Value Eats

Abhinav Kashyap Mandula, Ramya Kotha, Iswarya Mary Gade, Rakshith Reddy Bollu
Department of Soware Engineering
San Jose State University
abhinavkashyap.mandula@sjsu.edu, venkatagodanagaramya.kotha@sjsu.edu, iswaryamary.gade7@sjsu.edu,
rakshithreddy.bollu@sjsu.edu

Link of the Github repository : https://github.com/sjsucmpe272SP22/ValueEats

Link of the hosted application : https://valueeats.herokuapp.com/index

***Abstract*—Value Eats aims at easy availability and accessibility of the untouched leftover food in the restaurants to the needy people. The project aim is to prevent wastage of food and the solution should be quick and at our fingertips because the food would spoil within short period of time. This is achieved by the introduction of digital food vending machines wherein the unused food or leftover food from restaurants is loaded by the respective restaurants and the people who are in need of food can collect their desired food items at their nearest Value Eats vending machines.**

Keywords—food vending machines, wastage of food, food insecurity.

I. Introduction

More than 50% of food produced in the United States is never consumed. This has been the case since a decade now. California association of food banks is a non-profit organization which is located in Oakland and this organization tells that at any given point of time in California, more than 6 million people struggle with food insecurity. Food insecurity can be defined as the constant or frequent lack of food one needs for a healthy life. Before the COVID-19 pandemic has hit the world, it was estimated that 25 million Americans were suffering with food insecurity, it is for sure now that we can see a hike in this number as many people have lost their jobs due to employment drop and economic downfall the United States has suffered because of the pandemic. Besides all these, wasting food has environmental repercussions. It is evident that whenever some amount of food is getting wasted, we can assume that the resources like water and electricity that were used to produce food have also gone into vein. Though, food wastage movement is gaining momentum across the United States, it does have a need to accelerate in order to encounter one of the world's most critical problems as environmental consequences caused by wastage of food are irreversible. Value Eats application does have the capacity to encounter all the above stated dark facts. Having access to adequate food is a human right. This is the underlying thought that ignited a spark to come up with such an application that fights against food insecurity.

II. Approach

To create this web application, we used HTML, CSS and JavaScript to develop the frontend part of the application where admins are responsible for the deployment and maintenance of vending machines. Restaurant owners would log into the application, load the food in the Value Eats vending machines then update the records about the loaded food in the Value Eats application. We've planned to design a trigger that could notify all the registered users under that particular zipcode. This notification system is filtered on only one parameter and that would be zipcode. The users of the application would then login in the application and pre-book the food of his/her choice and the come over to pick the food from the Value Eats vending machine. We used Spring Boot as the backend framework and MySQL for handling the databases.

III. User Interface

The UI would basically contain three modules which are user, admin and the restaurant owner. Each module would be having a specific purpose or functionality. These individual modules push and pull the data from the database that contributes to the complete working of the Value Eats application. Admin is responsible for the maintenance of the application, does act as an intermediate between both the user and the vending machine, admin also acts as the intermediate between restaurant and the vending machine. Admin gets the luxury to have access to particular areas in the application that are not a part of user and the restaurant owner. This module includes a functionality of adding and removing vending machines from the database that's excluded from the functionality of user and restaurant owner in order to prevent manipulation of vending machines. The user module on the other hand is limited to only booking the food available whenever he/she gets notified by a trigger that is an e-mail. The restaurant owner gets to only add or edit the quantity of food by logging into the application in the "restaurant" module. So, each time restaurant owner adds food providing a particular zipcode. An e-mail notification would be sent to all the users registered with the application under that specific zipcode.

