

# NEAR FIELD COMMUNICATION FOR PAYMENTS

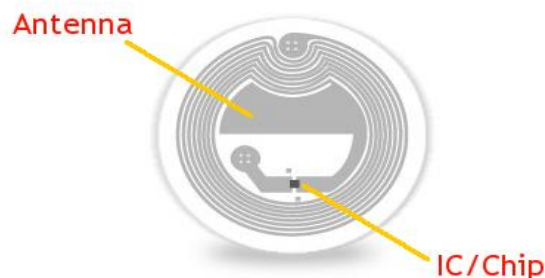
<sup>1</sup> Krishna Kumar R, <sup>2</sup> Lakshmikanth BS, <sup>3</sup> Lokesh S, <sup>4</sup> A A Gautham, <sup>5</sup> P Priyanga,  
<sup>1,2,3,4</sup> Undergraduate student, Computer Science & Engineering, K S Institute of Technology,  
<sup>5</sup> Associate Professor, Department of Computer Science & Engineering, K S Institute of Technology

**Abstract**—One of the basic goal of technology is to merge various technologies to make life easy. NFC or Near Field Communication is one such technology. NFC technology have become increasingly prominent over the past few years. It has created a revolution among users as consumers switch to cardless transactions and digital transactions. Payments through NFC technology aims at providing users a secure transaction from customer to retailer by providing an easy user experience with less human interference. NFC are built in different kind of devices such as mobiles, wristbands, cards, tags etc. which allows transfer of information or payment credentials between any such NFC enabled devices. In this research an NFC card is used to store minimal payment credentials which is transferred to other device during payment.

**Keywords:** NFC, Digital transactions, NFC card.

## I. INTRODUCTION

As an indispensable part of commerce environment, payment with paper currency and in face-to-face way has existed for centuries. With the rapid development of technology, payment has been persistently changing from traditional methods to the ones faster and more convenient. For the past decades, along with the popularization of the internet, the E-commerce has emerged and fitted in many fields around us. Therefore, internet has made it possible to revolutionize the way we do payment. The mobile payment refers to payment services operated under financial regulation and performed from or via a mobile device. Internet environment and mobile devices make merchants and customers around the world connected. With the information technology, the mobile payment can simplify payment procedure tremendously. Users of mobile payment can get rid of the limitation from real currency and geography. Recently mobile payment has sharply risen with the issue of the Google Wallet. The value of mobile transaction is expected to reach more than \$ 600 billion by 2020 and Asia, Western Europe and North America will be responsible for most of all mobile payment transactions. Near Field Communication (NFC) is an emerging technology for short range communication between two electronic devices. It is based on the **Radio Frequency Identification (RFID)** which uses magnetic field induction to enable communication. NFC operates within the globally available and unlicensed radio frequency ISM band of **13.56Mhz**, whereas other contactless technologies such as Bluetooth operates in **2.4Ghz** frequency. Digital Payment systems are broadly defined as any system used to perform transactions through monetary value and requires both parties to adhere to the technologies which are necessary for digital transactions.



**FIG 1: COMPONENTS OF NFC TAG**

## A. EXISTING SYSTEM

In the current system, Paytm is available in 11 Indian languages and offers online use-cases like mobile recharges, utility bill payments, travel, movies, and events bookings as well as in-store payments at grocery stores, fruits and vegetable shops, restaurants, parking, tolls, pharmacies and education institutions with the Paytm QR code.

## DISADVANTAGES OF EXISTING SYSTEM

- Difficulty in scanning the QR in low light areas.
- The speed of scanning the QR code depends on the camera pixels of the phone.

## B. PROPOSED SYSTEM

The proposed system is going to overcome the problems of scanning QR codes. To demonstrate we build an android application, which is able to read the details from a NFC card direct it to secure payment gateway (i.e. Paytm) and complete the transaction. Whenever a customer is paying the amount by cash then there is no issue, when the customer wants to pay the amount by Paytm then there is chance of having problems with scanning the QR codes. To avoid this, the customer can use our android application and choose an item and the quantity and just “Tap” the mobile on NFC card which contains the price of that specific item and then opens a secure payment gateway to make the transaction. Paytm is the secure payment gateway which makes use of Paytm SDK a secure, PCI-compliant way to accept Debit/Credit card, Net-Banking, UPI and Paytm wallet payments from your customers in your Android app or iOS app.

