

# “Android Based Food Ordering and Billing System Over Wi-Fi Network”

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## ABSTRACT

Technology has entered almost every field in our life, but still its effect is not yet that evident in the food industry, especially the food serving outlets including restaurants, hotels. Even today, most of the restaurants in India follow the traditional pen and paper method to take order from customers, which wastes a lot of time of both, the customer and the restaurant. This work aims to substitute the traditional pen and paper method by automating the food-ordering process in restaurant and thus improving the dining experience of the customer. This system proposes an automated system that uses wireless communication, a centralized database, and an android application to place the order without even waiting for a waiter. The android application installed in the touch screen device, fitted at the table, contains all the menu details with pictures of the item. The ordered details are wirelessly sent to the chef and the cashier. The manager has his own computer system that is used to update the menu that updates the global database which is situated on server, view and manages table wise customers' order, and receive feedback. As the system is automated, it becomes economical even from restaurants point of view, as it reduces manpower and just requires one time investment in installing the devices at table.

**Keyword :** - Touch technology, food-ordering system, Wi-Fi, Dynamic Database, Android Application.

## 1. INTRODUCTION

The sudden and rapid growth and development of communication technology, emergence of wireless technology and android devices has created quite a stir in the business transactions. Business in the hospitality industry has been greatly impacted and competition has increased due to improved food ordering techniques. In order to effectively run a restaurant, time saving and cost optimizations are essential [1]. Reduction in time by a few seconds for each table can speed up order processing, increase efficiency. The biggest obstacle most restaurants face is the migration from a paper-pencil system to a completely automated touch-screen system. The food ordering system, till a few years ago, was a completely manual process where a waiter used to note down orders from the customers using pen and paper, take the orders to the kitchen, bring the food and make the bill. Although this system was simple it required extensive investment in purchase and storage of paper, large manpower and also was prone to human errors and greater time consumption [2]. In order to overcome these limitations in manual system, some systems were developed later like PDA based systems and multi-touchable restaurant management systems to automate food ordering process.

PDA's (personal digital assistants) are much in use because of their portability feature and ability to communicate with personal computers but they too have some limitations. A PDA-based system lacks ubiquitous communication, is exposed to health hazards, requires training of attendants, the need of having attendants to operate, the inaccuracy during peak hours and small screen size. The multi-touchable restaurant management systems also have limitations like: they usually require low resolution output of the monitor; can produce activation without touching the screen and the cost to produce the special Infrared bezel for touch screens is very high. Taking in view these systems, we have proposed our system with more advanced features, which is specially designed for Android Devices [3].

Restaurants are one of the favorite premises. With no regard to the actual reasons for visiting restaurants, customer will make orders and wait for the ordered meals. However, it is common if customers complain for not feeling satisfied about the services ordered. There are many reasons leading to the feeling of dissatisfaction including being entertained late in terms of order taking by the waiter and meals serving. The issue of being late entertained could be solved with help of the advancement in the technologies of communication [4]. In accordance, this study initiates an integrated and networked system, with the focus is on its ability to solve the above described limitations in order taking. [5]

## **2. RELATED WORK**

### **2.1 Traditional Paper-Based Systems**

The traditional paper based system is one of the most extensively used systems worldwide. In this system all records are stored on paper. However, this system is plagued with various problems. Some of the problems are highlighted below: The most common blunder is waiters making mistakes with customer's orders. At times, a waiter can forget to add a specific item, make a change because a customer is allergic to certain substance, or forget to give the order to the kitchen. Customers have to wait for a waiter to take their order. They must rely on the waiter to remember their order and specific details. Their food may take longer to be prepared and served if the waiter has multiple tables. They may also get wrong bills since they cannot see their bill amount until their meal is complete. Impatient customers also call over the waiter/waitress frequently to out the status of their order several times during their visit, wasting the waiters service time Waiters need to constantly check with the chefs to determine when food is ready. Conversely, chef needs to make sure waiters know that food is ready. This can cause the food to get cold over time and lead to potential food-poisoning. It may also lead to wrong orders and an unsatisfied customer. Keeping tracks of empty, clean and reserved tables within a restaurant Busboys must always be alert as to which tables need clearing. This means that they must be always checking for tables. Waiters need to usually alert them. This takes extra time from other Managers have to analyze hundreds of paper receipts to determine best-selling items, popular hours and customer satisfaction. They also require re-printing of menus when food is not available or a price needs to be changed. This can be costly and time consuming to a restaurant.

