Mobile point of sale design and implementation

by Susmini Indriani Lestariningati

PAPER · OPEN ACCESS

Mobile point of sale design and implementation

To cite this article: S I Lestariningati 2018 *IOP Conf. Ser.: Mater. Sci. Eng.* **407** 012094

View the article online for updates and enhancements.

Mobile point of sale design and implementation

S I Lestariningati

Computer Engineering, Faculty of Engineering and Computer Science, Universitas
Komputer Indonesia, Jl. Dipati Ukur No.112-116, Bandung, Indonesia

*susmini.indriani@email.unikom.ac.id

Abstract. Mobile POS is a portable computer device that is used especially as POS (Point of
Sales) purpose and it is link to input and output device such as barcode scanner and thermal
printer, installed with special software for POS. This paper is a proposed two types design of
implementation Mobile Point of Sale (MPOS), which are using Mini PC Raspberry Pi and
Smartphone Android OS. Both solution passed the functional test and the comparison between
both is performed, which is shows that Raspberry Pi has more economical solution but more
difficult to be developed, less comfort and less friendly use than Android Smart Phone based
implementation.

1. Introduction
The Point of sale (POS) system is usually a computer device that is linked to a barcode scanner and
printer device, where on the computer has been installed special software for POS. For examples such
as transaction cashier or payment points in mini markets, super markets, hotels, restaurants, and much
more. POS systems can be made stand-alone (not connected to other POS systems) and can be
designed to connected to other POS systems as required, over the Internet as well as on local
networks. The traditional POS (TPOS) is not easy to be moved, which means more difficult to applied
for movable merchants.

Nowadays the technology has been growing rapidly and increasingly sophisticated along with the
times, especially in the field of computers and Internet. The advent of the Internet of Things (IoT) has
facilitated devices to be connected, with ease and enhanced to communicate and share data [1]. Low-
cost, low-power embedded devices are ubiquitous, part of the Internet-of-Things (IoT) [2]. We can
build mobile POS that can be carried easily anywhere, and the size of the mobile POS is small that can
be carried on where the transactions is take place, also has low energy consumption. In this research,
we design and implement two types of mobile POS, such as Fixed Mobile POS using mini PC
Raspberry Pi and MPOS using Android smartphone.

The expected result with the mobile POS development is a POS machine that can record sales
transactions and easy to moved anywhere, where there is a sale transaction occurs and have low power
consumption. The implementation of mobile POS have several ways of implementation, the two types
of implementation will be proposed in this paper, the function will be tested, and the parameter will be
compared.

2. Method
The common model of POS systems is a computerized cash registers which are traditionally used by
retailers to ring up customer's purchase [3,4,5]. There are several advantages to POS systems, besides

the use of sales data from a POS system for marketing purposes, time consuming administrative activities like ordering, customer management, stock control, can be reduced. POS systems replace the cash register in a retail store. A standard EPOS (Electronic Point of Sales) can easily handle payment systems, updates inventory and provides instant reports on sales and stocks [6].

The POS machine consists of several components such as input, process and output, we can choose the input device such as Barcode/RFID/NFC Reader, processing unit such as Personal Computer, Mini PC, Tablet or Smartphone, and output peripheral such as thermal printer and cash drawer. The POS machine can be stand alone or connected to the network such as LAN or the Internet. The components as illustrated in the figure 1.
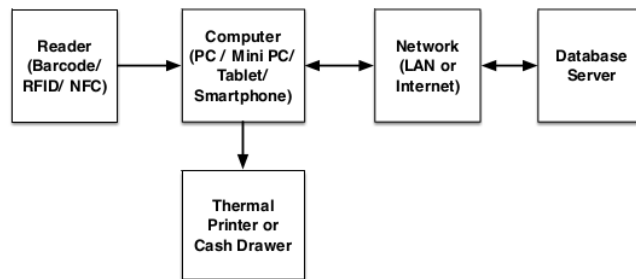

Figure 1. POS components.

Mobile POS or MPOS is a Mobile or Portable POS that can be moved easily without affecting its functions. MPOS can be defined as a smartphone, tablet or dedicated wireless device that performs the functions of a cash register or electronic point of sale terminal [7].

