COMSERVA
JURNAL PENELITIAN DAN PENGABDIAN MASYARAKAT
Volume 4 No. 10 Februari 2025 (3307-3315)
e-ISSN: 2798-5210
p-ISSN: 2798-5652

Internal Control-Based QR Code Inventory System of Maintenance and Repair Application at Manado State Polytechnic

Susy Marentek[1]*, Edwin Lumunon[2], Esrie Limpeleh[3], Heidy Pesik[4]
Politeknik Negeri Manado, Indonesia
Email: susy.marentek@polimdo.ac.id[1], edwin.lumunon@gmail.com[2], esrie.limpeleh@ymail.com[3], heidy.pesik@polimdo.ac.id[4]
**Correspondence*

ABSTRACT

The implementation of maintenance and repair activities at the Manado State Polytechnic is currently still manual so the evaluation of these activities cannot be monitored properly. Apart from that, reporting of damage to goods and repairs from units and departments is still manual with a letter signed directly and taken to Deputy Director 2 for approval. This will slow down the work process because UPT MR will carry out another evaluation which will then be reported to Deputy Director 2 for improvements. Therefore, we need an application that can make the steps for proposing repairs and maintenance digitally based on a website so that it can be done via a laptop, computer, or Android device. Apart from that, the existing inventory items are not properly recorded. Where no application can display the quantity and condition of goods, whether the goods are in good condition, damaged, or can still be repaired. This inventory process will be created in an integrated application through this system so that agency and unit leaders can monitor the condition and quantity of existing goods directly anywhere. Therefore, this application speeds up the process of collecting data on goods and can also repair all existing goods based on the correct rules and steps. Likewise, leaders can print reports on the condition and quantity of goods at any time for any purpose without needing to search for these data. Apart from this application being able to store data digitally, this application will also speed up and simplify the process of collecting data on goods by simply scanning the QR Code to see data on certain goods. This application will also speed up and make it easier for units and departments to propose repairs and maintenance of goods at the Manado State Polytechnic.

Kata kunci: Application, System, UPT MR, QR Code.

INTRODUCTION

Reporting of damage to goods and repairs from units and departments is still manual with letters signed directly and taken to Deputy Director 2 for approval. This will slow down the work process because UPT MR will carry out another evaluation which will then be reported to Deputy Director 2 for improvements. (Moorty et al., 2017). Therefore, we need an application that can make the steps for proposing repairs and maintenance digitally based on a website so that it can be done via a laptop, computer, or Android device. Apart from that, the existing inventory items are not properly recorded. (Vorobchuk & Pashkevych, 2022).

Where no application can display the quantity and condition of goods, whether the goods are in good condition, damaged, or can still be repaired. This inventory process will be created in an integrated application through this system so that agency and unit leaders can monitor the condition and quantity of existing goods directly anywhere (Susanto et al., 2015a). Therefore, this application speeds up the process of collecting data on goods and can also repair all existing goods based on the correct rules and steps. Likewise, leaders can print reports on the condition and quantity of goods at any time for any purpose without needing to search for these data. Apart from this application being able to store data

digitally, this application will also speed up and simplify the process of collecting data on goods by simply scanning the QR Code to see data on certain goods (Susanto et al., 2015b). Based on this situation, currently, we need an information system in the form of an interactive website that can store inventory data on goods that have been stored using a QR Code. Likewise, through this application, all work units and departments can send their needs so that students can create solutions and products for these needs (Wauran et al., 2023a). This information system will accommodate and display all goods and needs data into a transaction and information medium that can be monitored directly by the Internal Supervisor (SPI). With this information system, the process of requesting needs and repairs will be easily carried out and expanded. In this way, mutually beneficial communication will occur between the work unit and the leadership (Wauran et al., 2023b).

QR Code or Quick Response Code is a two-dimensional form of barcode. QR Codes were first introduced by Denso Wave in 1994 (Saputra et al., 2021), (Hanks, 2012), (Ahmad et al., 2019). As technology develops, currently QR Codes are not only recognized and read via special scanners but cameras on smartphones, even a webcam. Usually, QR Codes contain information such as text, URL links, geo-location, telephone numbers, business cards, and other things that can be embedded. The QR Code looks like a small box containing black and white pixels placed randomly as in the figure 1.

