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Cafeteria Automation System

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***Abstract*—Most of the existing cafeteria system follows manual system which involves manual billing, ordering and paper work. In industries, manual system is followed which requires lot of manpower. In most of the companies, manual cafeteria system is followed till now which has faced loss of data from order and employee table databases. Therefore it is required to address the problem by automating the cafeteria. This project aims to automate the existing cafeteria system with AWS cloud technologies and full featured web applications there by retaining the data for prolonged period of time with quick access and management**

Employees can use their employee ID to check in to the cafeteria web application and place orders by choosing the foods they want to order. Following selection, the food products will be placed to the shopping cart. After placing the purchase, the money will be taken out of the employee's wallet and a notification will be sent to the employee's registered cell phone.

***Index Terms*—Amazon Web Service(AWS), Automation, Cloudtechnology, Web Applications**

I. INTRODUCTION

In today's technology era, many canteen systems have moved from manual to automated system. This is mainly because manual system involves lot of manpower. It also involves paperwork and more importantly consumes time. The food industry has undergone a significant transformation due to technological advances. Most of the cafeteria systems today are shifting towards automation from manual. In manual cafeteria systems employee has to stand in queues which is a major problem. In the era of fast food and takeaways, restaurants and cafeterias have made the decision to put quick order processing and delivery ahead of providing a good eating experience.

Due to the dramatic increase in the popularity of the Internet and technologies associated with it, a number of opportunities appear on the Internet. So many companies and businesses are now risking their business easily due to the internet. One such business area as the Internet is an automated canteen ordering system. In today's era of fast food and takeout, many restaurants and canteens have chosen to focus on quick preparation and prompt delivery of orders rather than providing a rich dining experience. There are lot of ways of serving which includes waiter serving system, self-serving system ,robot serving system, automatic serving system. Manual cafeteria system consumes a lot of time and requires lot of manpower. Automating the cafeteria is the solution for the above mentioned problem.

II. LITERATURE REVIEW

The main purpose of the cafeteria automation system is to automate the existing manual system with the help of full- featured web applications and different technologies. Several strategies and procedures have been presented and tested in recent years to achieve these goals.

Existing systems such as conventional systems, tablet based menus, electronic POS terminals and proposed systems based on Model-View Architecture are described in [1]. An auto-mated touch based digital smart system for the restaurant is presented in the paper [2]. It provides a system that saves time, reduces human errors, reduces manpower and gives customer satisfaction. Mobile communication systems are continuously growing and have become an integral part for communication. The automation system proposed in paper [3] uses QR code to launch web applications. The proposed system is low cost, efficient, convenient and easy to use for placing orders. A touch screen based digital menu ordering system with AVR microcontroller is presented in the paper [4]. This paper describes a method of low cost, efficient and easy access to the digital ordering system for food menus in restaurants. The paper [5] discusses about a platform for more easily automating the entire process for the canteen and the customers on the cloud. With the use of cloud computing technologies, installations and hardware components are not needed.

III. METHODOLOGY

This paper proposes frontend and backend technologies which includes HTML, CSS, Bootstrap and JavaScript for frontend and Amazon Web Services and Node.js for

backend. Different AWS services are used for different purposes. Differ- ent lambda functions are used for authentication of employee ID, fetching the menu details, adding and editing user details, adding and editing menu details and other computational tasks. API Gateway, DynamoDB, SQS, SNS, S3 are the AWS services used for the backend part .

There are six screens for the frontend part. The login page, placing order page, user details and menu details page for admin and two error pages are the six screens. The frontend files are stored in S3 bucket. S3 bucket is used for object storage and hosting static web pages. The webpages are hostedusing Amazon S3. Amazon DynamoDB is NoSQL database which is fast and flexible. Three DynamoDB tables are created for storing the data i.e. user table, menu table and order table. Two API gateways are created i.e. user API and admin APIfor integrating the frontend with the backend.

AWS Lambda is used for computational tasks which requires an event for triggering it. Eleven lambda functions are created for different computational tasks as shown in the figure 1.

