
INVENTORY MANAGEMENT SYSTEM USING QR CODE ON ANDROID A CASE STUDY IN COMPUTER ENGINEERING DEPARTMENT

¹RENZA ILHAMI RIZQI, ²NURUL AZIZAH ROHMA ³DR. KITTIWAN NIMKERDPHOL

¹²³Department of Computer Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi

39 Moo 1 Rangsit-Nakhonnayok Rd Thanyaburi Amphoe Khlong Luang, Chang Wat Pathum Thani 12110

^{1,2}Informatics Department, Faculty of Engineering, Bhayangkara Surabaya University
E-Mail : ¹ilhamirisqi@gmail.com, ²nurulazizahrohmah2903@gmail.com, ³kittivan.n@en.rmutt.ac.th

ABSTRACT

Inventory management is the practice overseeing and controlling of the ordering, storage and use of components that a company uses in the production of the items it sells. Inventory management has been used as a decision-making in countless firms and has been extensively studied in the academic and corporate spheres. The purposes of inventory system are to know the details of the items including code, name, condition, location of items and the year of purchase. It is also to make easy for manage the item. Usually, creating inventory list can be done two ways either manually or computerized. Manually inventorying is usually written data with handwriting on the data books. It has many disadvantages. One of them is when the admin staff input the data, it is prone to be typographical errors. Here in the Computer Engineering Department in Rajamangala University of Technology Thanyaburi (RMUTT) the inventory management still using manual process for inventorying and collect the data of an item. This inventory management system will help the process inventorying using web-based application and also mobile application for collecting data information. Quick Response (QR) Code technology as a unique tagging solution for each item that store information from the server through the local network. The implementation of this system for Inventory Management System could be a solution for manage inventorying process and stored information of inventory through QR Code.

Keywords: *Inventory, Management, QR Code, Web-based, Mobile*

1. INTRODUCTION

Inventory management is the practice overseeing and controlling of the ordering, storage and use of components that a company uses in the production of the items it sells. Inventory management has been used as a decision-making in countless firms and has been extensively studied in the academic and corporate spheres. The purposes of inventory system are to know the details of the items including code, name, condition, location of items and the year of purchase. It is also to make easy for manage the item.

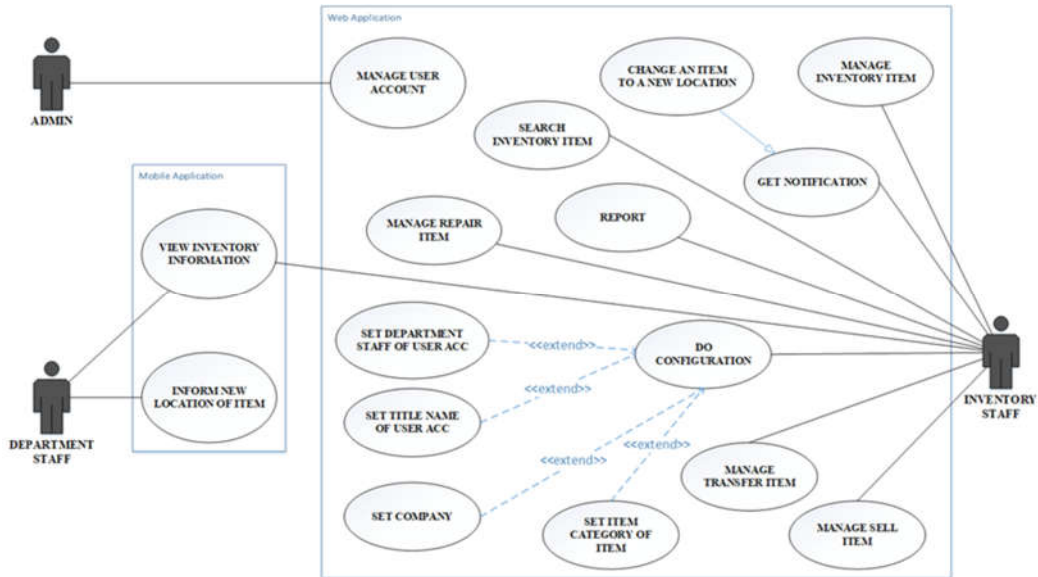
Usually, creating inventory list can be done two ways either manually or computerized. Manually inventorying is usually written data with handwriting on the data books. It has many disadvantages. One of them is when the admin staff input the data, it is prone to be typographical errors.

