

Canteen Management Using Intelligent Feedback System

Adiraj Amte
Shah and Anchor Kutchhi Engineering
College
Mumbai, Maharashtra
adiraj.amte@sakec.ac.in

Harsh Gada
Shah and Anchor Kutchhi Engineering
College
Mumbai, Maharashtra
harsh.gada@sakec.ac.in

Prathamesh Bhavsar
Shah and Anchor Kutchhi Engineering
College
Mumbai, Maharashtra
prathamesh.bhavsar@sakec.ac.in

Dhanashree Toradmalle
Shah and Anchor Kutchhi Engineering
College
Mumbai, Maharashtra
dhanashree.toradmalle@sakec.ac.in

Swati Gajbhiye
Shah and Anchor Kutchhi Engineering
College
Mumbai, Maharashtra
swati.gajbhiye@sakec.ac.in

Abstract—The purpose of the canteen management system is to automate the services provided by the canteen manager, and to make the work easy for them, this system will help the manager to keep a track of the bills of the customer, the app allows to make the payments using various online methods, and allows the user to check the menu digitally via an android application. The application also contains a system which analyses all the customers' reviews and sends a one-word review of the food to the manager, which allows them to judge the food by just reading a single word. The application will also keep a track of the customers' bills and generate a monthly bill of the same and then send it to the manager. This application will allow the simplification and digitalization of the canteen management which was traditionally done on books.

Keywords—*Sentiment Analysis, Naïve Bayes, Canteen management system.*

I. INTRODUCTION

This system is developed to reduce the human effort going into managing huge and small canteens as well by using record books and by maintaining each person's tab. This application will allow the customer to pay the bills online and also to place orders through the application. Traditional systems require a lot of human effort in maintaining huge canteens of big companies and colleges. This application will make it easy for a canteen manager to manage the canteen through the application itself. This application will also avoid human error to a huge extent, in huge infrastructures the management of the canteen is vulnerable to human errors, which can be easily avoided by implementation of this system. This system also will allow the manager to focus on other things more important than the canteen management and will result in proper and efficient management of the canteen, only due to undivided focus on the other works or tasks. The problem of physically going to the canteen or calling the canteen person for the food is resolved by accepting online orders, the customer could also track the status of his order. Receiving track of payments of a large number of customers is prone to errors, this also can be resolved as the user will be sent bills to his mobile application itself and he can pay those bills easily through any online payment methods, through the mobile application itself. The canteen manager often doesn't know how the food tasted at times, this application will analyze the customer reviews and will send a single word review of the food to the canteen manager which will allow the manager to notify the chef

about the food he's making to suggest some improvements. The menu of the canteen will also be listed in the mobile application which will enable the user to easily surf through that and order the desired item. This application is an user friendly system to overcome the human effort in managing the huge canteens of various institutions.

II. OBJECTIVES

The objective of this system is to develop a user-friendly design which can help the canteen manager to manage the canteen using this application more efficiently. This application will consist of a system to keep a track of the customers' bills over a period of time, the payment of the bills through various online payment methods. This application will consist of a digitalized menu for the customer and a special menu for the customer which will be updated daily on the orders of the chef. This application will allow the user to place orders from the mobile application itself and also can track the status of the order. This application will contain a special feature to analyze reviews of the customers and to give a single word review of the food to the manager of the canteen. The list of summarized objectives is as follows:

- a) Payment Gateway is provided.
- b) Sentiment analysis of the reviews is done.
- c) Special Daily menus will be provided on the screen.
- d) Bill tracker will be provided to keep a track of all your bills.
- e) Order status will be provided by the application.

III. PROPOSED SYSTEM

A. Use Case Diagram

Use case diagrams are commonly referred to as behavior diagrams that are used to describe a series of actions that should or can be done by some system or systems in conjunction with one or more external system users. The use case diagram of the proposed system is given below, Fig.1 shows the appropriate use cases in form of a diagram, given below.

