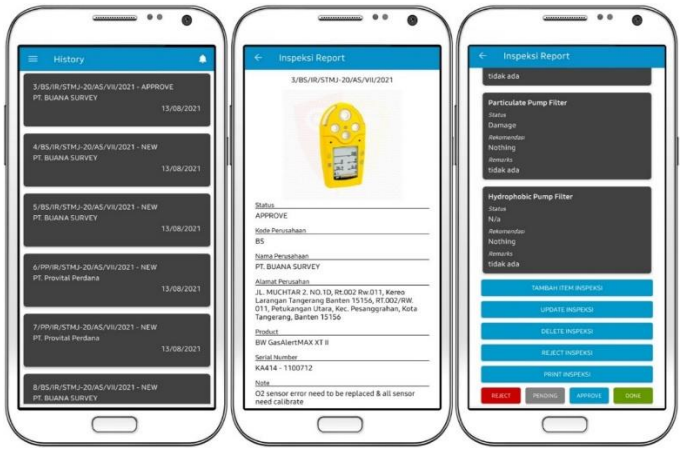


Fig.6. History Menu Screen Display

Figure 6 is the history menu page displaying information on the product inspection report status process. the initial display of users can see a list of company names that have been registered by PT Saka Tunggal Mandiri Jaya. On the next display, you can see the inspection report details where the information displayed is status, company code, company name, company address, product, serial number, note, valid date, date of manufacture, along with product items. If the user clicks the print buttton, the print information displayed is all inspections based on one company and item. Other features on this page include add inspection, update, delete, reject and print. At the bottom of the inspection report detail page, there are 4 buttons to convey the status of the action that occurred when the user clicked on it.

6. User Menu

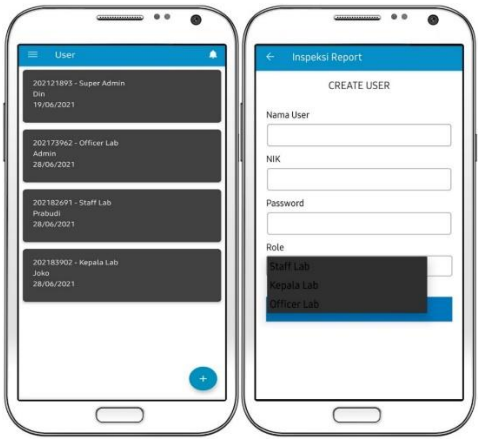


Fig.7. User Menu Screen Display

Figure 7 is the user menu page. On this display the user will get information about each user who will access the application and have their own restrictions according to their function. There are 4 users including super admin, lab officer, lab staff and lab head. If the user wants to update or add a user then the user clicks the plus button. Next, it will be displayed to the create user form page, users can input user name, nik, password and role category data.

Each user has limited access rights or displays any menu based on the type of level including:

a. Super admin, has full access (all privileges), all menus will be displayed.
b. Officer lab, the menus displayed are dashboard, company and history.
c. Lab staff, the menu displayed is dashboard and history.
d. Head of the lab, the menu displayed is dashboard and history.

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7. Product Menu



Fig.8. Product Menu Screen Display

Figure 8 is the product menu page, the information displayed lists the product names that have been inputted by the user, if the user wants to add product data, then click the plus button. Next will be the product name input page, then the data will be stored in the database.

8. Recommendation Menu

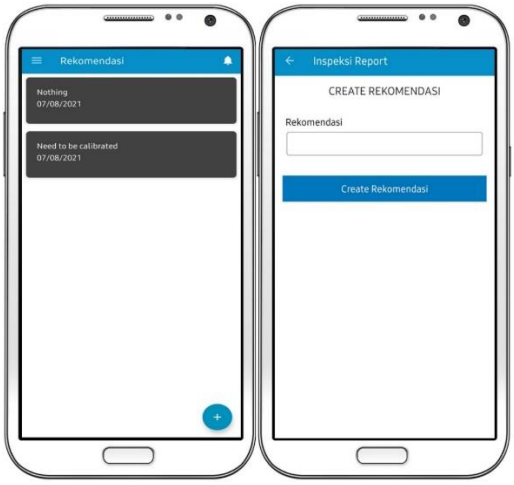


Fig.9. Recommendation Menu Screen Display

Figure 9 is a product recommendation display on the gas detector problem report application. There are 2 of them nothing and need to be calibrated. If the user wants to add a recommendation, the user clicks the plus button and then the create recommendation page will appear, the data will be stored in the database.

