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M-Commerce Using NFC Tags

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Abstract

This paper presents a novel method to create an Android based M-commerce application using NFC. It would require Mobile Devices which support NFC technology. NFC stands for Near Field Communication technology which is a short-range, high frequency, low bandwidth radio technology that allows transferring data within few centimeters. In traditional shopping, the customer needs to physically pick up the items to be purchased and carry cash or credit/debit cards with them to make payments. The application mentioned here would read the NFC tag(s) of the product(s) & add it to the shopping cart in our application. It would also provide methods to change the quantity of product/s purchased and edit the cart. Along with this the customer would be informed about the on-going offers in the store. Payment could be made through cash or online using existing payment methods. The paper would also throw light on NFC based payments.

INTRODUCTION

NFC is the abbreviation of 'Near Field Communication'. Generally this is a new technology of exchanging data among the mobile devices. Using high-frequency wireless communication, it becomes possible to exchange data over very short distances. This NFC technology is planned to use in mobile phones for, among other things, payment, in conjunction with an electronic wallet, and for setting up connections.

The rate of data transfer of this technology is 848, 424, 212, 106 kbits/sec and offer the safe and simple communication Many say that there is no doubt that this technology is the next big thing for portable electronic devices and replace the Bluetooth technology in mobile phones.

NFC is in its most common avatar is a Tap & Pay solution that can be used for retail offline payments, transit, entertainment and numerous other touch points

Mobile Commerce

There is no set definition for what m-commerce actually is. mobiThinking defines m-commerce as "the buying and selling of goods and services via mobile/wireless technologies and devices". This includes purchases on Websites or apps, in-store or from vending machines; paying for travel, events or bills; or redeeming a coupon… any type of commerce that is conducted using a mobile device. But there are much broader definitions of m-commerce that include all types of mobile transactions, such as mobile banking (m-banking) and money transfers (m-money) – which mobi Thinking argues should be categorized separately as mobile financial services (MFS).

A. Mobile Payment

Working with any NFC-equipped mobile (currently just the iPhone 6 and 6 Plus) as well as the Apple. The mobile stores encrypted details of the user's credit or debit card information. Tap your mobile screen on a retailer's reader and, after checking your identity via Touch ID sensor (or

sometimes PIN), the payment is made automatically.

B. Near Field Communication

Near Field Communication (NFC) is a new wireless connectivity technology to the radius of short range, which evolved from the combination of contactless identification and interconnection technologies (RFID). NFC operates at a frequency of 13.56 MHz and has a data transfer rate of up to 424 Kbps. Effective communication and optimal between two NFC-enabled devices occurs when they are at a distance of 0 to 10 cm. Simple movement as twist or swing will establish connections between devices and can initiate NFC, which will also be compatible with Bluetooth or Wi-Fi. NFC technology is a combination between the smartcard and reader that is planted in a single device, such as mobile phones or smart phones. With the NFC device planted on a mobile device, then the transaction activities such as retrieving information through NFC tags, micro-payments or payment transactions can be done by juxtaposing it to the NFC reader, which is in the user's mobile device and for payments at terminal point of sale (POS) at the location of the transaction. With a feature like this then NFC referred to as device that supports the contactless transaction.

C. Working of NFC tags

Near field communication or NFC is a technology that allows two devices to share information when in close proximity to one another. Near field communication is thought to be much safer than traditional credit cards and could cut down on identity theft and the stealing of credit card information.NFC payment works by taking and correlating two points of data for every transaction, RFID as well as an encrypted password. A secure radio within the mobile phone sends a special code to the retailer's payment system which in turn sends transaction details to the user's phone. The user then needs to enter a PIN number to approve the specific transaction. To stay protected against malware and hackers, the NFC radio is specially designed to be isolated from the rest of the phone's operating system and this way only one app on the phone would be capable or approving a transaction. This technology makes near field communications very safe. Currently, the only significant NFC payment system available in the United States is a system called Google Wallet. While Google boasts that the technology is accepted at over 300,000 retailers around the world, it is used much less often.

