Sustainable Food Waste Management

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Abstract – **Sustainable Food Waste Management is a web-based application designed to help feed the hungry across shelter homes by collecting surplus fit-to-eat food from restaurants. To start with, restaurants can sign up on this website and let us know what type of food and their quantity, quality etc. they want to donate. Next up, the volunteers can register on our website, who voluntarily would collect food from restaurants and deliver it to shelter homes.**

Keywords – Restaurants, Volunteers, Shelter homes, Node js, Machine Learning, JavaScript, Mongo DB

I.   Introduction

The American restaurant industry has a big food waste problem. A 2014 study by the Food Waste Reduction Alliance found that 84.3% of unused food in American restaurants ends up being disposed of, while 14.3% is recycled, and only *1.4% is donated*. Here are some disturbing facts which we came across:-

- A single restaurant disposes of more than 50 tons of organic waste every year.
- Food waste is 76% organic and can be recycled
- Meanwhile cost of food has increased 8%
- 27 percent of all food is thrown out, which works out to a pound of food every day for every American.
- Full service restaurants waste more food than fast food eateries. Food scraps make up 66 percent of restaurants' trash, compared to 52 percent at fast food places. [1]

Upon our survey conducted on many restaurants in San Jose downtown, we observed some key trends that were currently being followed. Some of them were reluctant to admit that they waste their food, some said they judiciously distribute left over food amongst themselves and some were not aware that they could donate their food for charity.

Hence it was our aim to educate many restaurants and other shelter homes that we have adopted the mission to end food waste, especially since so many people across the country suffer from a lack of access to high-quality food.

We have developed 'Alambile' – a web-based application, a budding environmental organization that has planned to help feed the lesser privileged, through several volunteers to bring about global awareness of the issue.

This report will give details regarding the architecture, technology, and workflow expected for this proposed solution.

II.   Architecture

This application is build using MongoDB, Node, React and JavaScript) as shown in Figure 2.1.

The users in our application are the Restaurants and Volunteers who can register on the website. The users' data entered on our website gets stored onto our application's backend database – i.e. MongoDB.
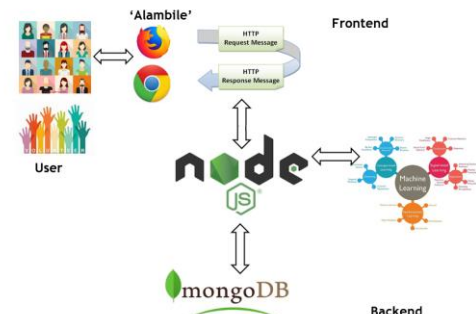

Figure 2.1 : Application's Architecture

The backend and frontend applications are executed through Node executable files. These programs help host our web application.

As a future enhancement, Machine Learning algorithms can be integrated with the current flow to provide some useful statistics to the restaurants like what kind of food gets perished easily, what type of food could be donated the most.

Also, in future Shelter Homes can request what type of food, quantity, category on our website, so that we can match the food category from restaurants and deliver to shelter homes accordingly.

III   Application User Interface

First time viewers can view our website to know more about us. The homepage is designed in such a way to attract potential restaurant owners and volunteers to sign up for this noble cause – Alambile as shown in Figure 4.1
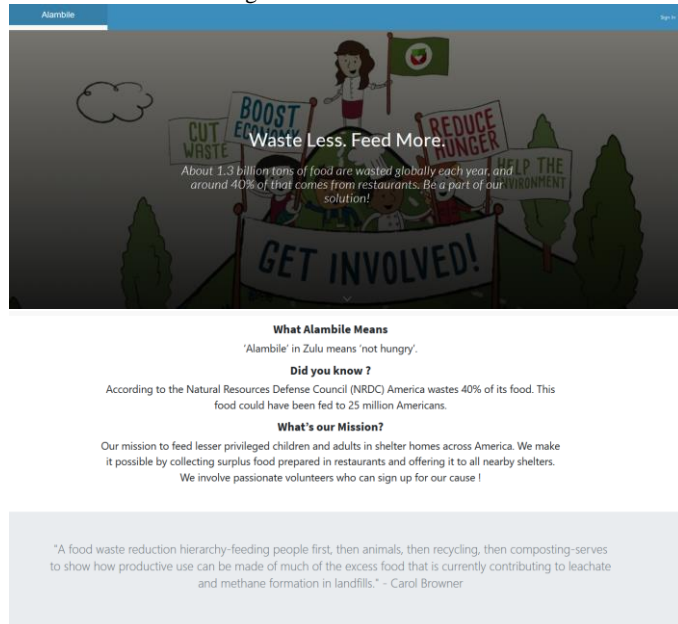
Figure 3.1