### **2.2 Computers Usage in Hospitality Industry**

The emergence of computers pioneered the automation of the food ordering system. A PC connection was established where the waiter after taking the orders would enter the order in the system. The respective orders taken were then displayed at a screen in the kitchen. The kitchen staff prepared the dishes accordingly and on completion noticed the waiter who collected and delivered the dishes to the respective tables. The system was also capable of intimidating the waiter about the availability of a dish. If a certain dish was unavailable, the waiter was able to ask for changes or even delete a customer's order. After serving the food, bill was generated at the cash counter. All the details entered by the customer were fed into the system which the management had full access to. With the advancement in the computer and communication technology, various systems were launched in market for the purpose of automation of the food ordering system. Some of the existing systems are mentioned below.

### **2.3 QORDER**

The next improvement in the food industry was the QORDER. The waiters now no longer took the orders on paper. Instead all the orders were taken on a handheld device called the QORDER. It was a portable android device where the waiter enters order information on the touch screen and then sends it to the kitchen in for processing. Simultaneously, the POS system receives the sales information for later billing. QORDER utilizes WI-FI to easily reach to the most remote corner spot in your restaurant. Once the guests are done, the waiter prints the receipt out and processes payment with the handheld unit.

### **2.4 Personal Digital Assistants (PDAs)**

With new technologies and approaches being introduced to automate the food ordering process, a number of wireless systems like I-menu, FIWOS, WOS were developed. All these systems were PDA- based. The feature of PDA systems was that customers or waiters key in ordering process. Communication between the PDAs and server became feasible and simple due to wireless technology. But this system also had several drawbacks. PDA-based systems surpluses the restaurant expenditures as many PDAs were required during peak hours. PDA systems also

did not provide any real time feedback from customers. Menu cards in the PDAs were unattractive and uninformative as it did not support images.

### 3. PROJECT SCOPE

To overcome the limitations of above systems, we propose this android based food ordering and billing system over Wi-Fi network. Android devices, in the past few years, have reached the pinnacle of popularity and have revolutionized the use of mobile technology in the automation of routine task in wireless environment. Android is an open-source, Linux based operating system for mobile devices such as smart-phones and tablets. The promising future of Android market makes the concept of writing applications for android beneficial. As a remedy for the above systems, we propose a restaurant with a android technology system. Our system aims at providing the following features:

- Combining of Wireless technology and Android OS to automate food ordering process.
- Allow the restaurant to operate faster (faster seating, faster order preparation, faster turnaround on food).
- Reduce employee error, thereby increasing customer happiness.
- This also reduces waste as when the wrong item is ordered, the food must be discarded
- To minimize the flaws in conventional system by atomizing the working of a restaurant.
- To provide a mechanism for obtaining feed-back from the customers and provide the restaurant a means of review of their service.

#### 3.1 User Classes and Characteristics

The end-users of the Android Waiter fall into three primary categories, unskilled, partly skilled and highly skilled.

**Unskilled user:** The users of the tablets at the table are walk-in customers and should therefore be assumed to have no relevant prior skills or education other than basic abilities to operate an automated system; no more complex than a mobile phone.

**Partly skilled user:** The users of the tablets and displays are managers and chefs respectively and they should be able to use the system and further be able to train others with minimal training themselves. They must be able to explain all elements of the user interfaces except the server. Supervisors also fall into the same category, though they will have to learn other sections of the system (refunds etc); these should not be of notably greater complexity than the standard functions. This class of user would be expected to have a high-school certificate education or equivalent.

**Highly skilled user:** The initial installation and configuration of hardware and the constituent proposed system components (especially the server) is guaranteed to require someone with notable computer experience, including extensive experience with network and operating systems to complete it. The software should not be needlessly complex, but it is still expected not to be entirely 'plug and play'. This class of user is expected to have a graduate certificate or equivalent, as well as extensive computer experience.

#### 3.2 Operating Environment

Android Operating system is an open source operating system. There are thousands and thousands of developers are there at sites trying to make android a better a operating system. There are so many eyeballs looking over the code every day. So the loopholes are quickly patched and fixed. Therefore android is secured. It always encourages your creativity. Unlike the iphone OS, Android user interface has been constantly refining and over the years. With Android Studio Google has made the user interface much more polished and modern.

