

CUSTOMIZABLE AUTOMATED FOOD ORDERING APPLICATION USING ANDROID AND DATA MINING TECHNIQUES

R.V.Patil¹, Aniruddha Kale², Dineshkumar Pawar², Tejas Patil²

¹ Professor, Computer Engineering, PDEACOEM, Maharashtra, India

² Student, Computer Engineering, PDEACOEM, Maharashtra, India

ABSTRACT

The development in computer and communication technology has large influence on the transactions in business. In previous days, food and other industry traditionally has been left behind other industries in adapting new computer and other wireless technology. However fast advancement in computer and information technology and high expectations of customer has force the food and other industry to bring automation and robotic in the process. Nowadays, the adaption of wireless technology & dawn of mobile and android has led to automation in the not only in communication but also food industry. The business transaction and services in restaurants can be improved with the combination of wireless and mobile technologies and also by using android technology. In this paper, a customizable food ordering system is proposed which can keep track of user orders smartly. Here basically we are going to implement food ordering system for various type of restaurants in which user will make order or make custom food by one click only. The implementation of this system will be done using android application for Tablet PC's also various algorithm has been used to make system smarter. Here data mining algorithm such as apriori has been applied for the frequently used food item combination and k-means has been used for bill clustering which has make system smarter. Here we have developed the web portal of the system which will allow the consumer to access the system through web page. We have developed this system customizable so this system can have been used for various type of restaurant.

Keywords: Android Application, Cluster, Data Mining Techniques, Frequent Item Sets, Wireless food ordering system.

1. INTRODUCTION

The basic problem in the food service industry is that restaurants are not realizing efficiencies that would result from better applications of technology in their daily operations. The earlier food ordering system was entirely a manual process which involved waiters, pen and paper. The waiter had to note down orders from customers, take these orders to kitchen, update them in records and again make bill. Even though this system is simple it may involve human errors in noting down the orders. 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. To overcome these limitations in manual system, multi-touchable restaurant management system is proposed in this paper to automate food ordering process.

The food restaurant with automated food ordering system will be equipped with a user-friendly touch screen, display screen in the kitchen, and software for completing the process at the backend. For this system there will be a system administrator who will have the rights to enter the menu with their current prevailing prices. The system administrator can enter anytime in the system by a secured system password to change the menu contents by adding or deleting an item or changing its price. Now when the customer enters the restaurant, customer will place his order with the help of the touch screen using the intuitive graphical user interface, right from the selection of menu items, confirming the order and viewing offers. The customer will select from the food options according to his choice and the system will display the payment amount customer has to make once finished with the order.

2. LITERATURE SURVEY

In [3] here an application of integration of hotel management systems by web services technology is presented. Digital Hotel Management integrates lots of systems of hotel industry such as Ordering System Kitchen Order Ticket (KOT), Billing System, Customer Relationship Management system (CRM) together. This integration solution can add or expand hotel software system in any size of hotel chains environment. This system increases quality and speed of service. This system also increases attraction of place for large range of customers. Implementing this system gives a cost-efficient opportunity to give your customers a personalized service experience where they are in control choosing what they want, when they want it – from dining to ordering to payment and feedback.

Also in [4] paper they done a research work aims to design and develop a wireless food ordering system in the restaurant. The project presents in-depth on the technical operation of the Wireless Ordering System (WOS) including systems architecture, function, limitations and recommendations. It is believed that with the increasing use of handheld device e.g. PDAs in restaurants, pervasive application will become an important tool for restaurants to improve the management aspect by utilizing PDAs to coordinate food ordering could increase efficiency for restaurants and caterers by saving time, reducing human errors and by providing higher quality customer service. With the combination of simple design and readily available emerging communications technologies, it can be concluded that this system is an attractive solution for the hospitality industry.

3. PROPOSED SYSTEM ARCHITECTURE

In this system customer orders the food by using android based touchpad. Figure shows the system architecture, which cover three main areas of the restaurant: the serving area, the restaurant owner's working desk (cashier table), and the kitchen. Customer first orders the food from the touchpad looking at various combination of food which is further carried to the kitchen for fulfilling the order and the same is passed for billing at the each customer's tablet.