Figure 1 QR Code

One-Time Password (OTP) is a series of symbols or numbers that are created as a password and used only once. One use of OTP is for user authentication, for example on social media, online banking, or digital wallets. There are many algorithms for generating OTP, one of which is a Time-based One-Time Password (TOTP). According to (YUDISTIRA, 2017), the way TOTP works is to create a password based on the key and time when the TOTP algorithm is used. In general, TOTP has the same scheme as HMAC-based One-Time Password or HOTP, but the difference is that the calculation process involves keys and time so that TOTP can be denoted as equation (1). Where K is a random key and T is the time (Marentek & Wauran, 2024).

TOTP = HOTP(K, T)(1)

The value of T is calculated based on equation (2). Where $Tcurrent$ is the current time in seconds, $T0$ is the agreed initiation time usually worth 0 ($T0$ = 0). Meanwhile, v is a parameter that determines how long a TOTP is valid. Usually v = 30 so TOTP is only valid for 30 seconds.

$T = Tcurrent - T0v$ (2)

OLTP is a form of data processing where each transaction is processed immediately, without delay in collecting transactions into batches. It has the characteristics of a large amount of data but the transactions carried out are quite simple such as insert, update, and delete (As & Shalahudin, 2021). The main thing that becomes the concern of the OLTP system is to perform queries quickly and easily to be repaired and accessible. Online Transaction Processing (OLTP), is a database concept that contains data processing to record daily transactions. Such as daily sales transactions.

METHOD

The block diagram system is displayed in the figure 2 below:

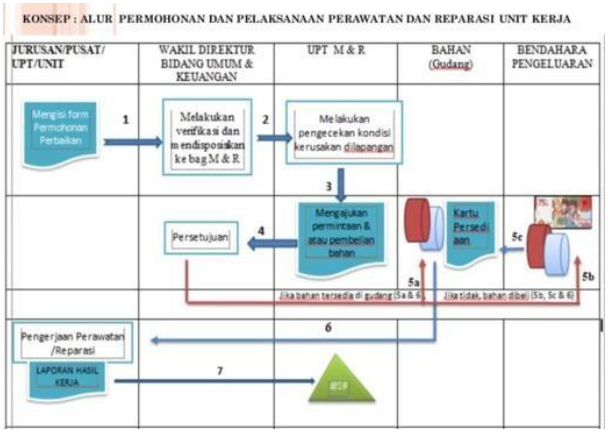


Figure 2
Diagram System

1. Jurusan/Pusat/UPT/Unit
   These units ask the vice director of financial and general affairs for the repair or new equipment.
2. Vice director of financial and general affair
   The vice director will ask the UPT MR to check the equipment.
3. New equipment from storage
   UPT will check if the need of the equipment is repairing or new. If the problem needs only repairing then the technician will do it and then report by sending the photo by this system. If it needs a new one then the technician will check the storage by entering the QR Code in this system. If the equipment is not available the the technician will ask the vice director to get the new one by this system.
4. Financial Officer

The vice director will approve and then send a note to the financial officer staff to buy new equipment. The research stages that will be carried out include:

1. Data Collection
2. System Analysis
3. Web Design
4. QR Code Configuration

5. System Implementation
6. System Simulation
7. Pengujian Sistem. The research stages that will be carried out include:

RESULTS AND DISCUSSION

Place Tables/Figures/Images in text as close to the reference as possible (see Figure 1). It may extend across both columns to a maximum width of 17.78 cm (7”).