#### 3.3 Design and Implementation Constraints

The proposed system should be written in a Java language with strong GUI links and a simple, accessible network API. Front end can be designed by using Android. The system must provide a capacity for parallel operation and system design should not introduce scalability issues with regard to the number of tablets or displays connected at any one time. The end system should also allow for seamless recovery, without data loss, from individual device failure. It is worth noting that this system is likely to conform to what is available. With that in mind, the most adaptable and portable technologies should be used for the implementation. The system has criticality in so far as it is a live system. If the system is down, then customers must not notice, or notice that the system recovers quickly.

The system must be reliable enough to run crash and glitch free more or less indefinitely, or facilitate error recovery strong enough such that glitches are never revealed to its end-users.

### 3.4 Assumptions and Dependencies

The implication is that the target hardware will provide a capacity for standalone program/application deployment and not require customized embedded firmware to be written. It is further assumed that tablet PCs of sufficient processing capability and battery life will be utilized. The SRS assumes that none of the constituent system components will be implemented as embedded applications. The surface computers employed by the system should facilitate being utilized on for extended periods and that they are programmable in the same fashion as x86 architecture computers. Finally, it is further assumed that the deployment environment is capable of supporting an IEEE 802.11 wireless network for system communication. The maximum distance of transmission is within 50-100 meters, about the range of Wi-Fi.

### 3.5 System Features

#### Order Management

The system shall let the user to place an order for their consumers.

The system shall prompt and ask user to verify the order that have been placed.

The system shall allow user to add in extra remark regarding the order

The system shall allow user to void the order that mistakenly placed or exceptional case occur.

#### Reporting Management

The system shall generate a report that based on the time period that customize by user.

The system shall retrieve related information from the database and generate the report to user.

#### Menu Management

The system shall only allow management level user to edit the menu card information by having an authorization login checking.

The system shall allow user to update their restaurant menu card information. The system shall save the updated menu card information to the database.

#### Billing Management

The system shall retrieve data that needed and arrange in a meaningful structure then print for user as a reference.

The system shall let user to choose the payment channel that they wish to use.

Goods and Services Tax Management

The system shall calculate the total amount of money that need to submit to government at the end of the month.

#### Order Queue Module

The system will update the queue display whenever a new order is placed.

The system will merge the amount identical food that needs to be prepared and display on the screen

### 3.6 External Interface Requirements

#### 3.6.1 User Interfaces

##### User Tablets:

This type of the tablets is especially for the use of normal users coming in the restaurant. These tablets will consist of the whole menu of the restaurant. They will be enabled with the Wi-Fi connectivity. The items in the menu are non editable for these types of the tablets. So, the user can not interfere in the menu and make changes in it. The tablets should be able to display all the items of the menu with sufficient visibility. Customer from any layer of the society should be able to handle and operate all the functions easily.

##### Manager Tablets:

These tablets are especially for the use of the restaurant manager. The manager should be able to control the function of whole restaurant from a single tablet. He can access any tablet and should be able to make changes to the menu. Like he can change price of particular item or he can disable particular item which is not available at that particular time.

##### Display at Kitchen:

These are present at the kitchen near chef so that he should be able to see what a particular has ordered. All the ordered items are displayed on the screen giving the table number below. They should be sufficiently large to be seen by chef at a reasonable distance. Chef should be able to denote a particular item that is ready.

### 3.6.2 Hardware Interfaces

There are three external hardware devices used by the proposed system, each related to a user interface. These devices are the wireless tablets and the displays. All the devices must be physically robust and immune to liquid damage and stains. The devices (with the possible exception of displays) must also have good industrial design aesthetics, as they are to be used in place of normal restaurant tables and notepads and will be in direct contact with customers. The devices behave as 'terminals' in the sense that they never have a full system image, do not store data and are not used for the core logic of the system. However, they should be fully capable tablets that can use textual data from the server along with local UI/interpretation code to display UI elements and take input. All order and transaction records should be stored on the server, not these tablets. The performance of dumb terminals over an area the size of a restaurant is likely to be unacceptable. In all the cases, the hardware device takes information from the proposed system and processes the information to display. It also provides user input information to the proposed system.

### 3.6.3 Software Interfaces

We will require interface with a JSP/Servlet that stores the information necessary for our system to operate. The JSP/Servlet must be able to provide, on request and with low latency, data concerning the restaurant's menu, employees (and their passwords) and available dietary requirements. Additionally, it should take and archive data provided to it. This data will include records of all orders and transactions (system states and state changes) executed. JSP/Servlet must store all data such that it can be used for accounting, as well as accountability.