A number of institutes and companies are moving from manually collecting and processing data to a computerize system. Computerize system has many options. Word processing or spreadsheet program (e.g. Microsoft Office®) can be utilized to do the task but it has disadvantages. Manually entering data into the spreadsheet can take a very long time especially if users have a lot of data to enter. It is also possible to view or edit the important data which should not be shown. This is very adverse for the institutes or companies.

This project aims to develop a web based application and mobile application to collect and process inventory data for Computer Engineering Department, Rajamangala University of Technology Thanyaburi (RMUTT), Thailand. Quick Response (QR) code will be used to encode the inventory ID and other related information in order to give general information of the particular item where the mobile application can display either online or offline. Inventory management will be done on web based application where an authorized staff can handle the inventory lists along with QR Code.

2. DESIGN AND IMPLEMENTATION

a. Use Case



b. Flowchart

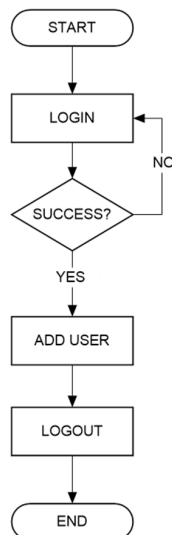


Figure 2. Flowchart for Admin Staff

Admin Staff can login in the login page. If admin staff success login, they will go to add user page. Admin staff can add user and edit user. If admin staff has finished, admin staff can log out from page.

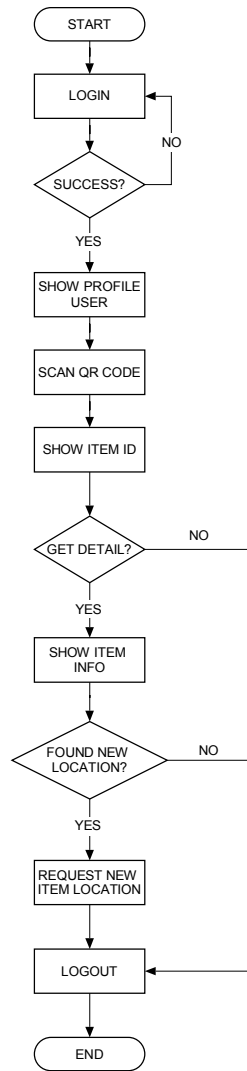


Figure 3. Flowchart for Department Staff (Online)

Department staff can inform new location, but they must login first. If the login success, they can see their profile user. Then, they can scan QR Code again until item ID show in page. If Department staff wants to inform new location, they must go to get detail and the item info will be show. They can request new item location. After they have finished what they do, they can logout from the page.

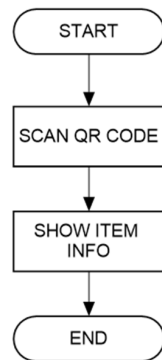


Figure 4. Flowchart for Department Staff (Offline)

This part for department staff who wants to scan QR Code. They can scan QR Code and the item info will be show. The item info has not more detail of item. Because they used offline.

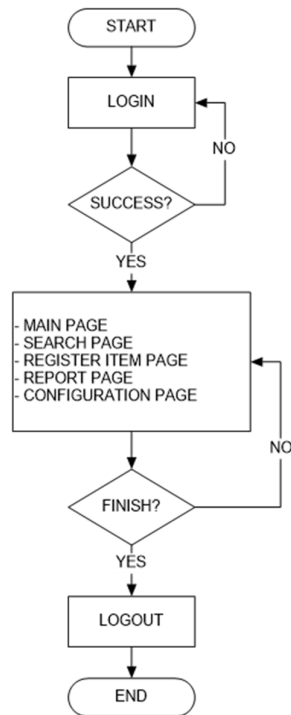


Figure 5. Flowchart for Inventory Staff

Inventory staff must login first to go to web page. After that, they can choose what they want to do. If they want to know new notification, they can go to main page. If they want to register new item, they can go to register item page. If they done, they can logout from web page.

