

# Tap and Dine – Smart Bistro Management and Ordering System

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**Abstract** – Automation and technologies continue to prevail in the digital era. Tap and dine proposes a desirable and user-friendly approach to overcome the human constraints surveyed in local cafeterias, small restaurants along food service systems. The project system intends to provide a serene dining experience for the customers in every way possible. This is fulfilled by applying a software approach and Google firebase which acts as a spine for the project. Aspects like ordering meals by the digital menu, also, paying the bill through the tablet located at individual tables eases the overall process for the customers. The web application proves to be beneficial to collect data and statistics on the restaurant's performance in real-time and automate the order placement system for the cooks. All of this resulting in reduced human labor, time, and cost-effective management, maintaining the quality of service, and an uptick in customer satisfaction.

**Key Words:** Automation, Digital ordering, Flutter Framework, Google Firebase, Mobile application, Restaurant management, Web application.

## 1. INTRODUCTION

Primarily, the restaurant process is a traditional handheld method. The customer walks-in, waits for the waiters to make them seated at a table. They are compelled to choose from the paper menu having a poor description of the food items and need the waiters to take their order to be noted down. This further is taken to the kitchen counters, the order update is registered, the food is served and a bill is addressed. All of this, bound in a typical simple system manner.

But human errors are what to be looked upon. Waiters may jot down or deliver the wrong order. Billing and calculation blunders are non-negligible. Throughout, the manpower featured process eats up a giant amount of time, testing customer's patience at each stage of it.

The project model wishes to analyze each of these factors and tends to find a solution bearing the form of an android application, yielding digital ordering and bill payment plus the feedback feature, building to the customer's content. The web application possibly suits the manager favorably for tracking down the restaurant's performance in actual time. Looking through the insights claimed in the surveyed literature, it was found that increasing customer's comfort

level has always been the top priority and adopting automation provides a dynamic experience on the whole for them. The restaurant and service management are enhanced to the fullest making it worthwhile.

## 2. LITERATURE

In the year 2015, Tanmay Bakshi and his co-authors proposed a Touch Based Digital Ordering System on Android using Global System for Mobile (GSM) and Bluetooth for restaurants that comprised of two different Android apps. The Customer's App was identified by the table number and the order from a particular table was sent along with it. The Restaurant App had three different types of users – manager, cashier, and the chef. The app had different functionality as per the user type. Manager had administrative access on the app with a complete control over the entire system and the centralized database. The system flow of their project had the customers placing the order, after which its details were sent via wireless GSM to the server and then stored in the database. The chef using the restaurant app, could view the fetched data from the database displayed on his device. Then the data is being travelled wirelessly through the Bluetooth and displayed on the Liquid Crystal Display (LCD) screen.

The chef after preparing the order, would mark it completed on the app. The order is then removed from the LCD screen and a new order is being displayed. The manager is notified of the completed order through his app and the waiter is asked to serve on the particular table. The cashier is able to view the ordered items with their prices and then collect the money from the respective customer [1].

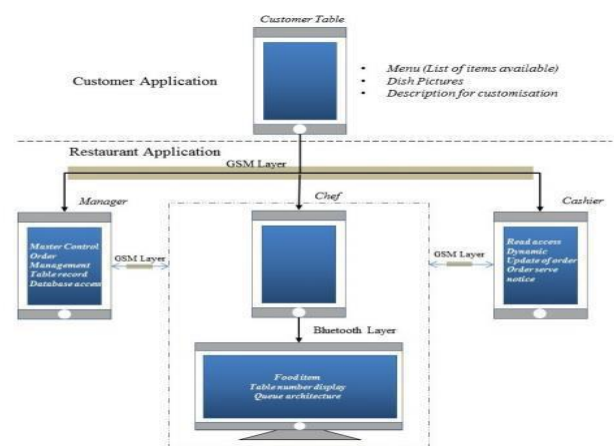


Fig -1: System Architecture taken from [1]