3. Design and result
There are two types Design of MPOS implementation proposed in this paper, fixed mobile POS using Mini PC Raspberry Pi and Mobile POS using Android OS Smartphone. We can build the fixed mobile POS from a small computer like Mini PC Raspberry Pi, second, we can build the Mobile POS using smartphone with Android OS. Fixed Mobile POS consists of several components, each component is interconnected and exchange information, figure 2 is a model of fixed mobile POS using mini PC Raspberry Pi. (Figure 2)
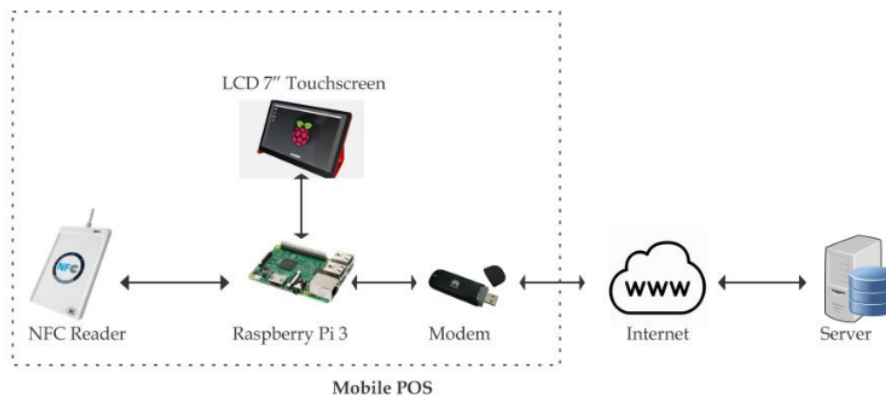

Figure 2. Fixed Mobile POS illustrations.

From Figure 2 depicted that Fixed Mobile POS is built on several components, namely Raspberry Pi 3 as a platform, LCD 7"Touchscreen for the user's interface, and modem as an intermediary for connection to the Internet, while the server as a backup data storage of data on Mobile POS. The following is a description of Figure 2.

- NFC Reader, as a data reader on NFC Tag
- LCD 7 "Touchscreen, as a screen to display the program interface
- Raspberry Pi 3, as a platform that runs the application program
- Modem, to connect the program with the Internet
- Internet, as a medium to communicate with the server
- Server, as the program database

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games [8,9,10].

The Mobile POS for Android OS Smartphone, use barcode as data input for every goods/merchandise. Using the smartphone camera to scan the items, if the barcode is known, it will take the next step for the transactions. (Figure 3)
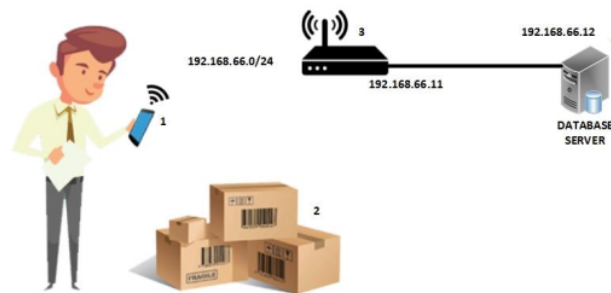

Figure 3. Mobile POS using Android OS smartphone.

In Figure 3 depicted the user or the cashier using the pre-installed smartphone application (M-POS) is used to scan the barcodes contained in the items to get the code contained in the barcode, where the smartphone connects to the database server via the wireless router. The explanation of the figure is:

- Android Smartphone installed Android Point of Sale based Android app.
- Merchandise to be scanned on its barcode using Smartphone Camera.
- Wireless Router to connect Smartphone with server.
- Database server where the account, goods and transaction data.

The test of those two type of implementation comparison result that both system passed all functional test as POS. It shows the transaction process has been able to be performed as required. The system has been able to do the process of buying and selling transactions as regular POS machines. However there are slight difference of those two implementation in terms of other parameters such as cost, difficulties of software development, compatibility with other I/O Devices, comfortability of GUI (Graphical User Interface) and User Experience of POS.

