

Restaurant Management System Using Near Field Communication

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Abstract- Near Field Communication (NFC) is a new technology developed by using Radio Frequency Identification (RFID) technology in radio communication. NFC technology gives a quick way to communicate between the devices. In this paper, an NFC supported ordering system in restaurants is discussed as one potential use of this technology. Customers, who visits restaurant, usually have to wait for being serviced by a waiter. One of the solution for this is to enable the customer to order his food directly from his table without the need of a waiter by using NFC technology.

Keywords- NFC, NFC Tags, QR code, NFC Reader/Writer Application.

I. INTRODUCTION

The food ordering process in most of the restaurants consist of several steps starting after the customer got seated in the restaurant. The customer waits for the waiter to come to their table and take their order. Sometimes, the customer has to wait for longer time for a waiter to arrive. This might happen if the waiters are busy serving other tables. Once the waiter arrives at the table with menu card, the customer searches for their desired food items from the menu. The waiter has to wait for the customer till he/she make his decision on ordering food items. Now, this entire process of food ordering becomes time consuming.

Since, there are no systems for ordering the food digitally without disturbing the waiter while in the restaurant. Therefore, in this paper, we are using NFC technology for food ordering. The customer uses the NFC reader/writer application in his/her NFC supporting android device. The customer taps on NFC tag and scans QR code for his/her verification. After verification, the menu will be displayed on the customer's android device. Now the customer can choose the food items that he/she wants to order. Once the order is placed, the order details will be provided inside the kitchen which will be displayed on chef's android device. The chef will prepare food as per given order and the food will be serve to the customer. Finally when the customer checks out, his bill will be displayed in his device as well as in cashier's device. The customers can make an online payment via. credit card,

debit card or Net Banking through their respective banks in order to pay their bill. This proposed system replaces the old pen paper based food ordering system. This system is expected to evolve over several releases, ultimately releasing it to the small scale as well as the large scale restaurants.

II. LITERATURE REVIEW

In paper [1] we refer the authentication problem of real-world goods on which 2D bar-codes (2D-BC) were printed and we take the competitors view. The competitors are assumed to have access to noisy copies of an original 2D-BC. A simple estimator of the 2D-BC is depends on copies averages is proposed, letting the competitors print a fake 2D-BC with as original by the system identifier. Performance of the of the proposed system in terms of error probability at the detector side is then derived with respect to QR and compared with experimental results on real 2D-BC. QR code has more storage capacity than 2D-BC and can be stretched out on any object allowing to be printed on any smaller and narrower areas.

Since NFC is based on RFID [2] technology, we consider it as more secure than the previous systems. RFID tags are used in many industries, for example, an RFID tag attached to an automobile during production can be used to track its progress through the assembly line; RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets allows for positive identification of animals. RFID tags can be attached to cash, clothing, and possessions, or implanted in animals and people, the possibility of attaching them to tables and using them for ordering food can be a best idea.

In paper [3] the system is designed for Android based smart phones. In this, an android application is required to be installed on a device for every restaurant. This can increase the complexity for the customer as well the system. We in our project have tried to overcome this drawback by making it web based which reduces the stress to the customer as well as the system.

In another external resource[4] uploaded on a social networking site we got the idea about how to read or write data on NFC tags and how it can be used in our project for the data transmission.

III. PROPOSED SYSTEM

Our proposed system consists of the user, android application, NFC card, server, database, admin and the support users. The user taps on the NFC card using his NFC-enabled Smartphone. The Smartphone application communicates with the server using wireless application protocol (WAP). The database stores the user data and the food items ordered by each customer. It also stores the details of the admin and the support users. The customer can interact with the system through the mobile application. As soon as the tap in is done, the customer’s Smartphone is connected to the server. The order details are sent from the Smartphone to the database which is also displayed in admin and support user’s system for order processing.

Food Ordering Process:

Step 1: The customer need to have or download NFC Read Application in their device.

Step 2: Customer taps on first NFC tag by which he will be redirected to registration page.

Step 3: The customer need to register himself by providing their User Name and e-mail id. The OTP is sent to e-mail for verification purpose.

Step 4: Now to complete the registration process, the customer need to enter the obtained OTP.

Step 5: The customer taps on second NFC tag present on the table which will open the NFC Reader App.

Step 6: The customer need to scan the QR code and enter the PIN retrieve from QR code in the application. The PIN is already encrypted and embedded in the QR code by the restaurant staff.

Step 7: After successful PIN verification, the menu will be displayed in the customer’s device from which they can choose their food items and confirm the order.

Step 8: The order details are provided to restaurant people (Chef, Cashier, Admin).

Step 9: The customer can pay their bills through debit cards, credit cards, Net Banking, etc. through their respective bank.