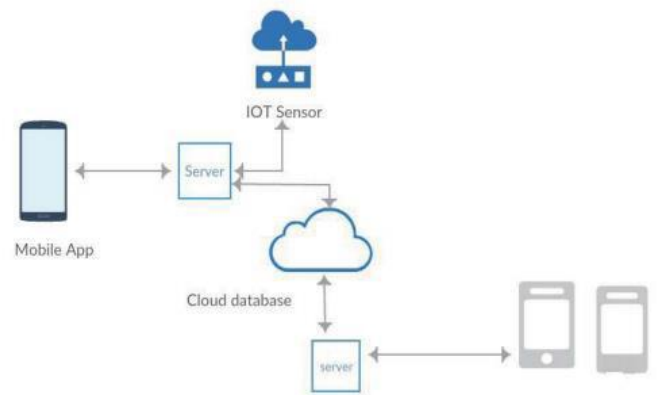
In 2015, Mayur D. Jakhete and a co-author contributed to a system of Smart Restaurant with e-menu Card. This is what we inferred from their working module. The customer would enable the Wi-Fi on the Smartphone/tablet having the E-menu card. Person might tap on the image he wishes to order for. After which, command would go to microcontroller through the Wi-Fi. The microcontroller was dumped with an embedded C coding containing all the details regarding menu item which the commanded the LCD to display the corresponding order at the kitchen section supported by a buzzer indication [2].

In 2016, Kunal P. Gundle along with his co-writers initiated a Digital Smart System for Restaurants using Wireless Technology. It was found that Android supports automation of routine tasks in wireless environment which resulted a convenient system for both the customers as well as restaurants in a cost- effective way. It provided facilities like digitally ordering the food, table list at reception, instant and user-friendly E-billing and quick parking service which strongly resulted in customer satisfaction and ultimately profited the restaurant [3].

In 2018, Dhanashree Mirgal with her co-authors put forth a system model with the two main software components of Smart Automated Restaurant specifically, the Android application and the web application. The Android application is used by the customers to interact with the restaurant staff and facilities, while the web application is used by the staff to connect to the customers and cater to their needs as well as to analyze the workings of the restaurant. Both of the applications in the system were not made to interact directly, instead they had access to the Apache HTTP web server. These applications mainly accessed, queried, and updated the database via a web server. Feature like finding available parking spaces in an easier way through Internet-connected infrared proximity sensors in the parking lot made the system efficient [4].

Vindya Liyanage with her co-authors, in the year 2019, intended the Foody, a Smart Restaurant Management. Customers could install the mobile app on their devices to register on the app. It mainly consisted of the restaurant availability pop up, a map, table reservation feature, meal ordering facility, ability to view past food reviews, view customized menu, and the ability to view meal preparing time. Orders were managed for kitchen staff through the admin section of the mobile app. The system model was being created with many popular technologies like Google maps, sensor and Signal handling, graph API, 3D max, and Natural Language Processing. The mobile application used python, firebase as a database among a few other technologies. In this mobile app, users could log in as a user or as an admin. When logged in as an admin, manager role and food ordering processes can be managed. When logged in as a customer, they can check availability, order food items, and manage

payments, and award feedbacks through the mobile application [5].



**Fig -1:** System Architecture taken from [2]

In 2019, Syed Viqar Ahmed and his co-author presented a Touch Screen Based Restaurant Automation System using Zigbee. The process flow we gathered from their working module is as stated. The customer sits at a table, explores a touch panel fixed on the table displaying a menu. On, selecting the items, the customer proceeds to place an order. Using the wireless communication system, the order gets transferred to the kitchen, where depending on the availability it is accepted to prepare and serve. If the order is not available i.e. if the kitchen staff is occupied to serve the order, then a notification is sent to the customer about the same. If the order is accepted, the same is conveyed via an acceptance notification, and the due payment is displayed on the screen with the additional order option. If the customer has an RFID registered with the restaurant, then he may choose to pay the bill at the table itself else the generated bill is transferred to the billing counter where the customer can opt for cash payment. RFID here acts as a POS system interface which is composed by ASP. NET, using RFID as an input. The customer would get the RFID card registered by the restaurant anytime and can add money to the card at the counter. Hence, after the meal, the system will send a bill message which can be paid by the RFID card with the customer [6].

Renjith V Ravi and his co-authors in 2019 presented an android based automation in which the customer could see all the available food items with its cost in the digital menu and could select the item. The order from each table is then received in the kitchen wirelessly by Bluetooth. It was being observed that the electronic menu system helps the people to select the food from the Android rolling touch screen to see the cost and recent availability of food items along with the table number. Once the food is ready in the kitchen, it gets indicated to corresponding customers table by a Light Emitting Diode (LED) glow. The bill was then generated through the means of a thermal printer [7].