## ADVANTAGES OF PROPOSED SYSTEM

- No issues in low light areas as the NFC feature in phones can be used to “Tap and Pay”.
- QR codes can be replaced with NFC tags as phones need not depend on the camera quality.

## II. LITERATURE SURVEY

In Paper [1], definition of NFC tags and its working is discussed. Near Field Communications (NFC) is a type of wireless connectivity protocols, in which it allows reliable communications within devices in short range. NFC which is based on a technology called Radio-Frequency Identification (RFID), an electromagnetic wireless, is standardized in ISO/IEC 18092.

In paper [2], NFC tags and different types of NFC device (reader/writer) The NFC tags can be used within applications such as posters, and other areas where small amounts of data can be stored and transferred. There are four types of NFC tags

- Tag 1 Type:** These NFC tags are read and re-write capable and users can configure the tag to become read-only. Memory availability is 96 byte.
- Tag 2 Type:** The NFC Tag 2 Type is also based on ISO14443A. These NFC tags are read and re-write capable and users can configure the tag to become read-only. The basic memory size of this tag type is only 48 bytes.
- Tag 3 Type:** The NFC Tag 3 Type is based on the Sony Felica system. It currently has a 2 Kbyte memory capacity and the data communications speed is 212 Kbit/s.
- Tag 4 Type:** The NFC Tag 4 Type is defined to be compatible with ISO14443A and standards. These NFC tags are pre-configured at manufacture and they can be either read / re-writable.

In this Link [3], Steps involved in Payment processing via Paytm android SDK is explained.

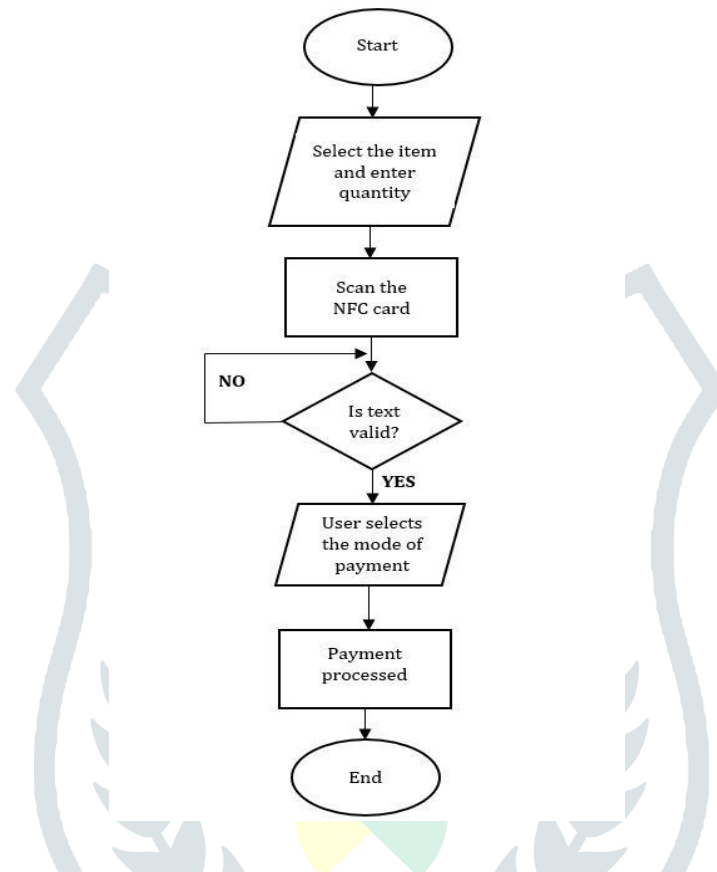
Onclick Pay Button in Android, App Generating checksum hash, Passing generated checksum and Payload back to Android App, Verification of Payload by Paytm SDK, Authentication of customer, Verification of Checksum hash at server side, Verification of Transaction Status.