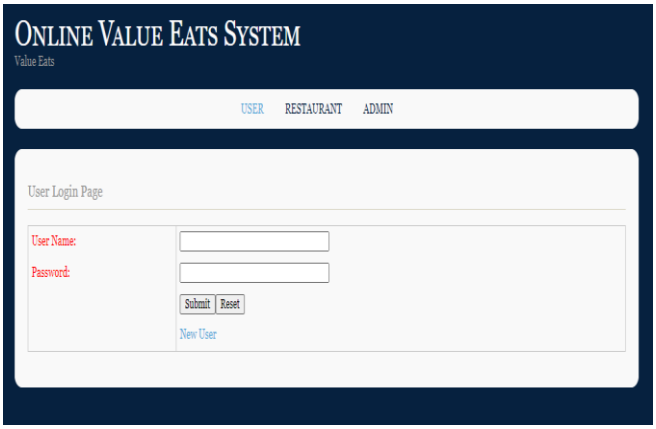

Figure 1

IV. UML DIAGRAM

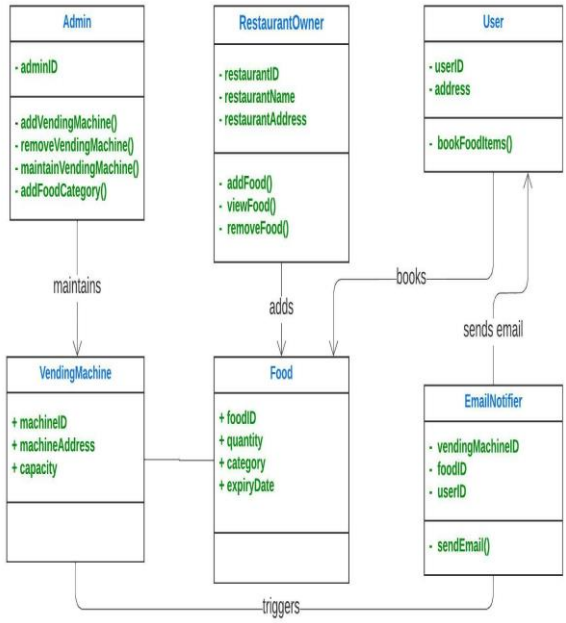

Figure 2

The Admin class in the UML diagram has a field called adminID. This class has an association relationship with the vendingMachine class in the system which contains three fields that are machineID, machineAdress and capacity. All these filed are set to public. VendingMachine class has an association relationship again with the Food class which contains foodID, quantity, category and expiryDate. Whenever data is changed inside the food class, VendingMachine class uses the EmailNotifier class to send a notification that's used a triggering mechanism. This mechanism uses the data in Users class like userId, adress to send e-mails to customers/users. RestaurantOwner class is also another that has an association relationship with the Food class as the data in RestaurantOwner uses the data in Food class to modify it's data.

V. SYSTEM DESIGN

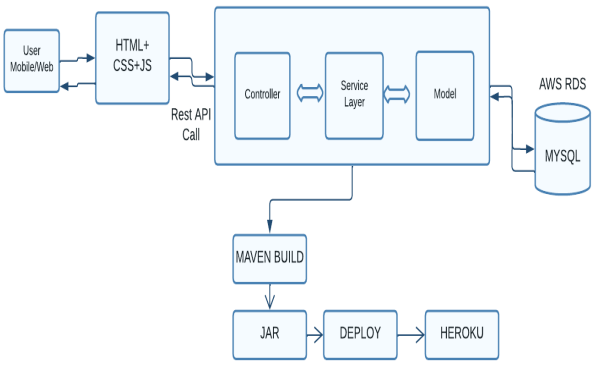

Figure 3

The system design is the process of defining the components, modules, interfaces and the data of the system so that specified requirements of project are satisfied. The frontend or the user interface uses the HTML, CSS and JavaScript. The backend REST APIs are triggered by a container that consists of controller, service layer and model. SpringBoot which is an open source micro-service-based java web framework. A fully production ready environment is created that is completely configurable. The database used is a MySQL database which is used to store structured data related to user like name, nameID, adress. This MySQL database is hosted on Amazon RDS. The tool used to develop the database is MySQL Workbench wherein the desired schema is designed according the specified requirments of the project and at the same time ensuring about the correctness and completeness of the functionalities listed in the Software requirement specification (SRS) document. This application is deployed on the Heroku platform which is an open source cloud application platform. It's a Platform-as-a-service (PAAS) model. The app runs on the Heroku platform in virtual containers which execute on a reliable run time environment. These containers are called as Dynos.

