Proceedings of the 2nd International Conference on Communication and Electronics Systems (ICCES 2017)
IEEE Xplore Compliant - Part Number:CFP17AWO-ART, ISBN:978-1-5090-5013-0

Restaurant Table reservation using time-series prediction

Fahim Rarh, Dastgir Pojee, Sajjad Zulphekari
Student
Department of Computer Engineering
Rizvi College of Engineering
Mumbai, India

Dr. Varsha Shah
Principal
Rizvi College of Engineering
Mumbai, India

Abstract— **In India with population of 1.32 billion [1], the diners have also increased in the recent years. For a restaurant which has limited number of table it is difficult to manage large number of people. In every crowded restaurant people have to wait for at least for 10-20 minutes [2] which increases the frustration among the diners. To manage the crowd and eliminate the problem of waiting time, we have designed and proposed an application for the customer to pre-book the table at specific time. The proposed system also provides additional optional features for customer to order food from their home through the application by just paying a booking amount to save their valuable time. To satisfy and enhance the experience of the customer we have predict time using intelligent algorithm for managing table for customers. It will not only help the customer but also help the restaurant to manage and serves customer easily. The system will also notify the customer if there is a delay for their reservation by the restaurant, it will help the customer to re-schedule their reservation. The sole objective of the proposed system is to eliminate the wait time of the customer, enhance the customer eating experience and manage the large number of customer by the restaurant.**

Keywords- NoQ; Restaurant Reservation; mobile application; prepaid; food; intelligent algorithm; time-series prediction; GPS; Food Nutrients

I. INTRODUCTION

Long wait time for tables can turn the customers away or can create revulsion towards the restaurant, many of people even argue that the restaurant make them wait unnecessarily [3]. "NoQ" give a proper solution to the problem by allowing them to pre-book the table online.

While it is appropriate to give customer a chance to look at the menu and decide their order, but it is not ideal if they feel like they are being ignored when the staff is too busy to attend them [3]. This creates a dislike towards the restaurant. Our proposed application will reduce the load of the staff to attend them by taking order online [4] at the time of booking. A reservation is a promise between the diner and the restaurant. Sometime customer show up late for their table and the restaurant cancel their reservation, the customer have to wait for another table to available even after they have reserved. "NoQ" will inform the restaurant if there is a change or delay in the reservation from the customer side.

II. BASIC CONCEPT

NoQ have many features that make it useful and timesaving too. The features are described below:-

1. Our proposed system will help both the customer and the restaurant by allowing the customer to pre-book the table online. It will help the customer to have a comfortable and a pleasant experience. To pre-book the table customer have to login via application and have to select the restaurant. If a table is available at desire time of customer [7], the table will be booked at the restaurant side. If a table is unavailable at the desired time of the customer, the application will suggest some times at which the customer can book the table.

2. Our proposed application will help the customer to choose the food which they want to eat at the time of booking the table. The customer can also choose to order at restaurant if they haven't decided what to order yet. Allowing some space between ordering and food arrival is acceptable but too much wait time will irritate hungry customer. While the time required to cook food is often unavoidable, this gap can be fixed by ordering the food online.

3. Our proposed application will have the option for customer for change or delay in the reservation through notification. The change or delay in reservation will be proceeded if the table in the restaurant is available.

III. NOQ APPLICATION

NoQ is a mobile application for customer and a website for restaurant. Customer can pre-book the table, pre-order the food, Make a change in reservation and etc. Whereas restaurant will receive the detail of the customer, reservation details, ordered food. The Application provides following functionalities to the customer and the restaurant.

For Customer:

A.) *Ability to search a restaurant.*

- *Food type (Chinese/Italian/Indian)* - The customer can specify the type of food [6] they prefer and can search based on their choice.
- Location - The app uses GPS to locate the customer's location and recommend restaurants near to them [5].
- Approximate cost per person- The customer can specify the amount they want to spend, based on their amount our application will suggest some restaurants.