3. TESTING AND RESULT

a. Functional Testing Result in Website

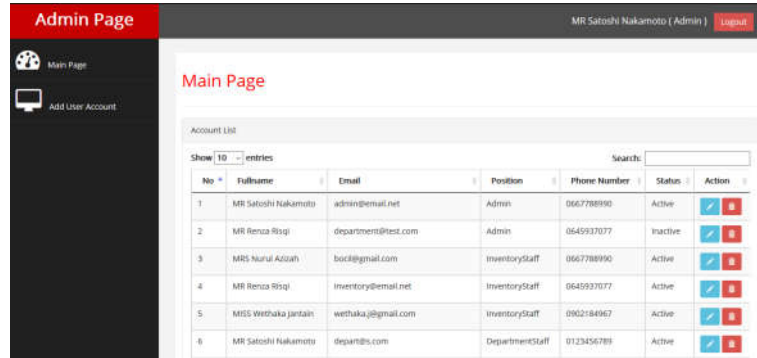


Figure 7. Admin Main Page

This is a admin page. In main page, admin staff can edit user profile and delete user. In the add user account, admin staff can add new user.

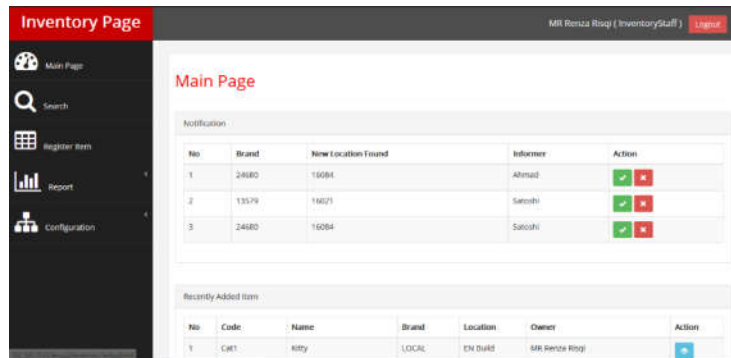


Figure 8. Inventory Main Page

This is inventory page. There are five menus in there. In the main page, inventory staff will be know the new notification from mobile application. They can accept or reject the new location that department staff has founded. In the search page, inventory staff can search the item. If inventory staff wants to see the report, they can go to report page. And if they want to setting configuration, they can go to configuration page.

b. Functional Testing Result in Mobile

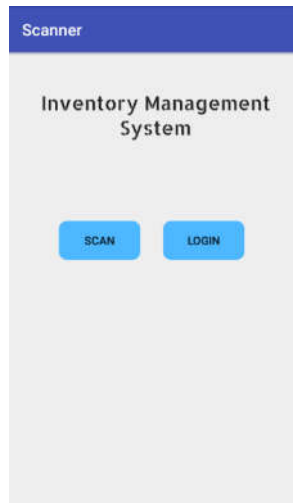


Figure 9. Home Scanner

This is home scanner in the android application. If the department staff wants to scan, they can click scan button. Sometimes, if the department staff found the new location of item, they can click login button. They can login as usually, enter their email and password. After that, they can scan again, get more detail of item and they also inform new location in mobile application.



Figure 10. Scanner Reader

When department staff click scan button, they will go to scanner reader. Point the scanner reader to the QR Code appropriately. After that, scanner reader will read QR Code and convert the data to be a text in the item info.

4. CONCLUSION

Based on the results of research and discussion that already done, it can be concluded that:

- a. Inventory Management System using QR Code on Android has been applied on Computer Engineering in Rajamangala University of Technology Thanyaburi was running well, where the results of testing the function of entity goes well.
- b. Real-time reading QR Code through android successfully applied in this research.
- c. The development of cloud computing-based applications has not run well because it only runs locally (local web server), but the use of web service has been applied in this research.
- d. Based on the results of functional testing can be seen whether the program is in accordance with the procedure of Inventorying Management by the user. User negligence in 11 events including Web and Android Applications. From the above test results can be stated.