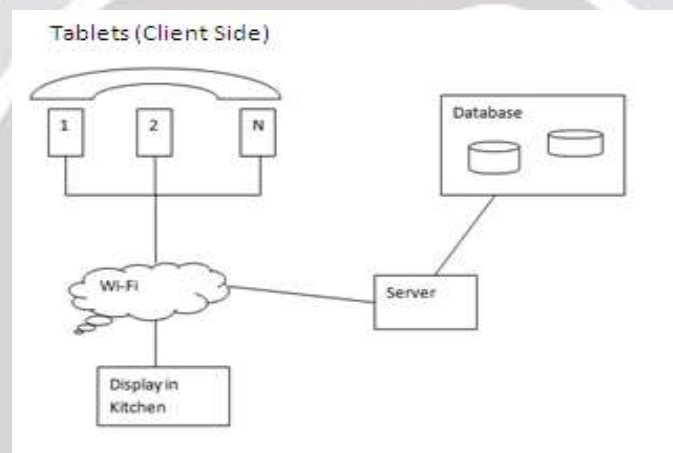


Fig-1: Proposed System Architecture



Fig-2: Working of Proposed System

Following are the major system functionalities in the proposed system-

1. Tablet on Table

There will be a tablet on each table. This will allow the customers to browse the food items as many times as they wish. Customer can view the suggestions for a particular menu item generated by the system. Customer can enter his/her details during bill payment. This helps the Restaurant owner to analyze the service and can notify the customer regarding different offers through messages or emails.

2. Suggestions for Customer

The Restaurant owner can post various combinations of menu items on tablet. This will help the customer to place the best order and increase sales.

3. Attractive Presentation

The Menu is organized in an attractive way. There are images of every food item which will make the view of customers more clear about how the food will look like after delivery. There is an attractive use of various themes and color schemes.

4. Modifiable Menu

The menu can be modified by the Admin manager. Admin manager can add, update, delete menu items.

5. Market basket analysis for a restaurant.

Generating frequent itemsets from the previous placed orders and suggesting their combinations to customers, this knowledge can also be used for promoting the other non-frequent items.

6. Customer relationship management.

7. Based on the classification in k-means appropriate text messages are sent to customers offering them attractive discounts and other suitable deals.

4. ALGORITHMS USED

4.1 K-means Algorithm

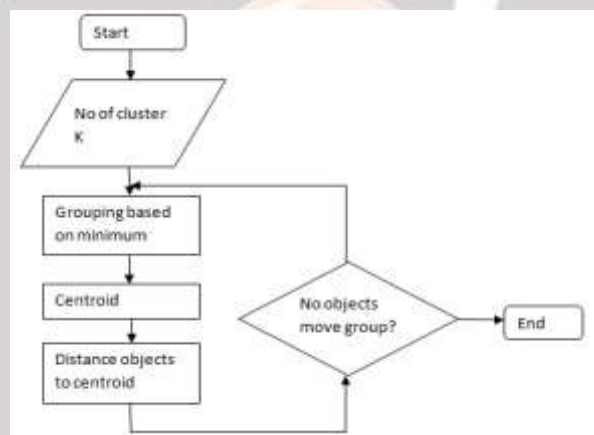


Fig-3: Flowchart of KNN Algorithm

This is an algorithm to classify or to group your objects based on attributes/features into K number of group. K is positive integer number. The grouping is done by minimizing the sum of squares of distances between data and the corresponding cluster centroid. Thus, the purpose of K-mean clustering is to classify the data.

Algorithm: The k-means algorithm for partitioning, where each clusters centre is represented by the mean value of the objects in the cluster.

Input: k : the number of clusters,

D : a data set containing n objects.

Output: A set of k clusters.

Method:

- (1) arbitrarily choose k objects from D as the initial cluster centres;
- (2) repeat
- (3) (re)assign each object to the cluster to which the object is the most similar, based on the mean value of the objects in the cluster;
- (4) update the cluster means, that is, calculate the mean value of the objects for each cluster;
- (5) until no change; Cluster by k-means partitioning.

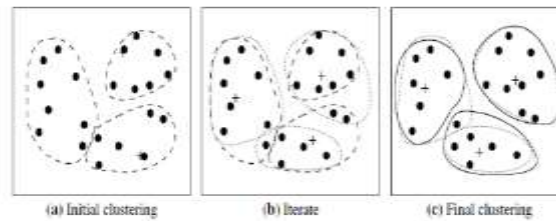


Fig-4: Clustering of a set of objects using the k-means method; for (b) update cluster centres and reassign objects accordingly (the mean of each cluster is marked by a c)

4.2 Apriori Algorithm

Association rule generation is usually split up into two separate steps:

1. First, minimum support is applied to find all frequent itemsets in a database.
2. Second, these frequent itemsets and the minimum confidence constraint are used to form rules.