### 3.7 Database Requirements

The database required for this system is SQLite database for storing details on the tablet itself. It also needs a database on the server which is handled by JSP and SQL. So what basically is SQLite? SQLite is a relational database management system contained in a small C programming library. In contrast to other database management systems, SQLite is not a separate process that is accessed from the client application, but an integral part of it. SQLite is ACID-compliant and implements most of the SQL standard, using a dynamically and weakly typed SQL syntax that does not guarantee the domain integrity. SQLite is a popular choice as embedded database for local/client storage in application software such as web browsers. It is arguably the most widely deployed database engine, as it is used today by several widespread browsers, operating systems, and embedded systems, among others. OS like Android, Web browsers like Mozilla etc. SQLite has many bindings to programming languages.

## 3. SYSTEM ARCHITECTURE

The architecture attempts at a full coverage of the three main areas of restaurant: the Serving area, the Kitchen, and the Cashier counter. The main components of this system are: The android application on tablets at the tables. The tablets will be provided to customers, at their tables, allowing them to directly view the menu card and order immediately from their respective tablets. The server application on the restaurant-owner's laptop/tablet to customize menu and keep track of customer records. The central database for restaurant-owner to store updated menu information, order details and broadcast various offers. Wireless connectivity between the three main areas of restaurant.

In this system, the Customer and Kitchen Controller has access to the android application. All the Customer need to login into the android application. The application have access to the SQLite database. The architecture attempts at a full coverage of the three main areas of restaurant: the Serving area, the Kitchen, and the Cashier counter. The main components of this system are:

1. The android application on tablets at the tables. The tablets will be provided to customers, at their tables, allowing them to directly view the menu card and order immediately from their respective tablets.
2. The server application on the restaurant-owner's laptop/tablet to customize menu and keep track of customer records.
3. The central database for restaurant-owner to store updated menu information, order details and broadcast various offers.

4. Wireless connectivity between the three main areas of restaurant.
5. All Android Waiter Application connected to the wireless network and established wireless LAN between them.
6. They will share the order details to the one device to another device after placing order by customer.
7. WLAN can allow to connect those devices which has register IP Address to the router.
9. All billing information will be stored to the management server as a backup at end of the day.

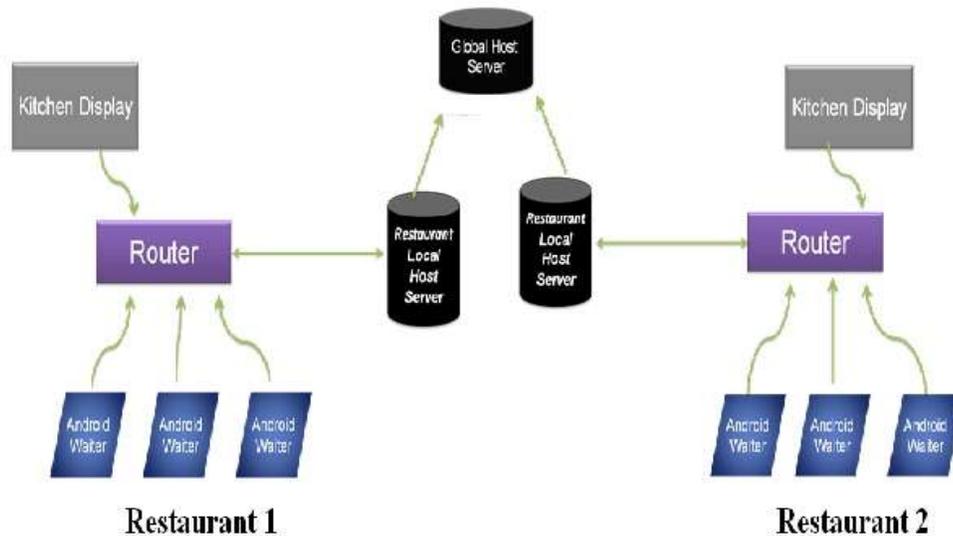


Fig -2: 1 System Architecture

#### 4. CONCLUSIONS

Our aims to introduce the idea of food ordering system by having an android application that help improved more interactive categorized food menu items of people to be better convenient. Android based Food Ordering and Billing System overcome the waiting for waiter in restaurant. Better customer satisfaction using Android Waiter. Managing & maintaining bill information of multiple restaurants will reach more market growth. Some amount of waiter work is done by using this Android Waiter.

#### 5. ACKNOWLEDGEMENT

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