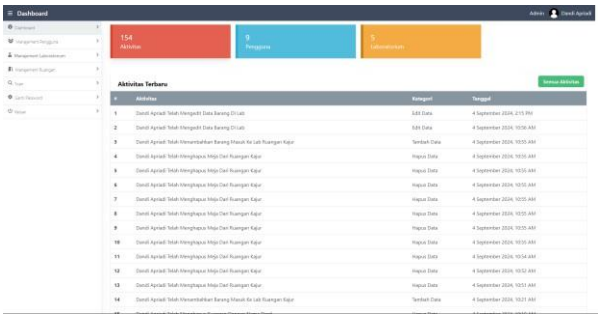
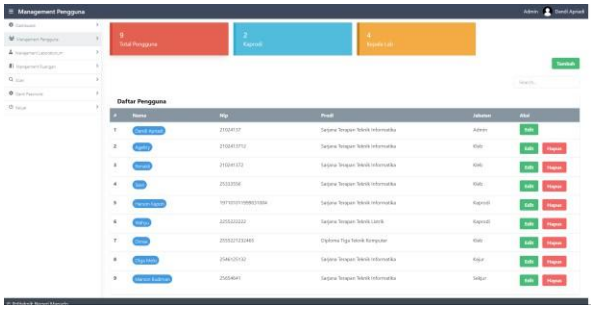


Figure 3
Admin Panel Page

The "Admin Panel" page is the control center for application management, where admins can monitor and manage all aspects of the system. Here, admins can view user statistics, manage department and study program data, and monitor student organization and UKM activities. The interface is designed to provide quick access to features and reports, ensuring efficiency in overall application management.



The "User Management" page provides tools for admins to manage user accounts within the application. Here, admins can see a list of all users, perform searches, and add, edit, or delete user accounts. This feature allows managing user access rights and roles, as well as monitoring their activities thereby creating a secure and organized environment in the application.

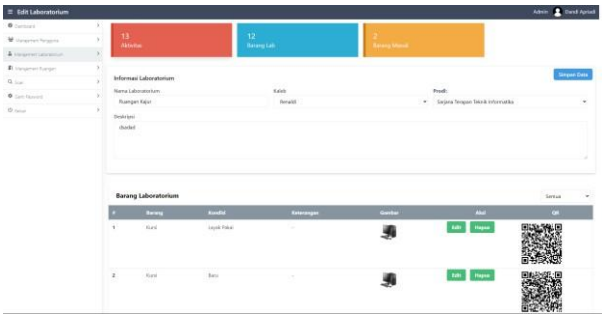


Figure 4
The list of inventory

The "Lab Item List" page displays a complete inventory of the tools and materials available in the laboratory. Each item is equipped with information such as item name, category, quantity available, and item condition. Users can easily search and filter the list by category or item name. This page aims to facilitate laboratory inventory management and help students and lecturers find the tools needed for practical activities.

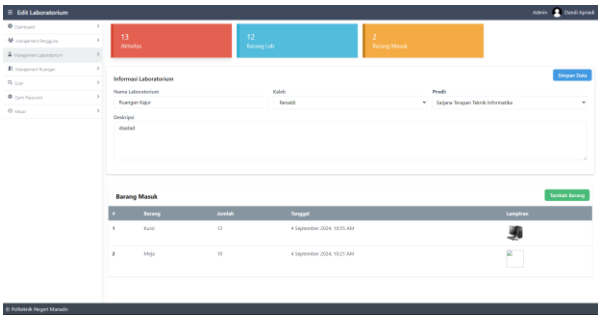
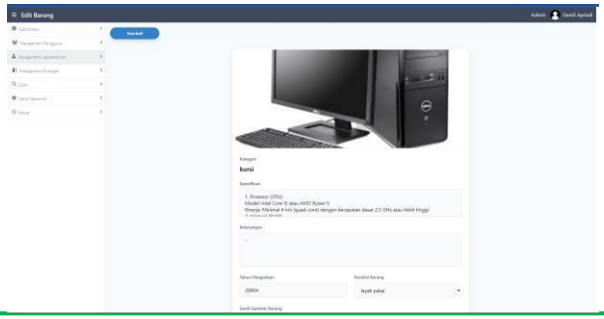


Figure 5
The List of New Inventory

The "Incoming Goods List" page displays all transactions for receiving goods into the laboratory. Each entry includes important information such as item name, quantity received, date received, and source of procurement. Users can search and filter by date or type of item to make