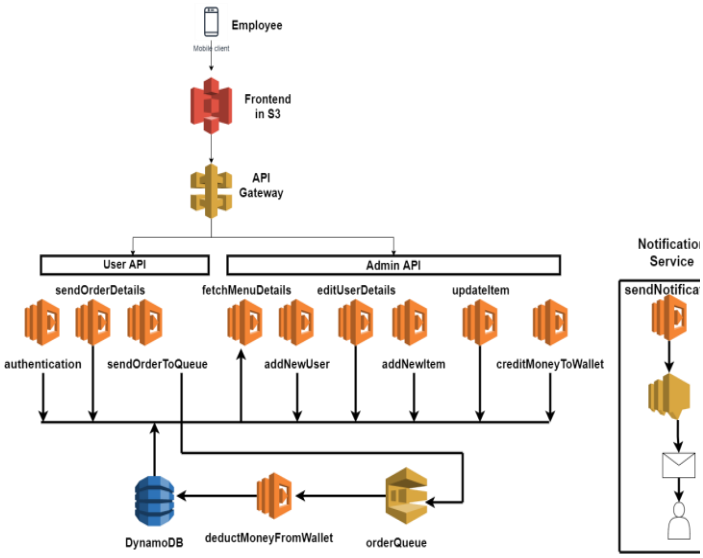

Fig. 1. AWS Architecture for Cafeteria Automation System

Both frontend and backend technologies which includes HTML, CSS, Bootstrap and JavaScript for frontend and Ama- zon Web Services and Node.js for backend. Different AWS services are used for different purposes. Different lambda func- tions are used for computational tasks such as authentication of employee ID, fetching the menu details, adding and editing user details, adding and editing menu details etc. AWS services such as API Gateway, DynamoDB, SQS, SNS, S3 etc. are also used. The system architecture is shown in figure 2.

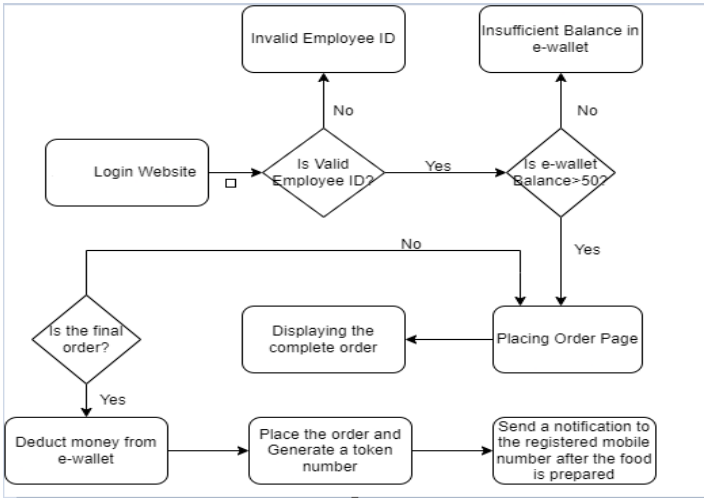

Fig. 2. System Architecture of Cafeteria Automation System

- authentication : It is used to check if the entered employee ID is valid or not.
- sendOrderDetails : It is used to send the details of the order to the order table once the employee clicks on the place order button.
- sendOrderToQueue : It is used to send the order details to the SQS queue.
- fetchMenuDetails : It is used to fetch the details of the menu from the menu table.
- addNewUser : It is used to add new user to the user table.
- editUserDetails : It is used to edit the details of the user and update the user table.
- addNewItem : It is used to add new item to the menu table.
- updateItem : It is used to edit the details of the menu andupdate the menu table.
- creditMoneyToWallet : It is used to credit Rs. 2100 to the employee's e-wallet on the first day of every month.
- deductMoneyFromWallet: It is used to deduct money from employee's e-wallet.

- sendNotification : It is used to send notification to the employee's registered mobile number.

The employee enters the employee ID in the login page. The authentication lambda function verifies if the entered employeeID is valid or not. It then takes the employee to the placing order page where the employee selects the items and places the order. The menu detail is fetched from the menu table using the fetchMenuDetails lambda function. The place order button hits the sendOrderDetails API endpoint and triggers the sendOrderDetails lambda function. The sendOrderDetails lambda function sends the order details to the order table and triggers the sendOrderQueue lambda function. It sends the order detail message to the SQS queue which stores all the order detail messages. SQS queue then triggers the deductMoneyFromWallet lambda function which deducts the money from the wallet. Finally the sendNotification lambda function is used to send the notification to the employee's registered mobile number after the food is prepared.