i.   Restaurant dashboard

After registering as a Restaurant, the website takes owners to their dashboard, where they can upload a picture of their surplus food, stating the quality, quantity and its shelf life etc. The restaurants can wait for Volunteers to accept request to collect their donation request as shown in Figure 4.2 and Figure 4.3
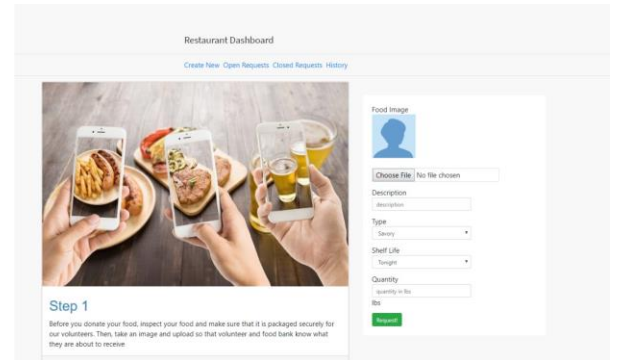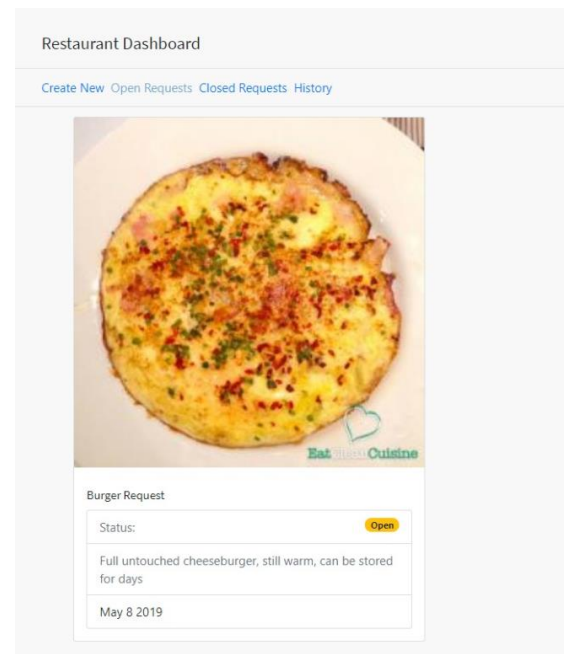

Figure 3.2 Restaurants Dashboard Features

Figure 3.3 Restaurant Dashboard Features

ii.   Volunteer Dashboard

The Volunteers, on their dashboard can view different open requests and can chose which restaurant to collect food from, at their disposal. These volunteers can also view their map, the different locations where they can pick up food and the shelter homes where they can deliver collected food as shown in Figure 4.4.
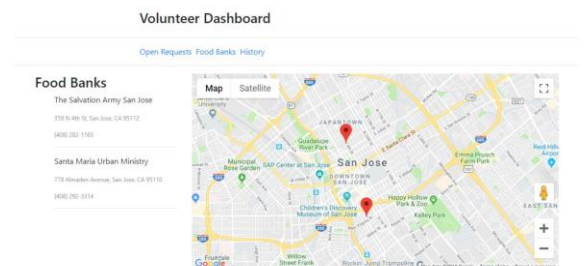

Figure 3.4. Volunteer dashboard features

iii. Volunteer Dashboard – Request Status

In addition to the location of different restaurants and shelter homes on their map, the volunteers can also view the request from restaurants and match their QR code on their mobile devices with the restaurant owners so that the latter would verify genuine volunteers based on QR code as shown in Figure 4.5.
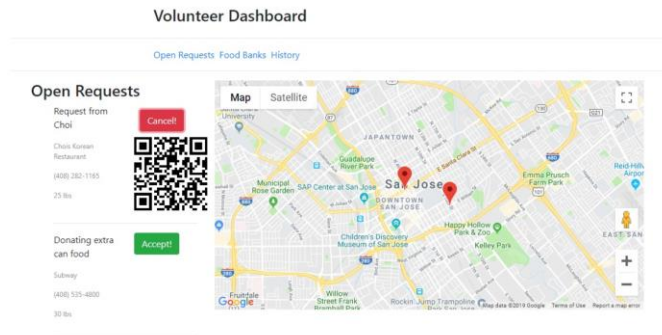

Figure 4.5 Volunteer request status

IV.   Future Enhancement

We plan on using Machine Learning algorithms to help both the restaurants and the shelter homes.

When the restaurants upload their excess food in the form of image, we plan to run an image classifier at the backend to identify the type of food uploaded and predict the shelf life of the food. This would enable the shelter homes to decide how efficiently they can distribute the food donations they receive . We also plan on leveraging machine learning algorithms to provide some useful statistics to the restaurants. Thus, these statistics made by machine learning based prediction engines can be used to analyze historical orders and make recommendations about how much the restaurant should cook to minimize excess food waste.

V.   Conclusion

The web application is useful to those restaurants and volunteers who want to donate generously thereby contributing to our noble cause. This website gives those restaurants a platform to request collection of surplus fit to eat food, who were unaware of this cause and those restaurants who can judiciously give away their food prepared in kitchen without being skeptical about Health Industry concerns.

VI.   Acknowledgements

Thanks to Professor Ranjan for providing the suggestion to survey various restaurants and giving us ideas and feedback.

VII. Project Repository

GitHub : https://github.com/kavyadayanand/cmpe_272

VIII.   References

[1] Green Eco Services

http://www.greenecoservices.com/food-waste-in-restaurants/