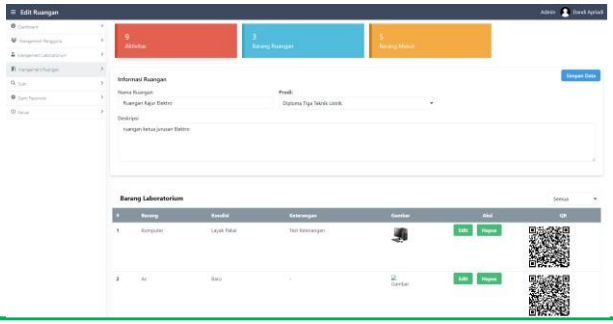
tracking easier. This page aims to provide transparency and make it easier to manage the inventory of incoming goods, ensuring that all goods are recorded properly.

Figure 6
Inventory Editor

The "Edit Lab Items" page allows users to update item information registered in the system. Users can change details such as item name, category, quantity, storage location, and item condition. With an intuitive interface, users can make changes easily and save changes directly. This page aims to ensure laboratory Inventory data.

Figure 7
List Inventory per-Room

Always accurate and up-to-date, supporting more effective goods management. The "Item Details by QR" page displays complete information about a laboratory item which is accessed via QR code scanning. After scanning, users can view details such as item name, category, quantity, condition, and storage location. This page is designed to provide quick and easy access to inventory information,



increasing the efficiency of inventory management in the laboratory. This feature supports more effective monitoring and use of goods, making it easier for users to make decisions regarding inventory.

Figure 8
Room Editor

The "Room Inventory List" page displays all items and equipment available in each room. Users can view details of each item, including item name, category, condition, and quantity available. Search and filter features make it easy for users to find specific inventory based on specific criteria. In addition, this page also provides information about item locations and loan status, helping to manage inventory efficiently and transparently.

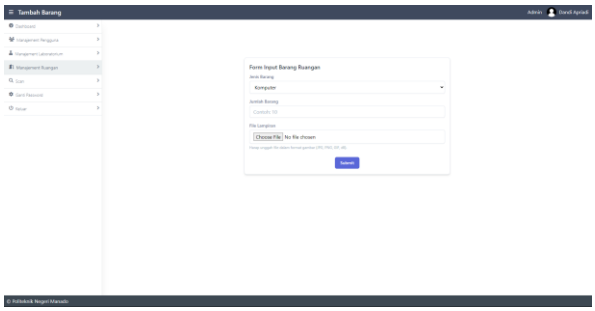


Figure 10
Add Inventory

The "Add Incoming Items/Inventory" page allows users to add new items received into the inventory system. Users can fill out the form with important information such as item name, category, quantity, entry date, and item image. In addition, users can also record additional information such as serial numbers or storage locations. With an intuitive interface and clear guidance, this page ensures the process of adding items is quick and easy, and helps maintain accurate inventory data. Once saved, items will automatically be listed in the room inventory, making it easier to manage and track items.

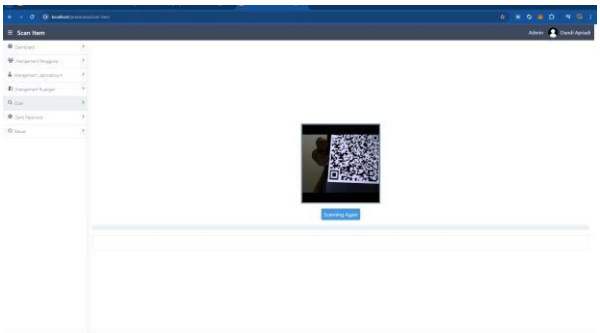


Figure 11
Scan Inventory by QR Code

The "Scan Inventory Using QR Code" page allows users to quickly and easily scan an item's QR code to instantly access inventory information. After scanning the QR code, users will be directed to the item details, including name, category, quantity, and status. This feature speeds up the inventory

management process, reduces manual errors, and makes monitoring easier. With a simple and responsive interface, it is designed to provide a seamless user experience, enabling efficient inventory management in the laboratory or storage room.