VI. ER DIAGRAM

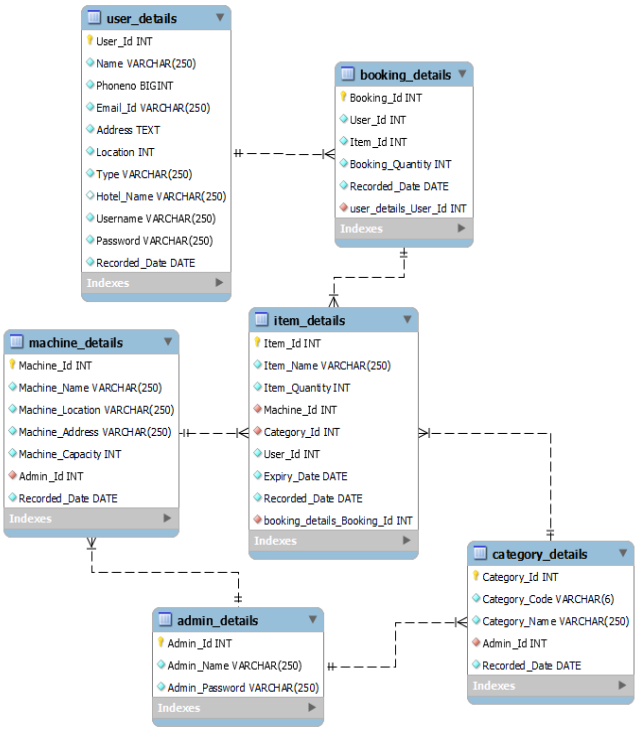

Figure 4

The database schema of the system 6 tables which are user_details, booking_details, machine_details, item_details, admin_details, category_details. The primary key user_details table is the user_id field, user_details table is used to store the details of registered users, this tables also stores the credentials required for the user to login into the application. Booking_deatils table is used to track the information related to the booking history of the user in his/her dashboard, the primary key here is Booking_Id. Item_details is table that's related to the restaurant owner persona, it basically stores the item details restaurant owner intends to add into the database, it contains fields like expiray_date of the food, machine_id of the machine restaurant owner would like to add food into, the primary key is item_Id. Machine_details table simply stores all the information about the machine like address of the machine, name of the machine. The primary key is machine_Id. Admin_details table contains admin_name and admin_password. This table is responsible to store all the information about admins, primary key in this table is admin_Id. Each food item falls into a different category, so to keep a track of such strutured data, we have a table called category_details. This table is used to fetch or edit information by the admin persona. It contains fields like catrgory_code, category_name, admin_Id and recorded_Date. Primary key in this table can be category_Id.

VII. TECHNOLOGY STACK

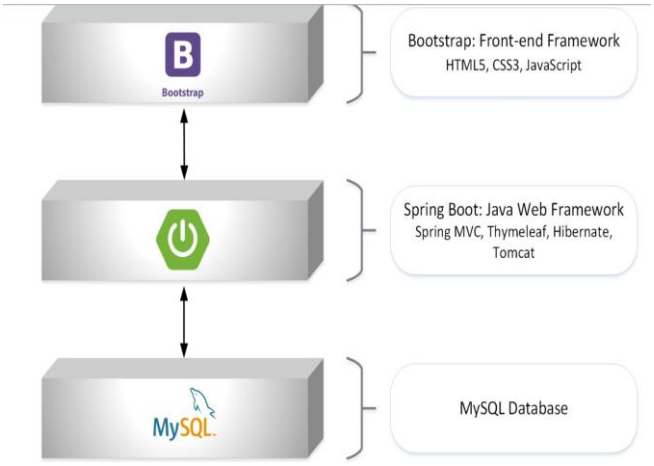

Figure 5

Bootstrap is used a front-end framework in this project. Basic web technologies like HTML is used to create buttons, text fields that would store the data entered by different persona(s) like users, restaurant owner and admin in the frontend. CSS is used to style the static HTML pages. JavaScript used to add dynamic nature to the application and therefore event handling is done inside the application. Middleware is implemented by the SpringBoot technology. The backed is built using MySQL database as specified in the system design section, MySQL is used to store and retrieve the data whenever there's a requirement to all the persona(s) of the application.

