

# Shopping Application System With Near Field Communication (NFC) Based on Android

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**Abstract -** The rapid development of mobile communications systems today, along with the changing technology, both in terms of hardware, operating system used and the use of Internet bandwidth, making some mobile applications also contribute to make a tool to change these developments. Mobile Commerce Applications for an example became the most popular applications for mobile users who do not want to trouble yourself with having to carry cash everywhere. An important technology behind mobile payments is called Near Field Communication (NFC). As an indication that NFC represents the potential and tremendous business, leading companies such as Nokia, Microsoft and NXP (Next Experience) Semiconductors, actively engaged in the NFC Forum. Shopping application process integrated with NFC (Near field Communication) technology based on Android. Shopping application system designed, for the 2 sides: To the user and on the merchant sides, by beneficial the use of handset that already has NFC technology. In this project we also provide some additional option like price comparison of same product at different location in shopping mall.

**Keywords—** Mobile commerce, NFC, Android, Shopping mobile payment.

## I. INTRODUCTION

With the progress of economical situations, people now have more avenues to arrange their expenditures. Many would choose online shopping. However, it may bring loads of problems, a typical one being dissatisfaction with the goods. Meanwhile there are still traditional ways, yet it would consume much more time and energy. NFC (Near Field Communication) is a set of short distance wireless communication solutions based on RFID and internet technology. Any two mobile devices share the same NFC protocol will be able to automatically activate the communication system within 10 cm and transfer data in a non-contact mode to complement functions like digital wallet or authentication systems. It operates within the radio frequency ISM band of 13.56 MHz on air interface and at rates ranging from 106 Kbit/s to 424 Kbit/s. It also supports other protocols including Bluetooth and 802.11 wireless specifications. NFC technology meets the international communication standards and has the potential to become a very competitive technology in short distance wireless connection territories.

An important technology behind mobile payments is called Near Field Communication (NFC) [4-7]. As an indication that NFC represents the potential and very high intensity business, leading companies such as Nokia, Microsoft and NXP Semiconductors, actively engaged in the NFC Forum, a nonprofit group comprised of industry players with the same thinking. It's definitely not just a bookworm club, because the

important non-technical players like Visa Inc. MasterCard Worldwide and is also present in the NFC Forum and is a valued member.

In this study offers a prototype shopping application Mobile Phone using hardware already integrated system in which the NFC. This study focuses on usability and functionality of the equipment are turning Smartphone functions as a tool shop using NFC technology in it by just doing the tag to the item or items to be purchased. The purpose of this research is to design a prototype application using the technology Shopping Near Field Communication (NFC)-based operating system Android on Mobile Phone. This prototype can be developed and used for the shopping at the Supermarket, Supermarkets, or Wholesale.

With the growing number of mobile phones worldwide, the potential to transform transactions into mobile deals are enormous. In Japan, consumers can buy a train ticket or items in the store with a mobile phone and mobile payment trials have been conducted in neighboring countries, Singapore and Malaysia. The analysts predict the top three regions for mobile payments is the Far East & China, Western Europe and the United States - which as a whole will account for more than 70 percent of mobile payment gross transaction basis by 2013.

Of course, mobile payments are not claimed will displace all financial transactions method. Indeed, the practical and personal nature will make it a very useful technology in low value transactions, but often and do not require receipts. With the mobile payment ecosystem is evolving rapidly, people

will not only speed up the payment process, but also can check your balance, and if needed add balance to send money from their bank accounts. Consumers can order a coffee on the way to the office, and instead reached into his pocket for the money, then waited for the incriminating bag, they simply waved cell phones, beep, and return to continue the journey.

improvement on the existing system if the technology of NFC is implemented. Consumers will be able to get information of all the items at shopping mall, total up the prices of items as they shop, and save unnecessary time at the cashier. Also they can compare price of other products in shopping mall.

Tabell:- Comparative Study

SR NO.	PAPER TITLE	AUTHOR'S NAME	ISSUE	SOLUTION	FUTURE WORK
1	Towards robust color recovery for high-capacity color QR codes	Zhibo Yang, Zhiyi Cheng, Chen Change Loy, Wing Cheong Lau Chak Man Li, Guan Chen Li	Major disadvantage of a QR code is the codes dependability on a mobile device or a Smartphone.	The QR code advantage is its versatility. QR code can be used for anything and everything.	The future of QR codes may lie in other mobile marketing like NFC (near field communication) chips or digital watermarks embedded in images.
2	A novel compact harmonic RFID sensor in paper substrate based on a variable attenuator and nested antennas.	Valentina Palazzi, Federico Alimenti, Marco Virili, Chiara Mariotti, Giulia Orecchini, Luca Roselli	RFID can be easily disrupted. And collision like tag, reader occur.	RFID tags can be read at much greater distances; an RFID reader can pull information from a tag at distances up to 300 feet. The range to read a barcode is much less, typically no more than fifteen feet.	The key to good tag performance is the antenna design. It's the antenna that helps determine where and how a tag can be used, and how well it will perform.
3	Implementation of Smart Shopping System based on NFC Technology.	Hangzhou, Zhejiang, Shenzhen, Guangzhou, Shenzhen Excelsecu.	Comparison of recent products is not done in this system.	We can add the code in order to show the comparison we have to connect to internet.	For air travel, airlines including Alaska Airlines is experimenting with NFC for boarding passes and security access.
4	Shopping Application with Near Field Communication (NFC) based on Android	Emir Husni Sugeng Purwantoro	Only applicable on NFC based mobile.	No solution on this problem presently but in future may be possible.	More technologies are going to developed on this system.