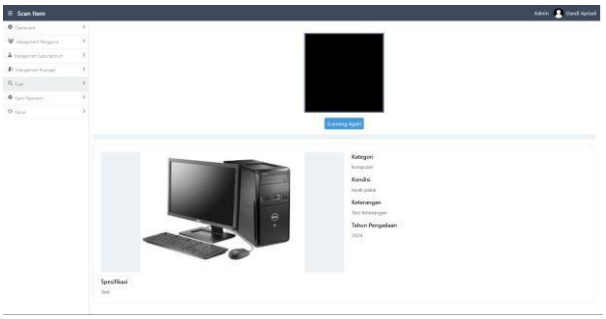


Figure 12
Result of Scan Inventory

The "Inventory Scan Results" page displays detailed information about items that have been successfully scanned using a QR code. Users will see the item name, category, quantity available, current status, and image of the item if any. Apart from that, this page also provides options for editing item data, adding notes, or recording item transfers. With a clear and informative display, this page helps users manage and monitor.

CONCLUSION

In conclusion, this system made the process of data inventory easier and faster because we can. By this system, the leader and technician can search and find the availability of components in the storage. The process of maintaining and repairing can be faster and more flexible because this system can make real-time communication between the leader, UPT MR, Unit, Department, and Financial Officer. Special thanks to the Director of Manado State Polytechnic, also Vice Director of Academic Affairs, Vice Director of Finance and General Affairs, Vice Director of Students Affairs, and the Head of Research and Community Service for giving us the chance and fund for this research. Thank you to our friends who contributed to this research by providing us with data for this system.

BIBLIOGRAPHY

Ahmad, P., Tripathi, D. K., Deshmukh, R., Pratap Singh, V., & Corpas, F. J. (2019). Revisiting The Role Of ROS And RNS In Plants Under Changing Environment. *Environmental And Experimental Botany*, *161*, 1–3.

As, R., & Shalahudin, M. (2021). *Rekayasa Perangkat Lunak Terstruktur Dan Berorientasi Objek*.

Marentek, S. A., & Wauran, A. S. (2024). Monitoring And Evaluation System Of Personnel Performance At The Manado State Polytechnic Based On Website And Multimedia. *International Conference On Applied Science And Technology On Social Science 2023 (ICAST-SS 2023)*, 589–593.

Moorty, D., Ruman, M., Irfan, N., & Aishwarya, K. R. (2017). QR Code-Based Text To Speech Conversion. *Vol. VI*, *No. May*, 66–69.

Saputra, R. H., Waziana, W., Baba, J. A., Magribi, M. R., & Putra, A. D. (2021). Rancang Bangun Perpustakaan Buku Digital (E-Book) Berbasis Web. *Jurnal El-Pustaka*, *2*(2), 58–70.

Susanto, H. M., Mantja, W., Bafadal, I., & Sonhadji, A. (2015a). Developing Management Information System For Teachers And Education Staff. *Jurnal Pendidikan*, *3*(2).

Susanto, H. M., Mantja, W., Bafadal, I., & Sonhadji, A. (2015b). Pengembangan Sistem Informasi Manajemen Pendidik Dan Tenaga Kependidikan. *Jurnal Pendidikan Humaniora*, *3*(2), 93–105.

Vorobchuk, M. S., & Pashkevych, K. (2022). Typology Of Coding Systems In Graphic Design. *Art And Design*.

Wauran, A. S., Kalele, S., & Pomantow, W. (2023a). *Management Information System Of Student Affairs in Manado State*.

Wauran, A. S., Kalele, S., & Pomantow, W. (2023b). *Management Information System Of Student Affairs in Manado State Polytechnic*.

YUDISTIRA, R. (2017). *Aplikasi Pengolahan Data Permintaan Pemesanan Kerja Perbaikan Perangkat Komputer Pada Pt Pupuk Sriwidjaja Palembang*. Politeknik Negeri Sriwijaya.