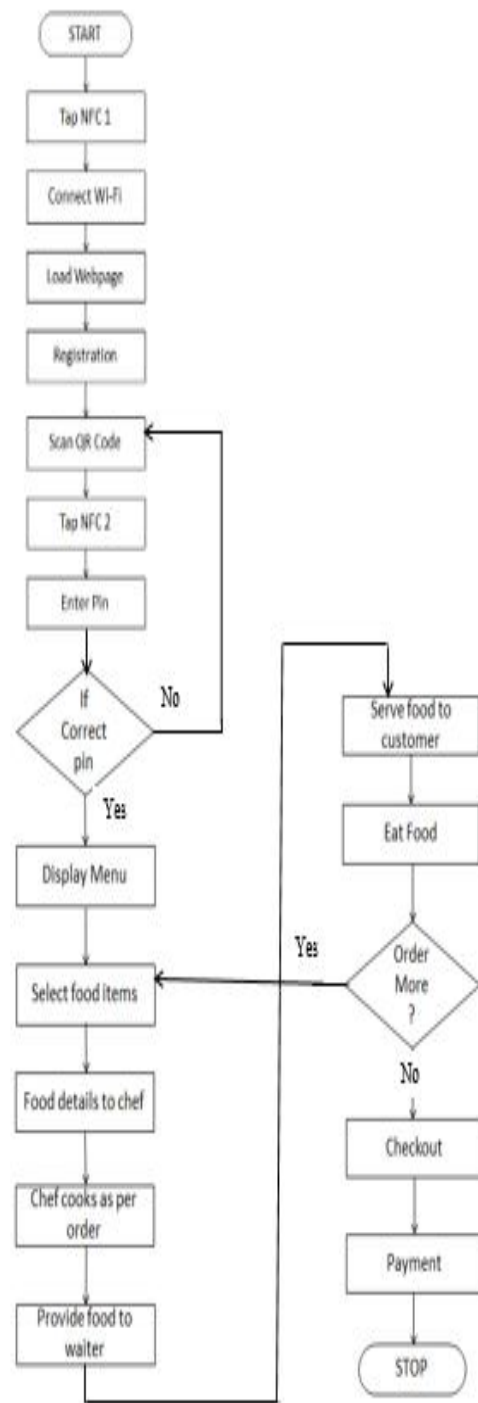


Figure 1. Flowchart

NFC Read Application:

This application is used to retrieve data from NFC and execute the task for which it is programmed for.

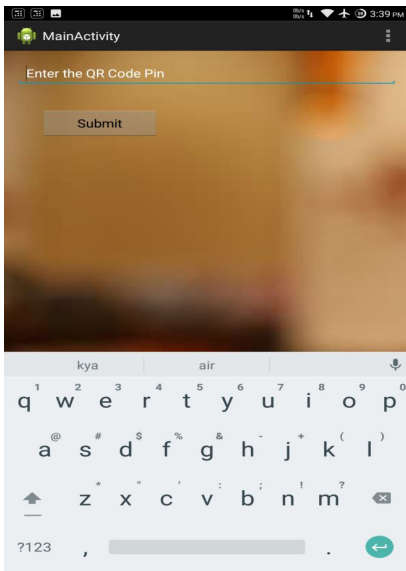


Figure 2. Snapshot of NFC Reader App

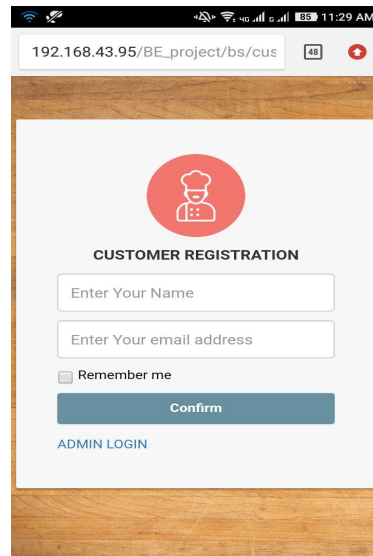


Figure 4. Snapshot of Registration Page

NFC Write Application:

This application is used to modify the NFC Tag. The data stored in NFC Tag can be changed using this App.

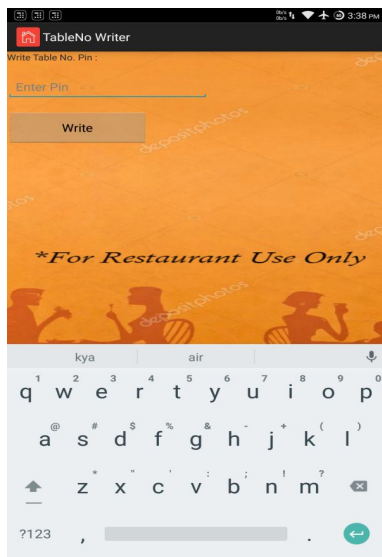


Figure 3. Snapshot of NFC Writer App

Glimpse of menu:

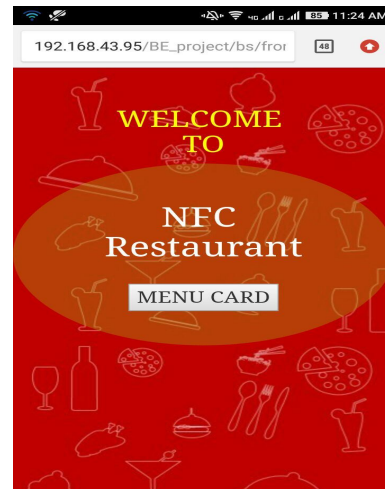


Figure 5. Front Page of Menu

IV. RESULTS AND ANALYSIS

The proposed system provides the customers an efficient way of food ordering in restaurants. Also the system and its interface are easy for users to understand which makes users comfortable to adapt the system.

Screenshots



Figure 6. Menu Card

V. CONCLUSION

This system gives an expedient way of experiencing the food ordering process. Most of the processes in this system doesn't require waiter's help which reduces the labour work which in turn reduces the cost of restaurants. Therefore this solution makes the system cost effective. Since, the NFC technology is the new and emerging technology, it has chance of getting used in different sectors.

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