## II. LITERATURE SURVEY

Nowadays, if a consumer would like to buy something at a shopping mall, consumers need to take the particular items from the display shelf and then queue up and wait for their turn to make payment. Problem will surely arise when the size of a shopping mall is relatively huge and sometimes consumers don't even know where certain items are placed. Besides, consumers also need to queue for a long time at the cashier to wait for turn to make payment. The time taken for consumers to wait for the customers in front of the queue to scan every single item and then followed by making payment will definitely take plenty of time. This condition will surely become worst during the season of big sales or if the shopping mall still uses the conventional way to key in the price of every item by hand to the cash register. On the other hand, consumers often have to worry about plenty of things when going to the shopping mall. For example, most consumers will worry the amount of money brought is not enough to pay for all the things that wanted to be bought until it comes to our turn to pay at the cashier, consumers might also worry that whether certain food product available at the shopping mall are suitable for vegetarian since most of the food product might not be stated clearly. It will be a great convenience if the information of items that are available in the shopping mall can be obtained. It will be a great

### TRADITIONAL BILLING METHOD

In the traditional shopping system we just provide list off product that we want to buy from store. Then person present at counter will collect list of the items provided by customer. Then customer will pay bill at counter and he can get their product.

This is time consuming process for both customer and store owner. Also customer cannot compare their required product with other products in the market.

A single point of failure in the industry can be leaving subscription billing processes as an afterthought. While it's undoubtedly true that your business can't compete in the market

### BARCODE BASED SYSTEM

Without a stellar product, if your business can't collect monthly recurring revenue, that's a problem. We'll examine several of the ways that traditional accounting solutions simply aren't a reasonable answer for subscription billing

Currently available method in shopping malls is barcode method. In this method there are barcode labels on each product which can be read through specially designed barcode readers. A barcode reader (or barcode scanner) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a light sensor

translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain decoder circuitry analyzing the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port.

When user select any product for buying we put it in the trolley and take it to the billing counter. The cashier scans the product through the barcode scanner and gives us the bill. But this becomes a slow process when lot of products is to be scanned, thus making the billing process slow. This eventually results in long queues.

#### ***i) RFID CODE ALGORITHM***

A majority of tree based algorithms are based on assigning an  $n$  bit identifier to each tag, and exhaustively considering every bit to distinguish and identify any given tag. However, this can soon become combinatorial explosive depending on the depth of the binary tree. As seen in Figure 2, if we start considering from the root of the tree, the earlier attempts are invariably going to be replete with collisions since about half the tags (assuming that the tree is complete and that there is a tag identifier at every leaf node) would respond for the first bit from the top (of either 0 or 1). Similarly, given the symmetry of this representation, the bottom most level of the tree would have the same Consequence since the number of 0s as 1s is the same. This situation clearly necessitates an "intelligent" means to address the issue. The proposed method utilizes the density

#### ***ii) QR CODE ALGORITHM***

QR code algorithm is made up of two different stages. The first one by means of similarity transformation where the novel matrix gets transformed in limited steps to real tridiagonal or Hessenberg form. The first stage of the QR algorithm prepares for the next stage which is the actual iterations of QR which are useful to the tridiagonal or Hessenberg matrix.

### **III. PROPOSED SYSTEM**

Now become a technology shift from one machine to the network and the devices connected to a single concept from hardware to multiple devices purposes. It is important that consumers do not face complications in the hardware configuration for the establishment of a network, leading to near field communications, will be the NFC is a combination between identity and connectivity through technologies that contactless proximity between information and become easy communication between small electronic devices to be created to urge the magnetic induction when they are touching the devices or become closer to each other with a few centimeters to enable communication between them. Also been established and peer-to-peer network for data exchange.