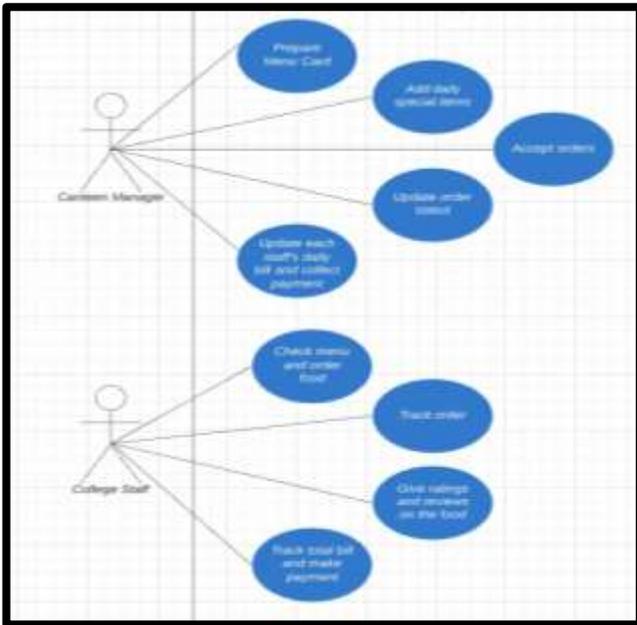


Figure 1. Use case diagram of the proposed system

IV. METHODOLOGY

Sentiment analysis and opinion mining are concepts used to describe an area of research that examines people's views, evaluations, appraisals, behaviors, and emotions toward things like goods, programmers, organizations, persons, problems, activities, subjects, and their qualities. These words are used interchangeably to describe positive and negative feelings of views.

The Naive Bayes classifier is a straightforward classifier based on Bayes theorem conditional probabilities and strict independence assumptions. Because of its computational design, reliability, and reasonably good predictive accuracy, naive bayes is a common tool in text classification. The Naive Bayes classifiers are a group of simple probabilistic classifiers based on the premise that a set of data is random. The benefit of Naive Bayes Classifier is that it needs limited training data for classification. Naive Bayes classifier is simpler to enforce, quicker to be categorized and more effective.

Bayes' algorithm determines the connection between likelihood of two occasions C and X, P(C) and P(X) and contingent likelihood of occasion C molded by X and occasion X adapted by C, P(C | X) and P(X | C). Consequently, Bayes' equation is:

$$P(c|x) = \frac{P(x|c)P(c)}{P(x)}$$

Likelihood
Class Prior Probability
Posterior Probability
Predictor Prior Probability

$$P(c|X) = P(x_1|c) \times P(x_2|c) \times \dots \times P(x_n|c) \times P(c)$$

V. EVALUATION

We performed a comparative study of Linear SVM and Naive Bayes algorithms. The performance evaluation of the algorithms in this study was carried out by calculating the value of Precision, Recall, Accuracy and Error Rate by using confusion matrix.

| Correct Classification | Classified as | |
|------------------------|--------------------|--------------------|
| | + | - |
| + | True Positif (TP) | False Positif (FP) |
| - | False Negatif (FN) | True Negatif (TN) |

$$Precision = \frac{TP}{TP+FP} \times 100\%$$

$$Recall = \frac{TP}{TP+FN} \times 100\%$$

$$Accuracy = \frac{TP+TN}{TP+FN+FP+TN} \times 100\%$$

$$Error Rate = 100\% - Accuracy$$

True positive presents an outcome where the system perfectly predicts the positive class.

False-positive identifies an outcome where the positive class is incorrectly predicted by the scheme.

True negative is the result where the system divides the adverse class exactly.

False negative is an outcome where the negative class is incorrectly predicted by the system.

The Support Vector Machine, or SVM, is also a common Supervised Learning algorithm for classification. Linear SVM is used for linearly separable data, which means that if a dataset can be divided into two groups with a single straight line, it is called linearly separable data, then the classifier used is called Linear SVM.

| CLASSIFIERS | PREDICTIVE POSITIVE | PREDICTIVE NEGATIVE | ACCURACY % |
|-------------|---------------------|---------------------|------------|
| LINEAR SVM | 1711 | 1604 | 82 |
| NAIVE BAYES | 1721 | 1639 | 84 |

On performing comparative analysis, we get the results that Naive Bayes has more accuracy than Linear SVM and thus we have implemented it.

VI. CONCLUSION

The advantage of using a cloud-based system is that the scale of a canteen does not make any difference. This system can be implemented on small as well as large scale canteen business. We can have a track of orders and we can cook the food based on customer satisfaction and we give feedback form after delivery of food in application so the Chef can cook according to customer satisfaction. The Naive Bayes algorithm, in our opinion, has the best overall consistency performance, so we use it to classify sentiment analysis food feedback. Sentiment analysis is accomplished by categorizing data in the form of food item ratings into positive or negative sentiments. Lastly, we conclude on the note that, this application will be able to make the task of ordering food easy, this will also make management of the college canteen systematic and paperless. Overall review of food will be posted to the canteen manager from time to time, bill records will be saved into the database which will make account keeping easy and paperless as well as accurate.

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