VIII. USE CASE DIAGRAM

Figure 6

User logs into application after successful authentication which is used to know if the user details provided are valid or not. The base use case "login" is associated with an "includes" relationship with the "authentication" use case. "Prebook food" is also associated with the user. Final use case in the application is "collect food" which is also associated with the user. Restaurant owner is associated with

"add food" use case which is having an "includes" relationship with the "invokes trigger" use case because each time food is added by the restaurant owner, user associated with that particular zip code are being notified by an e-mail. Admin is associated with use cases like "add vending machines", "view vending machines" and "maintaining vending machines". These use cases aren't exposed to either user or the restaurant owner to safeguard the integrity of the application. "Login" use case is a use that is common to all the persona(s) inside the application. All the three persona(s) have this functionality of logging in and implement their respective tasks in the application.

IX. Screenshots from the Application

A. *Admin Adding Vending Machines*

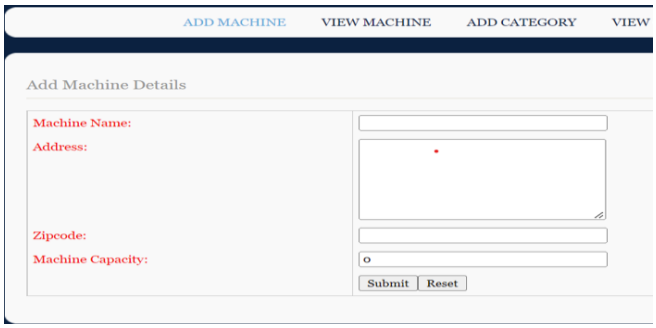

Figure 7

Once admin logs into the application proving his/her credentials, vending machines can be added in the application. As told earlier, this can only be done by admin.

B. *Restaurant Owner Adding Food Giving The Zip Code As A Parameter*

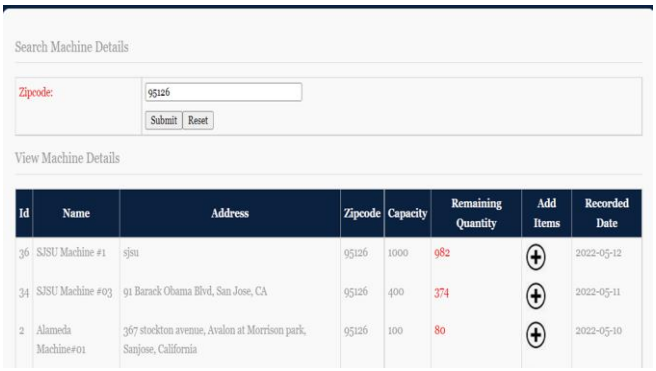

Figure 8

Restaurant owner can only add the food by giving the parameter called zip code that gets the list of the vending machines along with name of the machine, address of the machine and the machine ID. From the list that's generated, any vending machine can be selected and processed further to add food. That's when it triggers all the registered users with the specific zip code about the same.