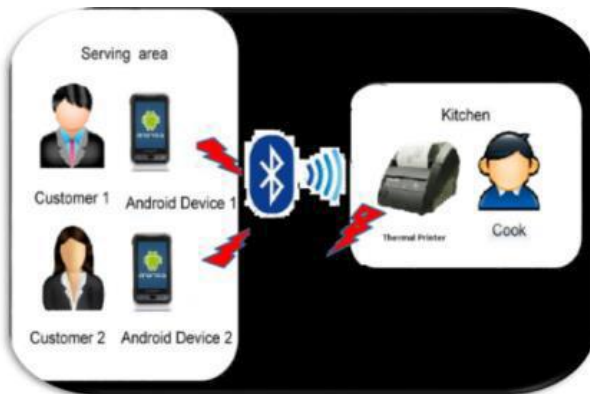


Fig -1: Communication diagram

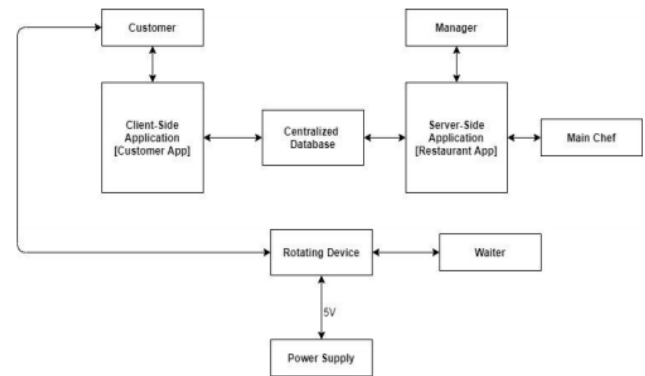


Fig -1: System Architecture taken from [9]

In 2020, Rajdip Paul and his co-authors suggested a system wherein each table contained a QR Code stand where customer needs to scan the QR Code using their mobile phones to view the menu. In manger side, it had a web application which is connected to the router to manage whole functionalities of the restaurant. The system worked on an intranet environment which provided an additional security [8].

### 3. CONCLUSIONS

In this paper, it is being established that from ordering food to paying the bill, everything comes under one software platform which serves rightly for both the customer and the restaurant. Monitoring the literature study, it's observed that the system GUI attracts potential customers by keeping them engaged. Improving the restaurant's business, it encourages the restaurateur to adapt to the new technologies and believe in one-time investment. Manual errors will be compressed. Human labor is altered. In a big way, the system might retain the inclusive time skillfully. However, customers with complex problems may find it hard to get familiar with the use of technology.

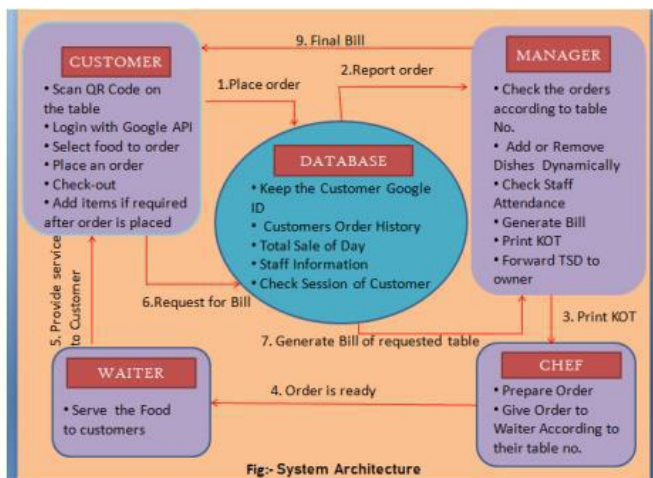


Fig -1: System Architecture

In April 2020, Vishal Gupta with his collaborators presented a model consisting of two modules, namely, software and hardware. Software module is an android-based application. By using digital restaurant application, customer orders their food. Hardware module consisted of the automatic device which is Arduino-based. Food would be reached at the particular customer table through the conveyor belt [9].

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