9. Company Menu

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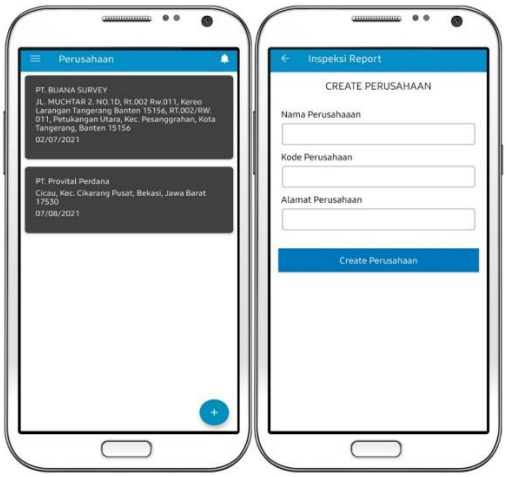


Fig.10. Company Menu Layout

Figure 10 is a menu page listing companies that have been registered by PT Saka Tunggal Mandiri Jaya. On this display is an explanation of the company name and full address of the company. In the process of adding users must click the plus button and will go to the next page, namely the create company form, consisting of the name, code and address of the company then the data will be stored in the database.

10. Status Menu

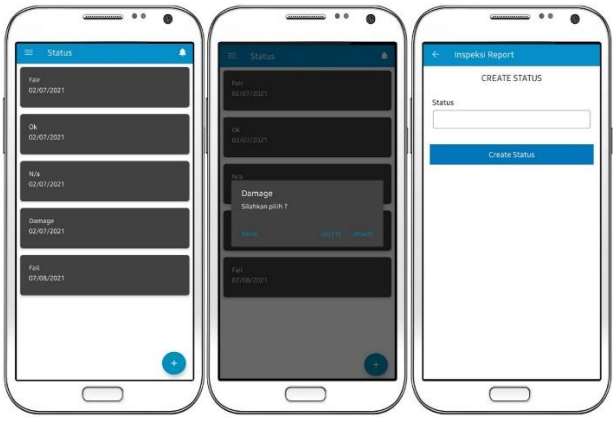


Fig. 11. Status Menu Screen Display

Figure 11 is the status menu page, there are 5 statuses that have been inputted by users including fair, ok, n/a, damage and fail. Users can update or add status categories to the gas detection device problem report application at PT Saka Tunggal Mandiri Jaya.

5. CONCLUSION

The conclusions obtained from the developer of the android-based gas detector problem report application are as follows: With the gas detector problem report application, it makes it easier for laboratory staff to obtain inspection information searches along with product items for the reporting process to the head of the section. By utilizing android-based technology through mobile devices. Helping users ensure the quality of the products produced in accordance with the provisions, as well as knowing the types of products in quality control, either functional or tool replacement. so that users can control damage or repair gas detection devices in determining units for one very important

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component. Some things that are suggested in the development of an android operating system-based gas detection device problem report application for further application development improvement, namely: The gas detector problem report application can be further developed in the information section based on categories such as searching for company names on the dashboard menu list, making it easier for users in the product inspection process. For the next stage of development, add calibration information, where the calibration process is carried out after the problem reporting is complete. So that it can cover all work processes from incoming goods to completion. In the next development of the gas detector problem report application, it is expected to have more features on the history menu. Such as filtering or searching data according to the date period of the record, then the data is filtered according to predetermined parameters in displaying so much data.

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Submitted : 3 June 2024
Accepted : 19 June 2024
Published : 1 July 2024

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