

Scan & Order

A Model for Ordering in Restaurant Based on QR Code

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Abstract: QR codes were first used in 1994 in the automotive industry in Japan. Since then and today the technology of QR code has come a long way and is now a household name. QR code scanning has found usage in many fields and industries over the years. One of the latest and more exciting usage of QR code was found in the restaurant business. The methodology is simple, customers scan a QR code provided to them with their smartphones, a menu shows up, they place orders via an app on the smartphone. In today's world where social distancing is so necessary because of the pandemic, this process can prove to be the saving grace of the restaurant industry.

Keywords - QR Code, Restaurant management system, android app

1. Introduction

One of the things that customers hate about restaurants is the waiting time. One a typical busy restaurant day, a customer has to first wait for a table, after settling down the customer has to wait for the server to take the order [1], then the server takes the order to the chef and the wait for food preparations begins. After all this the server brings the order to the customers and they can finally enjoy their food. All this waiting time gives the patron a bad experience. If there was a way to reduce the waiting time, it would give a major boost to the entire experience.

Restaurants are also one of the worst hit industries because of the global pandemic. People are wary of restaurants because they are afraid that they will catch the virus from the staff of the restaurant or other patrons [2]. This is causing the restaurants to incur heavy losses.

The traditional system of restaurants needs a revamp to account for all these problems. Restaurants need a way to reduce the waiting time as well as reduce the human contact in any way possible.

A way to tackle these issues can be the "Scan & Order" app. "Scan & Order" is a QR code-based food ordering and payment app [3]. The user will be provided with a QR code in their table. The code can be scanned with any smartphone and will take the customer to a menu page. With the help of this customers can order without waiters and can also pay for the food through the app.

2. A brief study of the QR code technology

2.1 Background of QR

A QR (Quick Response) code is a scannable code encoded with data. In the case of QR codes, data (of various forms) is converted into a unique two-dimensional arrangement of squares. When a QR code scanner is placed over those squares [4], it decodes their marshalling back into that data's original form.

2.2 Components of a QR code

Following are some important components of QR code

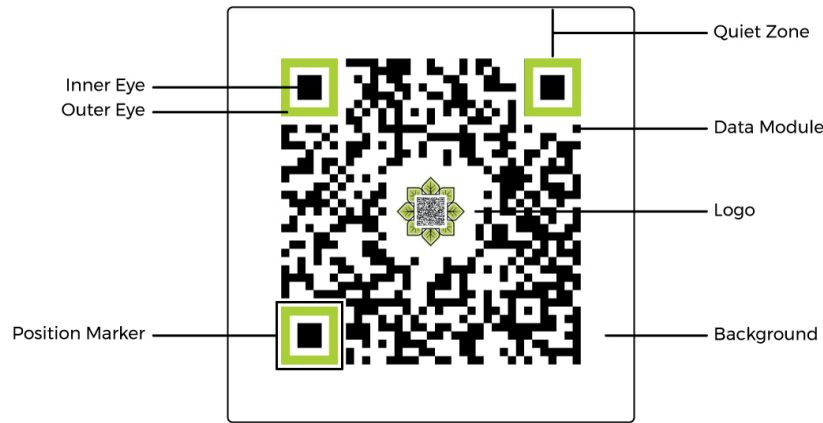


Figure 1: Mechanism for QR scanning

- **4.1 Data Modules:** A simple black square on white background (color composition can change) [5]. Most of the QR code is composed of marshalling of these data modules.
- **Position Marker:** Every QR code has three position markers [6]. The purpose of position markers is to help the code scanner in identifying the position of data modules [7]. Position markers are composed of an inner eye and an outer eye.
- **Quiet Zone:** Quiet zone is an empty area inside which the positions markers and data modules are present [8]. Its purpose is also easy identification of code areas by the scanner.

3. System Designing

The Scan and Order app has to be installed in the user's smartphones. The data flow is as follows: Once the user scans the QR code, the data will be gathered by app and sent to a server running Node JS [9]. The backend server processes and verifies the data and queries the database. The database sends requested data back to the backend which is transferred to the application.

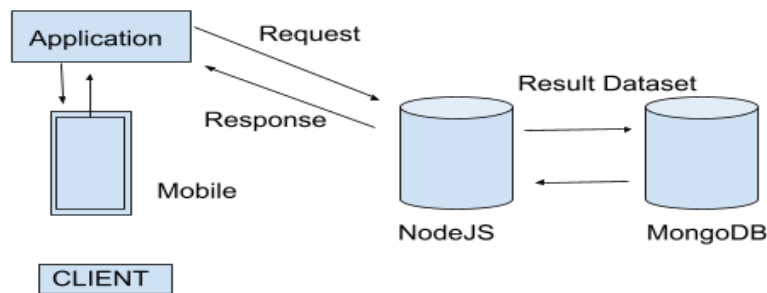


Figure 2: System Design Overview of Scan and Order

3.1 System Implementation

The flow chart of scan and order app is depicted in **figure 3**. First step after opening the app is OTP login. In case of successful login, the user can scan the QR code provided to them. The QR code data will provide a menu to users from which they can order [10]. After ordering, the payment menu will pop up and after successful payment, the order is redirected to the chef.