B.) *Reserving preferred table or a group of table depending on the number of people.*

- The customer can book the table depend on their choice. e.g: A.C. / No A.C. / Preferred Table
- The customer can request to set multiple tables into a single table for a large of people. (i.e Family dinner, birthday party and etc)

C.) *Ability to pre-order food online at time of booking table.*

- The customers have a choice to order food online or they can order when they are present in the restaurant [8] [9] [10].
- The customer can pre-order their food at time of reserving the table.
- When the customer arrive the restaurant the food will be prepared for them.

D.) *The customer can specify when a particular dish should arrive after they reach the restaurant.*

- The Customers have a flexibility to specify which dish should be served first and which dish should later.

E.) *Ability to make online payment*

- The Customers have ability to pay online or pay at the restaurant.
- The Customer can make payment online after pre-ordering the food.
- The Customer can select different payment option depending on their choice. (i.e, credit card, debit card and etc.)

F.) *Option to cancel the reservation.*

- The Customers have the ability to cancel the reservation.
- The Customer will get full refund if they have paid online except the booking amount which was charged for pre-booking the table.

Features for restaurant owners are:

A.) *Setting different prices for different tables*

- The Restaurant can set different prices for the food, for different type of table. (i.e. Premium / Basic)
- They can also set different prices for the food, for different type of section.
  (i.e. A.C. / Non. A.C.)

B.) *Ability to add the menu*

- The Restaurant have the ability to add and modify their menu. Menu consist of dish name, description, ingredients and nutrients present in the food [6].
- The Restaurant can mark the dish in the menu as unavailable if raw materials required to make the dish is unavailable.

C.) *Give loyalty bonus to customers based on their history*

- The Restaurant would also get to know customer visits and amount of money spent on their own restaurant.
- Based on their visit restaurant can avail discount or can serve some complimentary drinks / beverages.

D.) *Ability to select and change the number of tables available for online reservation*

- The Restaurant can set number of table they want for reservation
- The Restaurant have ability to increase or decrease number of table for reservation.

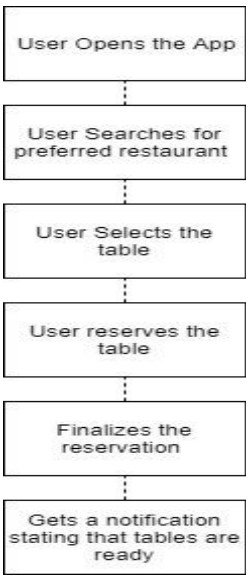
E.) *Ability to set timings as of when a particular table will be available to book*

- The Restaurant can specify the time from which they want to start taking the reservation [7].
- They can also specify the time at which they want to stop taking the reservation.

F.) *Ability to cancel reservations due to some reasons*

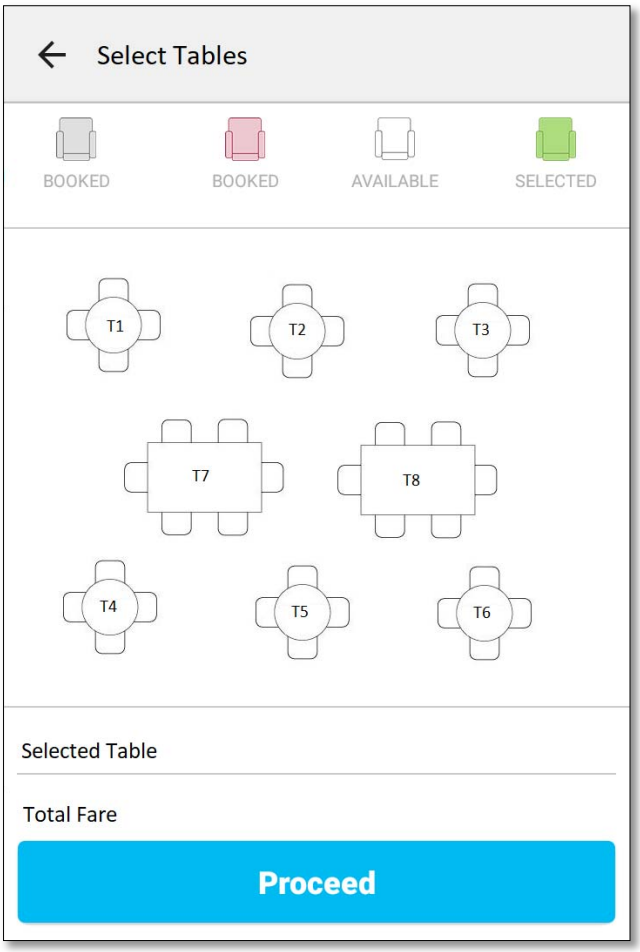
- The Restaurant has the ability to cancel the reservation of the customer in some circumstances or in some emergency.
- The Restaurant has to specify the reason behind the cancellation.
- The Customer will be informed about the cancellation of their reservation and the reason behind the cancellation.