PROBLEM STATEMENT

Let's just start with the small stuff. For one, the motion itself should be no different. It's not like contactless payments via mobile is a more physically efficient form of living and transacting. You grab your credit card out of your wallet in your pocket, and swipe it through the reader (or in some cases tap it, just like the phone). In the case of NFC, you grab your phone out of your pocket, open Google Wallet (or whatever), and tap it to the reader. It's the same exact motion. But that doesn't even matter when we start to consider the real obstacles for NFC mobile payments. There are two issues: the smaller is that, along with not being any faster or easier physically, no one is actually getting rid of their wallet. For one, everyone needs an ID and an ID isn't safe in a pocket or loose in a bag. So, until I can use my phone as a form of identification at the airport, with the police, or to go to a Dr.'s appointment, my wallet will still remain. And it's fair to assume that at least some people prefer to have a little cash on them, just in case.

PROPOSED SYSTEM

The proposed application system will be using Android based mobile phones which are integrated with NFC technology. In general, the user will do the entire shopping process with the help of their Android mobile phones with a software application that would read and process the tap to the NFC Tag of the products, which are to be purchased. These tags assigned to the products would retrieve the information about them from a main database which is stored on the server at the merchant's end. The products whose NFC tags were tapped (read) will be stored in a shopping list/cart. Users will be able to perform editing of existing products in the cart such as the process of addition, subtraction of quantity or deletion of the product all together from the cart. Furthermore, the user will be informed about the ongoing offers in the store and could avail them right from the application itself. The user at all times would be aware of the expenditure made by them and could verify the same. Finally, the user will checkout and confirm the same to the Merchant by performing a handshake with the merchant device. The shopping cart consisting of selected items will be processed and the same will be recorded in the merchant and user history. Application processing time is not too long, for instance the application process features not more than 1-2 seconds for communication between mobile device and the server and 2-3 seconds for processing description of goods based on reading of NFC tags. Payments as of now could be made using cash at the point of sale or online using existing payment gateways through a credit/debit card. In future with the development and advancements in NFC based payments, the same could be applied for the prototype application. The overview of the entire system has been shown in Figure 2.

METHODOLOGY

The System Requirements to develop such a system could be classified as follows:

Hardware Requirements

1. NFC tags that would store product information.
2. Mobile Device running on Android operating system and which support NFC technology.
3. Merchant Device.

Software Requirements

1. Android SDK
2. NFC Tag Writer by NXP Semiconductors OR NFC

Writer by Tag stand.

ANALYSIS

The overall analysis based on the study of the research paper can be summed up as follows:

Additionally, the ability to tap your phone against an NFC-enabled point-of-sale terminal will be coming in the near future – you'll then be able to ditch the real-world wallet for good and opt for a digital one.

1. If you're out of town and staying in a hotel, your door keycard information could be stored on your phone, meaning you'll never leave your hotel room again without the door key. While this isn't immediately available, tests have already taken place in a chain of hotels by Nordic Choice Hotels showing that it's a real possibility.
2. Use your phone as a pass for use on transport systems. Just swipe your phone across the NFC reader, like you do with already existing contactless travel cards. Contactless systems exist in the UK, Germany, China and all around the world.

3. Swapping business cards can be done virtually, easier and cheaper than it's done now. Put two phones in close proximity with each other and let the phones do the transfer. You'll never have to buy business cards again, as the data can be rewritten if needed when you change jobs, or change your number.

4. Security

Although the communication range of NFC is limited to a few centimeters, NFC alone does not ensure secure communications. Applications particularly dealing with payments may use higher-layer cryptographic protocols (e.g., SSL) to establish a secure channel & overcome potential threats such as:

1) Eavesdropping
2) Data modification
3) Relay attack
4) Lost property

Fig.2. Overview of shopping system based on NFC tags

FUTURE SCOPE

Near-field communications (NFC) has paved the way for a new world of technology, with its ability to pass data wirelessly a few inches. An entire ecosystem is all set to support applications ranging from contactless payment cards to authentication between mobile devices. This ecosystem includes chips such as NFC-enabled microcontrollers, standards for wireless transactions, and protocol stacks for handling various communication tasks.

Already, contactless payment cards can be used at 51,000 merchant locations worldwide. NFC-enabled devices such as smartphones and tablets can emulate contactless payment cards. The devices can be used for services such as e-ticketing; e-couponing; secure file sharing; and access control in offices, homes and vehicles. Tapping both NFC and geotargeting technologies, the Google Wallet NFC payments program has lined up such partners as Citi, First Data, MasterCard and Sprint for a launch this year in San Francisco and New York City in the United States.

CONCLUSION

In just one tab you will have the product inside your virtual cart. The customer has the liberty of setting the quantity and analyzing the product. It's any day better then E-commerce as you get the product delivered the day itself. No more standing in queues and waiting for turn.

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