In this Link [4], steps involved in Paytm integration with Android app until 2018 is explained. The first step is generating checksum on server, it is generated by a php file named generatechecksum.php available in Paytm app checksum Kit. The next step is Accepting payment through Paytm SDK, initially PGSDK\_V2.1.jar file should be added to jar dependencies. Which should be added to the app/lib path. Now the Paytm is integrated to Android app.

In this Link [5], the Banking credentials for testing purpose provided in the Paytm website is given. For example, the card details for payment testing is given as follows

Card Number	Any Visa or Master Card
Expiration Month & Year	Any Future Month and Year
CVV	123
OTP	123123

### III. WORKFLOW OF SYSTEM



### IV. IMPLEMENTATION

Our android application makes use of Paytm API to initiate payments by reading the data from NFC card written on behalf of merchant. The Paytm API used in our application is in Staging Service and can be moved to Production Service in future. Using Wamp/Xampp we run a php server on personal computer (PC) to get the Paytm gateway for our android application to initiate payments. The mobile device which is running our android app and the personal computer should be connected to same network. Our application will be efficient on NFC enabled devices only, as we aim to achieve the concept of “Tap and Pay” process. Our project is made for two purposes, they are

- i. **Institutional Use:** An android application in which the user has to select an item and then pay by reading the amount stored in the item specific NFC card available with the merchant using Paytm API.
- ii. **Generalized Use:** An android application in which the user has to read the merchant details stored in the NFC card (similar to QR code) and enter the total amount to pay using Paytm API.

Following are the snapshots of our android app for Institutional use.