Apriori uses breadth-first search and a tree structure to count candidate item sets efficiently. It generates candidate item sets of length k from item sets of length $k - 1$. Then it prunes the candidates which have an infrequent sub pattern. According to the downward closure lemma, the candidate set contains all frequent k -length item sets. After that, it scans the transaction database to determine frequent item sets among the candidates.

5. EXPECTED RESULTS

The proposed system will have two web applications and an android application. One web application will be a Admin module which will be used by the restaurant admin to maintain the menu card of the restaurant and bill generation. This module will be connected to the android application running on the tablet. The admin module will use different data mining techniques like apriori and k-means for analysis purpose. Second web application will be used by the customers who wish to order food online. The bill payment of ordered food will be handled through cash on delivery basis. Lastly the proposed system will have an android application which will be running on tablets kept in cafeteria. The customers can view menu card through the application and can place order accordingly. The customer will get recommendations on the application and can request for the bill also.

6. FUTURE SCOPE

In future, work can be done on providing provisions to accept different types of payments like credit cards, debit cards, tips, etc. The system can be further extended to register and link multiple restaurants to enhance the dining experience of customers. The module of stock maintenance and raw material management can be added to the existing system to ease the work of restaurant admin.

7. CONCLUSION

The implementation of such type of proposed automated system will minimize the number of employees at the back of the counter. Also the system will help to reduce the cost of labor. As there are lots of orders at the restaurants, there is possibility of human errors during calculations or taking orders. By using this system, such type of errors can be eliminated and controlled up to some level. The proposed system would attract customers and also adds to the efficiency of maintaining food orders at different tables in the restaurant. Another advantage of the automated food ordering system is that the system will be available 24 hours for 365 days, because the machine is not going to take any sick or vacation leave. The proposed system will have an admin module which will help the restaurant owner to get the required analysis. Data mining techniques like apriori, k-means are used to perform association mining and clustering operation. The proposed system makes use of these data mining techniques for recommendation and clustering features to acknowledge the frequency of customer in restaurants and to get the preferred combinations of menu items.

8. REFERENCES

- [1] Automated Food Ordering System with Real-Time Customer Feedback, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 2, February 2013, Shweta Shashikant Tanpure* Department of CSE, J.S.P.M, Pune.
- [2] A customizable wireless food ordering system with realtime customer feedback, Noor Azah Samsudin, Shamsul Kamal Ahmad Khalid, Mohd Fikry Akmal Mohd Kohar, Zulkifli Senin, Mohd Nor Ikhazan Universiti Tun Hussein Onn Malaysia,

UTHM Parit Raja, Malaysia, 2011 IEEE Symposium on Wireless Technology and Applications (ISWTA), September 25-28, 2011, Langkawi, Malaysia.

[3] DigitalOrdering System for Restaurant UsingAndroid Ashutosh Bhargave, Niranjan Jadhav, Apurva Joshi, Prachi Oke, Prof. Mr. S. R Lahane Department of Computer Engineering, GES's RHSCOE, International Journal of Scientific and Research Publications, April 2013.

[4] The Application of Wireless Food Ordering System, Khairunnisa K., Ayob J., Mohd. Helmy A. Wahab, M. Erdi Ayob, M. Izwan Ayob, M. Afif Ayob, MASAUM Journal of Computing, Volume 1 Issue 2, September 2009

[5] K. Read and F. Maurer, 'Developing Mobile Wireless Applications', IEEE Internet Computing, 2003.

[6] Billpro Pocket® and Billpro POS for Restaurant Available: [http:// billpro-pos.apponic.com/](http://billpro-pos.apponic.com/)

[7] J. K. Zao, et al., "Smart Phone Based Medicine In-take Scheduler, Reminder and Monitor, July 2010, Poster Session, 2010.," in Proceedings of IEEE HealthCom, 2010.

[8] K. J. Patel, et al., "PDA-based Wireless Food Ordering System for Hospitality Industry - A Case Study of Box Hill Institute," in Wireless Telecommunications Symposium 2007.

[9] K. Kamarudin, et al., "The Application of Wireless Food Ordering System," MASAUM Journal of Computing, 2009.