Once you create a communications network to other wireless technologies can be used such as Bluetooth and Wi-Fi to exchange a large amount of data and increasing the range of

communications including. Let's take an example if you have a laptop and cell phone equipped with NFC, then you can easily download data from Internet into your cell phone by simply touching your cell phone with laptop. Like that you may take pictures from your cell phone and if you want to show those pictures to your friends on big screen (TV) then you may just touch your phone with TV and show them. Or if you want to print those pictures then by touching the cell phone with NFC equipped printer will give you the prints of those pictures. This principle works with any kind of devices equipped with NFC to communicate with each other. There is no need to set up the communication link initially. Suppose you want to transfer a file from one laptop to other by using novel technologies, like Bluetooth or Wi-Fi. You need to manually set up the communication link between laptops. But if you are using NFC enabled laptops, then you may transfer the file by just touching both laptops. In another situation you may establish the link using NFC and once communication link is established Bluetooth or Wi-Fi can be used to transfer data. Advantages of using this method is to transfer larger data or containing the communication session if devices go away after touching each other. NFC enables two way communications between electronic devices. And has the capability to write to the RFID chip. Therefore bidirectional communication between NFC-equipped cell phone and NFC reader can be established. That makes the possibility to develop complex applications like payment, secure exchange of data and identity's authentication. NFC implements touching paradigm. This touching paradigm was initially used in RFID (Radio Frequency Identification) technology. In RFID technology items marked with tags contain transponders which emit messages in the form of signals. RFID readers were used to read those messages.

NFC is now integrated with this RFID technology. The tags to be readable by NFC reader should have 4 to 10 byte unique ID. This unique ID is used for the identification of the tag. There are multiple manufacturers in the industry, so ID's length may vary in size. From the technical point of view, NFC is blend of contactless smart card technology and cell phone. NFC equipped devices normally operate in three different modes. Card emulation mode, peer-to-peer mode, and reader-writer mode. In card emulation mode NFC device behaves like a reader e.g. NFC tag. This tag has the capacity to store data securely and the applications of this mode are electronic ticketing and payments.

In peer to peer mode two devices equipped with NFC can exchange data directly by touching each other. Applications of P2P mode are transferring data between laptop and cell phone. In reader writer mode NFC device can read or write the tags in similar fashion like RFID tags. NFC can read and write data on RFID chip. And RFID (Radio Frequency Identification) chip can be embedded in everything starting from paper to machinery. RFID is mainly used for tracking and identification through radio waves. NFC core

applications include connecting electronic devices, Accessing digital contents and making contactless transactions.

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#### IV. SYSTEM ARCHITECTURE

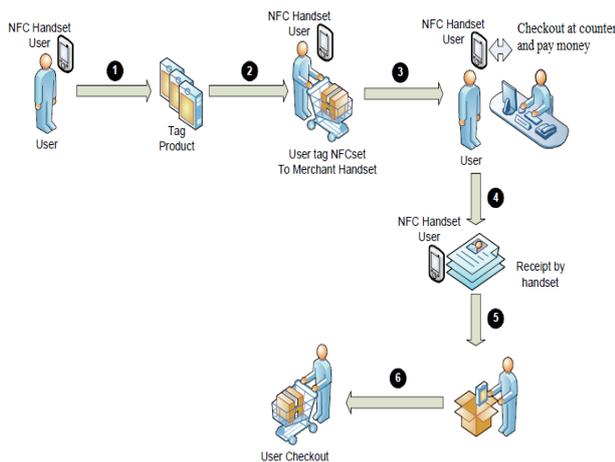


Fig.1 System Architecture

Shopping system that will be built using hardware (equipment) Android-based phones in which the integrated NFC technology. In general, explained that the user will do the shopping process with the help of the Android mobile phone with a system to process the Tap / Tag to goods to be purchased, the next Android NFC will record a shopping list that will be done. Users can perform editing of existing expenditure items such as the process of addition, subtraction or deletion. Furthermore, the user will confirm to the merchant shopping for items to be processed so that the expenditure items should be recorded or should exist in the merchant and user history.

General or global description of the process NFC transactions to be constructed. Applications that will be created consist of two parts, namely the application of the User and Shopping Cart applications on the Merchant. Simulation system made only a prototype and not the Client-Server. Application on the user side can do some things that:

1. Expenditures by doing tap / tags to an existing product shopping tag NFC that in planning this time using a Mifare 1K Card for NFC Tag.

2. See Balance in the user by setting the value of a balance of IDR. 1,000,000 (one million rupiah)

3. Record Shop, with this facility the user can perform and see the results of spending tag, and user can perform editing shopping results from the process of adding, reduction and elimination.

1. Cellular Phone Handset Device (Mobile) Samsung Nexus S with specifications that use the Android operating system version 2.3.3 or 2.3.4, an integrated NFC technology in it.