FIG 2: FLOWCHART

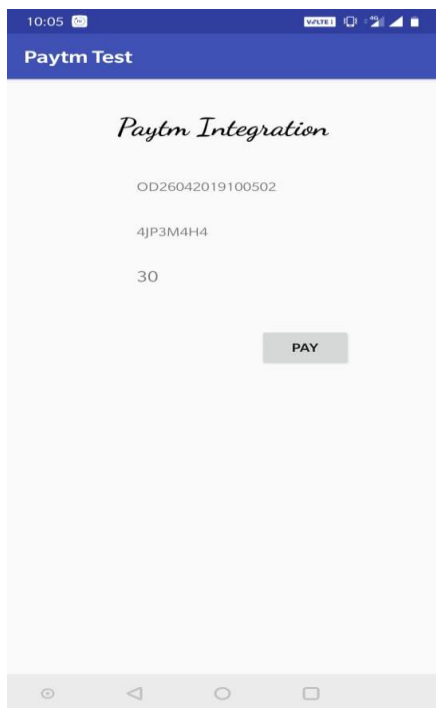


FIG 5: PAYTM INTEGRATION WITH CUMULATED AMOUNT

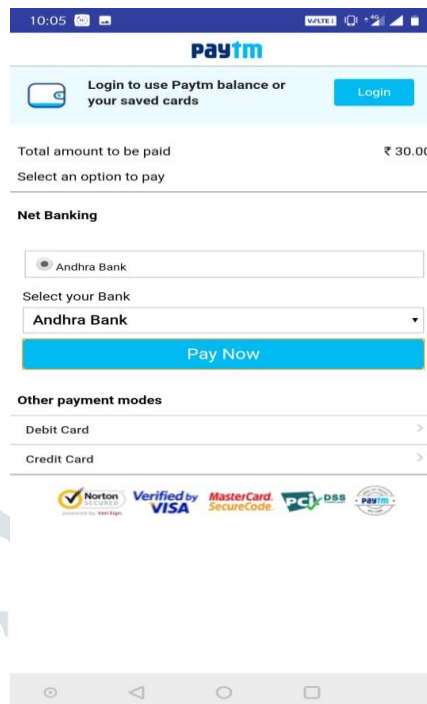


FIG 6: PAYTM PAYMENT

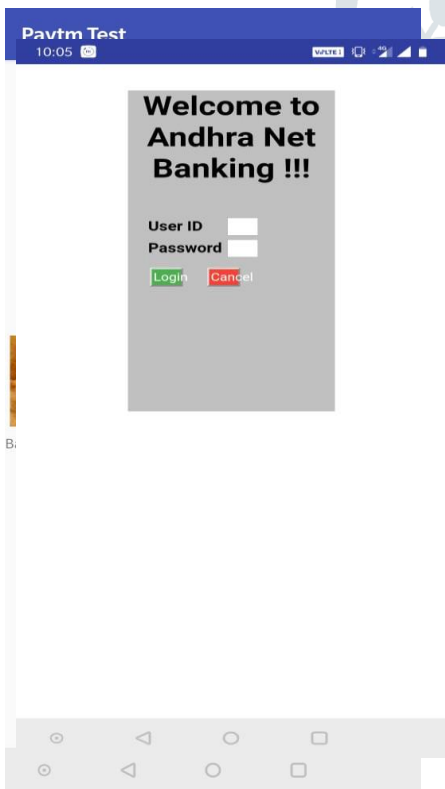


FIG 3: USER INTERFACE TO SELECT ITEM AND THE

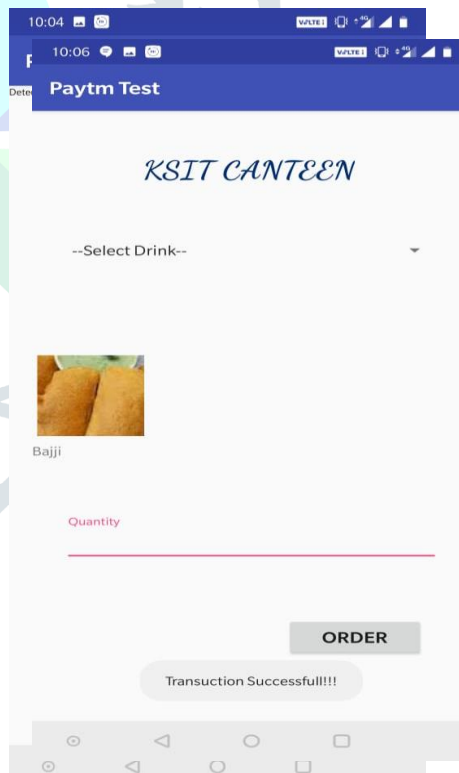
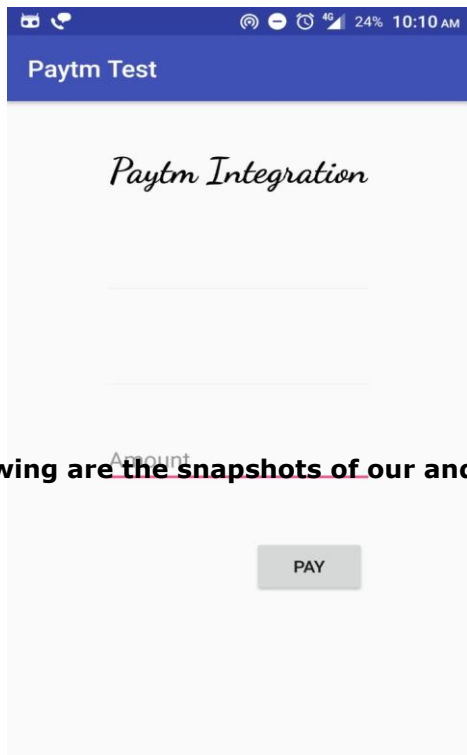


FIG 4: READ THE DATA FROM SPECIFIC NFC CARD



Following are the snapshots of our android app for General use.