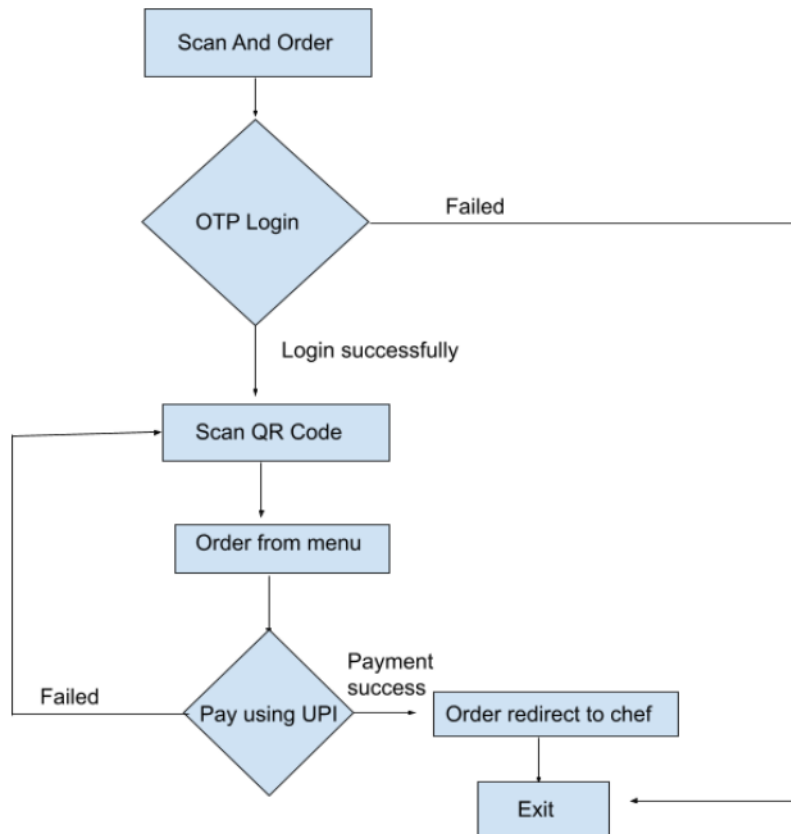


Figure 3: System Implementation of Scan and Order

3.2 Use Case diagram

The Scan and Order app will have the following functionalities as shown in **figure 4**: OTP login, QR code scanning, ordering from menu, payment using UPI.

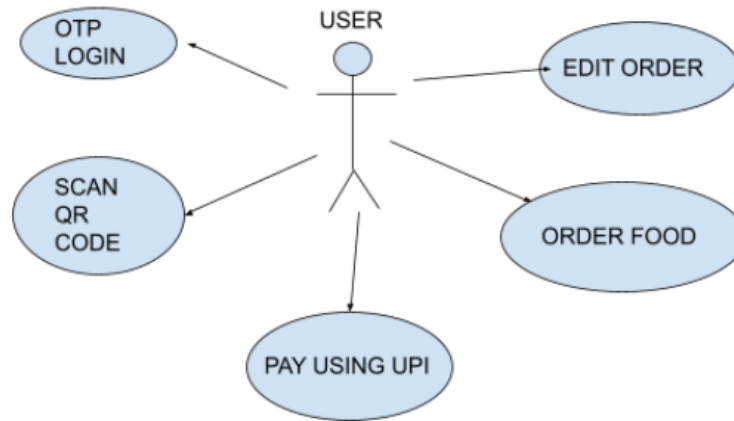


Figure 4: Use case diagram of scan and order

4. Methodology

4.1 Placing order without a server

In every table of the restaurant, there is a QR code unique to that restaurant. The patron requires to have a smartphone and the “Scan & Order” app present in the phone. The patron can scan the QR code with the app [11]. After scanning the code, a menu will be displayed in the app. The user can see details about various food items, their price etc. and place orders directly from the app. The chef and customer have a sort of direct connection which saves time by cutting the middleman [12]. The chef also gets orders in a timely and ordered manner which reduces the chance of preparing the wrong order.

4.2 Payment without a cashier

After the customer is done with the ordering, they can enjoy their food [13]. The last part of the cycle is payment. The “Scan & Order” app can also handle payment of orders. The user will automatically get a bill in the app which can be paid with the help of UPI from the app itself [14].

5. Advantages and Challenges

5.1 Advantages

- Saves time of restaurant staff
- The customer can order at their own leisure
- Hassle free electronic payments
- Reduce contact of staff and customers (Covid precautions)
- Option to rescue the restaurant workforce

5.2 Challenges

- An active internet connection is required for the process
- The loss of traditional restaurant face to face interactions
- At least one time contact with staff when the server brings over the food

6. Conclusion

Although there is a certain charm and nostalgia attached with the traditional system of restaurants and face to face interactions the times and conditions today demand a change in the system. With almost everyone in the world using a smartphone and rapid technological advancement, restaurants should make use of technology to replace or better the traditional system.

There are many improvements that can be made in the app itself for example adding some entertainment system for customers while they wait, still the use of such technology can greatly improve the customer's as well as staff's experience. There is room for improvement in the system which will breed innovation and help the restaurant managers make the experience of both customers and staff much better.

7. References

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