2. Device PC / Laptop to the development process and planning applications made in which installed:

- a. *Software Development Tools* (SDK) Android : installer\_r12-windows.exe dan ADT 12
- b. Eclipse 3.5.2 Galileo
- c. Adobe Photoshop (for layout design)

3. RFID Tag/NFC Tag and Data cable For the scenario can be seen on User globally flowchart. Users make the shopping process by doing a tag to the item of goods to be purchased. Tag on the goods themselves in order to have the format can be read by an application is made, namely: CodeStore#NameOfGoods#CodeOfGood#PriceOfGoods be like the following example: KD090#Store100#TShirt# 75000. Users can perform a modification of shopping items tagged e.g. by doing editing (delete, add or subtract). Once the items are finished shopping the next process is to communicate with a merchant to make the process of sending the item shopping before the payment is made, so the merchant can find out detailed spending items that will be processed and will be paid by the user. For the process of communication with a merchant that is sent by users other than expenditure item is the IMEI (International Mobile Equipment Identity) # TRANSACTIONCODE #

RANDOMNUMBER#TOTALBUYER. And for the communication process is used as the security PIN.

### V. SCREEN SHOTS

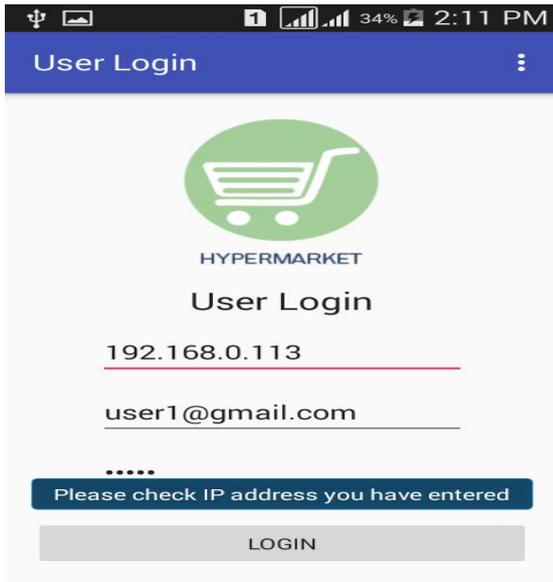


Fig.2 User Login Panel

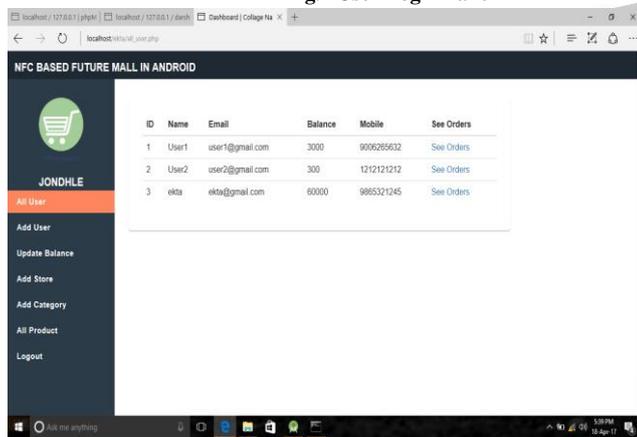


Fig. 3 Admin Panel

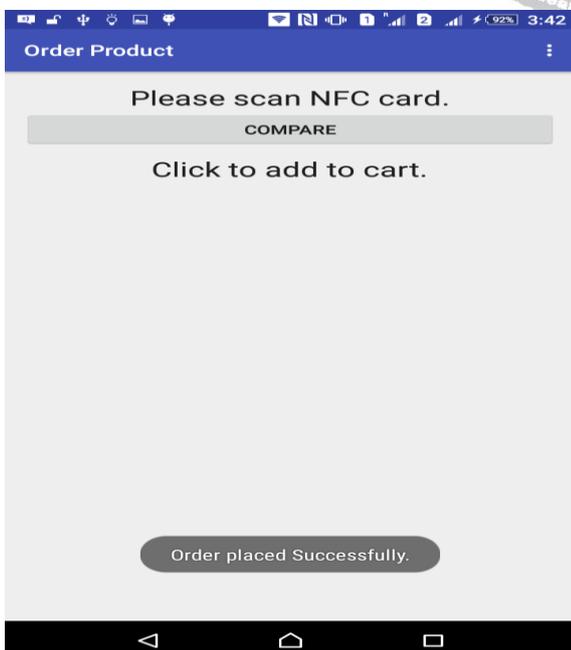


Fig.4 Order Placed

### VI. CONCLUSION

We have tried to implement the paper “Shenzhen, Guangzhou”,” Implementation of Smart Shopping System based on NFC Technology”, NFC 2015 and according to the implementation the conclusion is NFC Shopping Application is used to make the shopping easier and faster. So in our project will use NFC enable mobiles for implementing the application. The application based on android.

In this paper NFC is used for comparing the two products abstracting the details of the required product from the mall. And also user can shop with the help of NFC user can make clear which and what product should be beneficial for us. This is the future planning of the product.

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