C. *Restaurant Owner Adding Food in the Vending Machine*

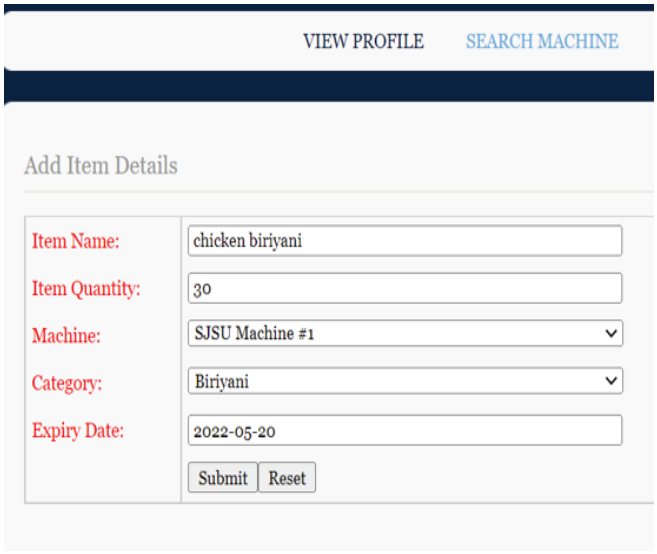

Figure 9

Restaurant owner can add food providing the details as shown in the above figure, like item name, item quantity, machine, category and expiry date of the food item.

D. *User Entering Zip Code To Make A Booking*

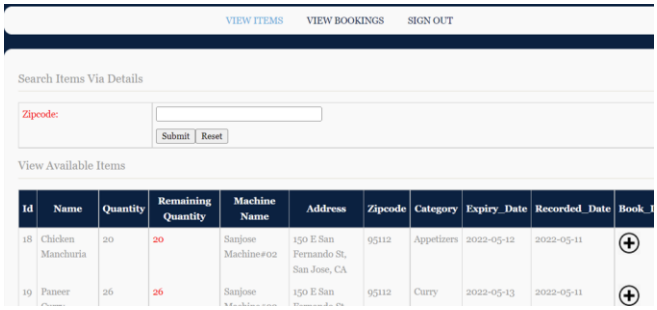

Figure 10

User enters a zip code to search food items besides, he/she getting notifcation for availability of food in a particular zip code that the user belongs to.

E. *User Can View Bookings Made*

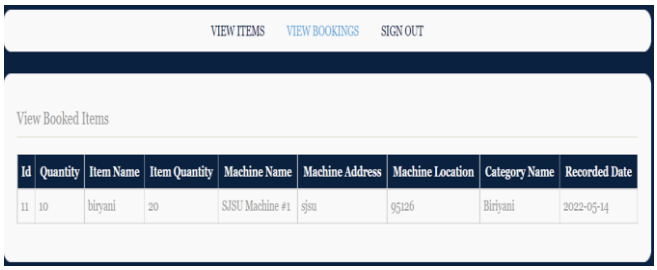

Figure 11

User can view bookings made after he/she has made a booking by entering a particular zip code and selecting food from the listed vending machines available that come under a specific zip code.

F. Registration Of Restaurant Owner

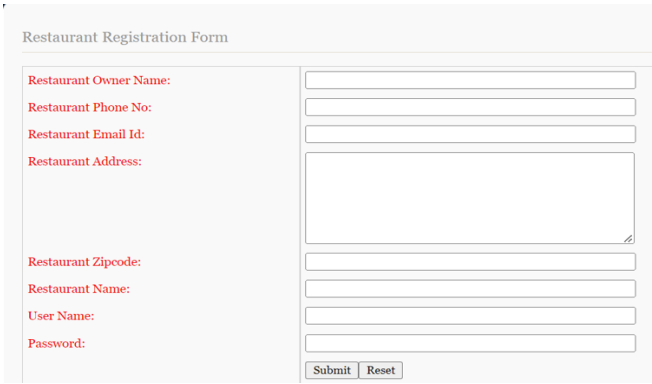

Figure 12

Restaurant owner has to register in the application in order to add food by entering a particular zip code. Once registration is done, he/she can login into the application using credentials.

G. User Getting Notified

Figure 13

User gets notified by an e-mail as triggering mechanism used here is an e-mail system. All the registered users of particular zip code gets notified about the addition of food in a vending machine located in the zip code given by the restaurant owner.

REFERENCES

[1] https://www.today.com/food/vending-machines-homeless-will-dispense-free-food-t119374

[2] https://www.vending.com/vending-machines/food-machines/

[3] https://ieeexplore.ieee.org/document/5530240

[4] https://www.forbes.com/sites/brucelee/2016/04/22/current-and-future-trends-in-vending-machines/?sh=3ec699c5127a