IV. RESULTS

The results obtained for various functionalities required to meet the system requirements are discussed below.

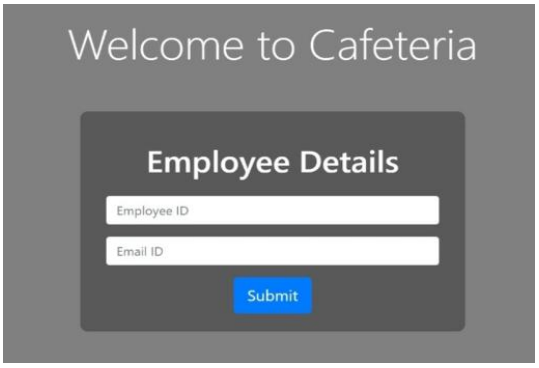

Fig. 3. Login Page

Figure 3 shows the login page for entering the employee details that includes employee ID and email ID. After the employees are validated, they are displayed on the order placing page.

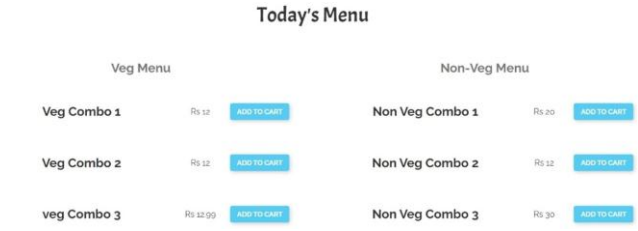

Fig. 4. Menu Page

Figure 4 shows the menu of that day which includes both the veg menu and the non-veg menu.

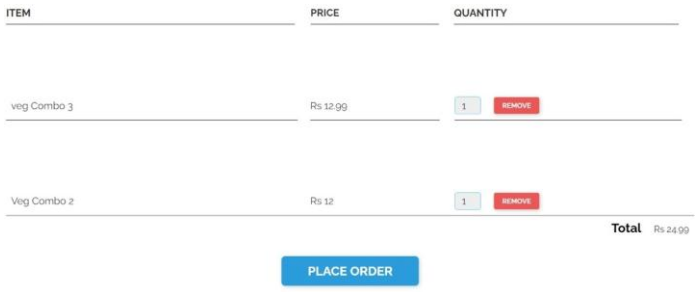

Fig. 5. Placing Order

Figure 5 shows the items added to the cart and are placed for ordering.

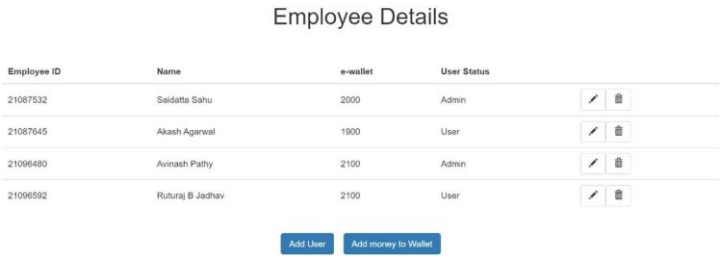

Fig. 6. Employee Details Page

Figure 6 shows the Employee details page which is con- trolled by the admin to add or update employee details

Fig. 7. Menu Details Page

Figure 7 shows the Menu details page which is controlledby the admin to add or update Menu details

V. CONCLUSION

A cafeteria automation system offers quick services to its users. Typically, individuals must go to the canteen to place their meal orders and wait in line for a very long time before receiving their orders. However, using this only requirespeople to follow a relatively straightforward procedure to place their orders. The development of an automated cafeteria automation system allows employees to place food orderswithout having to wait for a waiter to collect their order.Employees register online, read the e-menu card, and then choose the food they want to order online via the web application. The chef will be able to see the results on the screen once the customer has chosen the necessary food item and can then begin processing the order. This application eliminates the need for a waiter or lessens the waiter's job. The benefit is that in a busy cafeteria, there is a potential that the cafeteria people will be overwhelmed with orders and unable to satisfactorily service the needs of the employees. As a result, users can directly order meals and have it delivered.

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