IV. Operating Procuedure of the System



V. WORKING OF PROPOSED SYSTEM

NoQ Application allows the customer to book table as shown:



User can Select any table or group of tables and proceed to reserving those tables.

VI. CONCLUSION

This Paper introduces a new system for restaurant as well as users to conveniently reserve table at preferable time over the cloud. Restaurant will be benefited by having proper time management. Moreover, customers could pre-order the food, which would save time for restaurant as they could have food prepared and customers would not have to wait at restaurant to select the food to order, which in turn allows the restaurant to accommodate more customers throughout the day.

REFERENCES

[1] World Bank Data, [Online], Available: https://data.worldbank.org/country/india

[2] Average Waiting Time, [Online] Available: https://www.foodnewsfeed.com/new-concepts/study-released-average-restaurant-wait-times

[3] Customer Satisfaction Study, [Online] Available: https://www.sld.com/blog/food-service/strategies-to-reduce-frustration-around-restaurant-wait-times/

[4] N. Rianthong, A. Dumrongsiri and Y. Kohda, "Maximizing service value: A case study of online hotel reservation," *2014 IEEE International Conference on Industrial Engineering and Engineering Management*, Bandar Sunway, 2014, pp. 803-807.

[5] M. A. Habib, M. A. Rakib and M. A. Hasan, "Location, time, and preference aware restaurant recommendation method," *2016 19th International Conference on Computer and Information Technology (ICCIT)*, Dhaka, 2016, pp. 315-320.

[6] S. Amano, K. Aizawa and M. Ogawa, "Food Category Representatives: Extracting Categories from Meal Names in Food Recordings and Recipe Data," *2015 IEEE International Conference on Multimedia Big Data*, Beijing, 2015, pp. 48-55.

[7] S. A. Curin, J. S. Vosko, E. W. Chan and O. Tsimhoni, "Reducing service time at a busy fast food restaurant on campus," *Proceedings of the Winter Simulation Conference, 2005.*, 2005, pp. 8 pp.-.

[8] T. Shimmura, T. Takenaka and M. Akamatsu, "Real-Time Process Management System in a Restaurant by Sharing Food Order Information," *2009 International Conference of Soft Computing and Pattern Recognition*, Malacca, 2009, pp. 703-706.

[9] YongChai Tan, KienLoong Lee, ZhiChao Khor, KaeVin Goh, KhimLeng Tan and BentFei Lew, "Automated Food Ordering System with Interactive User Interface approach," *2010 IEEE Conference on Robotics, Automation and Mechatronics*, Singapore, 2010, pp. 482-485.

[10] X. Hongzhen, T. Bin and S. Wenlin, "Wireless Food Ordering System Based on Web Services," *2009 Second International Conference on Intelligent Computation Technology and Automation*, Changsha, Hunan, 2009, pp. 475-478.