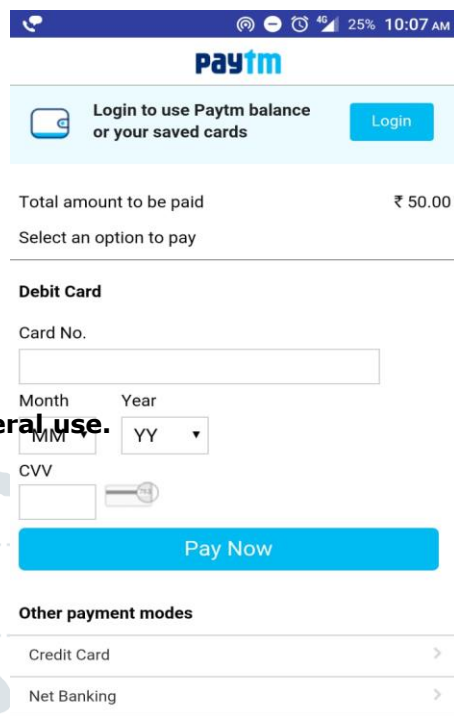


FIG 10: PAYMENT PAGE

FIG 9: USER INTERFACE TO READ MERCHANT DETAILS FROM NFC CARD AND ENTER THE AMOUNT

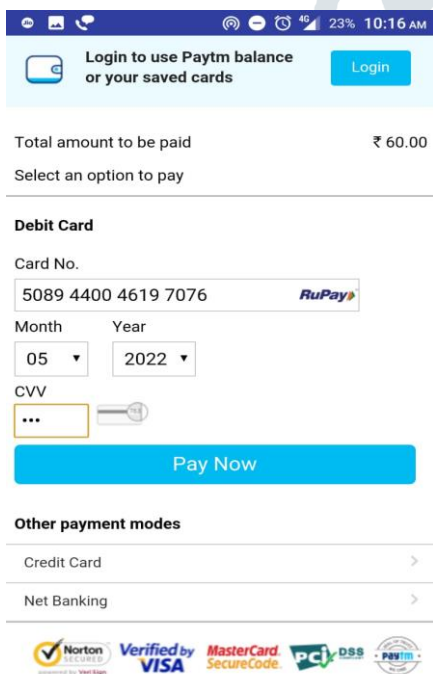
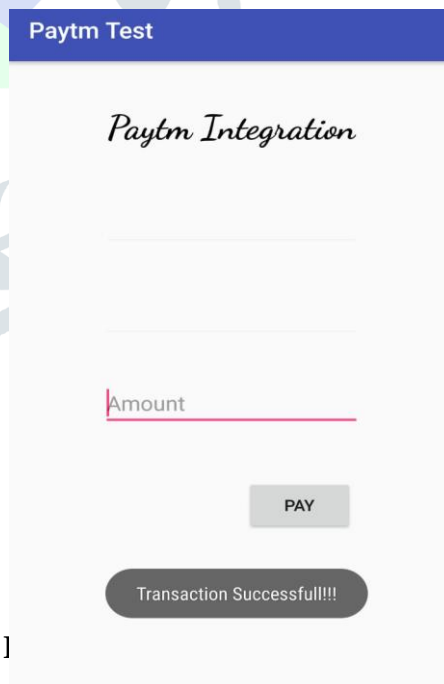


FIG 7: STAGING NET BANKING LOGIN PAGE



## V. CONCLUSION

We have developed an android application to “Tap and Pay” using the NFC card and Paytm API. The application is in Staging service which could be set to Production service with actual merchant details. Application created with ease of understanding and the design is created and tailored to the payment process

more effective and user friendly making it easier for users to do payments. Though certain security measures are adopted to secure the data in NFC card, still there could be an increase in security parameters. The php server running on the personal computer could be deployed on cloud so that the mobile device and the person computer may not be connected to same network. With respect to the feedback of the App users further improvements can be done to make it more user friendly and efficient.

### REFERENCES

- [1] HUSSEIN AHMAD AL-OFEISHAT, MOHAMMAD A.A.AL RABABAH IJCSNS International Journal of Computer Science and Network Security, VOL.12 No.2, February 2012.
- [2] Madhura Tare, Shweta Kulkarni, Mohak Mehta, Gauresh Salgaonkar International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 05 | May -2017
- [3] <https://developer.paytm.com/docs/v1/android-sdk/>
- [4] <https://simplifiedcoding.net/paytm-integration-android-example/>
- [5] <https://developer.paytm.com/docs/testing-integration/>