ACKNOWLEDGE

We would like to take this opportunity to acknowledge and thank those who made this work possible. First of all, we would like to thankful to the God because without His bounty, this project will never be done. Was made as one of the requirement to obtain a bachelor's degree in Department of Informatics Engineering, Faculty of Engineering, Bhayangkara University Surabaya.

We also would like to extend our utmost gratitude to our advisors, Dr. Kittiwann Nimkerdphol, Department of Computer Engineering at Rajamangala University of Technology Thanyaburi, whose sincerity and encouragement we will never forget and we also would like to express our sincerest appreciation to our mother, our father, our brother and sister and everyone that took place in our project.

The author realizes that this project has not been perfect, both in term of material and presentation. For that advice and constructive is criticism is expected in the completion of this project. The author hope that this project can give benefits and insight to the reader, and especially for the writer too.

REFERENCES

- [1] Kadir, Abdul. *Pengenalan Sistem Informasi*. Yogyakarta : CV. Andi Offset. 2003.
- [2] Barracrough, Alex Todd and Chris. *What is Android and what is an Android phone?*. 2017. [Online] Available from: https://recombu.com/mobile/article/what-is-android-and-what-is-an-android-phone_M12615.html# [Accessed 03 August 2017].
- [3] Tanenbaum, Andrew S.. *Control in organizations*. New York: McGraw-Hill, 1968.
- [4] Kumar, Archana, *Computer Basics with Office Automation*. New Delhi: I.K. International Publishing House Pvt. Limited. 2010
- [5] Jagodiü, Dijana, Dejan Vujiü, and Siniša Ranyü. *Android system for identification of objects based on QR code*. 23rd Telecommunications forum TELFOR 2015 Serbia. Belgrade. 2015.
- [6] Hou A-Lin, FengYuan and Geng Ying. *QR code image detection using run-length coding*. 2011 International Conference on Computer Science and Network Technology, 2011, 978-1-4577-1587-7/111\$26.00 ©2011 IEEE.
- [7] InvestingAnswers. *Inventory*. [no date]. [Online] Available from: <http://www.investinganswers.com/financial-dictionary/financial-statement-analysis/inventory-2474> [Accessed August 3rd, 2017].
- [8] Investopedia. *Inventory Management* [no date]. [Online] Available from: <http://www.investopedia.com/terms/i/inventory-management.asp> [Accessed 03 August 2017].
- [9] Nivedan Bhardwaj, Ritesh Kumar, Rupali Verma, Alka Jindal and Amol P. Bhondekar. *Decoding Algorithm for color QR code: A Mobile Scanner Application*. 2016 FIFTH INTERNATIONAL CONFERENCE ON RECENT TRENDS IN INFORMATION TECHNOLOGY, 2016, 978-1-4673-9802-2/.16/.
- [10] Ballou, R.H.. *Business Logistics/Supply Chain Management: Planning, Organizing and Controlling the Supply chain*. New Jersey: Pearson/Prentice Hall Inc. 2004.
- [11] Chase, Richard B., Nicholas J. Aquilano, and F. Robert Jacobs. *Operations Management for Competitive Advantage*. New York: McGraw-Hill. 2004.

- [12] Griffin, Ricky W. *Management*. New York: Houghton Mifflin Company. 2005.
- [13] TechTerms. *QR Code*. 2015. [Online] Available from: https://techterms.com/definition/qr_code [Accessed 03 August 2017].
- [14] Wanke, Peter. *Production And Inventory Management Journal*. 2014. Volume 49 (1), p.9.
- [15] Wikipedia. *Winston W. Royce*. 2017. [Online] Available from: https://en.wikipedia.org/wiki/Winston_W._Royce [Accessed August 3rd, 2017].
- [16] Wikipedia. *Android (operating system)*. 2018. [Online] Available from: [https://en.wikipedia.org/wiki/Android_\(operating_system\)#Development](https://en.wikipedia.org/wiki/Android_(operating_system)#Development) [Accessed February 8th, 2018].