The comparison between those two are depicted in Table 1.

Table 1. Fixed Mobile POS vs Mobile POS with Android OS.

	Fixed Mobile POS	**Mobile POS**
Cost	More economic in hardware supply	Less economic, because the required smart phone, which price of good smartphone more than 1 million IDR
Software Development	Difficult, we must know the programming language for Raspberry Pi	Less Difficult
Compatibility with Input/Output Devices	Limited to Mini PC Raspberry Pi	Broad options
Graphical User Interface	Not good because of the size of the Display is small	Good
User Experience	Not user friendly	User Friendly

4. Conclusion

The proposed two types of Mobile POS implementation are successfully tested, that are Raspberry Pi based POS as Fixed Mobile POS and Android Based Smart Phone Based POS, with constraint that Raspberry Pi is more economical but more difficult to develop and less user friendly and comfortable to used. The choice of these two will depend on the requirements and conditions when Mobile POS system is deployed.

References
[1]   Semwal T and Nair S B 2016 Ag Pi: Agents on Raspberry Pi *Electronics* **5** 10 p 1-3
[2]   Hajji W and Tso F P 2016 Understanding the Performance of Low Power Raspberry Pi Cloud for Big Data *Electronics* **6** 1 p 235-240
[3]   Plomp M G A, Rijn G van and Batenburg R S 2012 Chain digitization support by point-of-sale systems: an analysis of the Dutch product software market *International Journal of Information Technology and Managemen*t **11** 3 p 257-260
[4]   Saravanan S and Arunkumar D A 2015 Conceptual Model Of Logistics Information System Effectiveness On Retail Outlets Towards Customer Service Quality In Tiruchirappalli *International Journal of Management and Commerce Innovations* **3** 7 p 1058-1060
[5]   Saravanan S and Arunkumar A 2016 Study on Effectiveness of Logistics Information System in Organized Retail Outlets and Its Impact on Customer Service Quality in Tiruchirappalli *International Journal for Scientific Research and Development* **4** 6 p 1447-1450
[6]   Mukherjee K 2017 Technology at Point-of-Purchase-A Journey from Electronic Cash Registers to all Inclusive Point-of-Purchase Systems *Asian Journal of Applied Science and Technology* **1** 5 p 1-5
[7]   Lin Y C, Ha N and Lin K 2015 The Role of mPOS System in Process Change and Strategy *Open Access Journal* **3** 11 p 198-200
[8]   Santhoshkumar G and Krisna M N V L M 2015 Low Cost Speech Recognition System Running On Raspberry Pi To Support Automation Applications *International Journal of Engineering Trends and Technology* **21** 10 p 239-240
[9]   Sudrajat R and Lestariningati S I 2016 *Proc. Seminar Sistem Informasi dan Telekomunikasi* **1** (Indonesia:Bandung) p 91-95
[10]   Sujana A P, Nurhayati S and Lestariningati S I 2017 Sistem Aplikasi Ujian Praktikum Online Berbasis Raspberry Pi *Jurnal Sistem Komputer Unikom* **6** 10 p 17-20

Mobile point of sale design and implementation

1	Submitted to Universiti Teknologi MARA Student Paper	2%
2	ajast.net Internet Source	2%
3	Submitted to University of Central Florida Student Paper	1%
4	mdpi.com Internet Source	1%
5	Submitted to Bridgepoint Education Student Paper	1%
6	Submitted to Grwp Llandrillo Menai Student Paper	1%
7	Jae Hyeon Ryu. "Prototyping a low-cost open-source autonomous unmanned surface vehicle for real-time water quality monitoring and visualization", HardwareX, 2022 Publication	1%
8	www.sciencegate.app Internet Source	1%

9 Vladimir Faerman, Kirill Voevodin, Valeriy Avramchuk. "Case of Discrete-Event Simulation of the Simple Sensor Node with CPN Tools", 2022 International Siberian Conference on Control and Communications (SIBCON), 2022
Publication

1 %

10 Submitted to Queen Mary and Westfield College
Student Paper

1 %

Exclude quotes	On	Exclude matches	< 9 words
Exclude bibliography	On		