

Food-For-All Web Application for Donation Management

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ABSTRACT

Food is a vital need for all human beings. But in the current society, many people cannot afford or fulfill their daily food requirements. Many people want to help people who are in hunger, but the problem is there isn't a good and trustworthy platform to get information and connect the donor and the receiver that is available for Sri Lanka. The application's main purpose is to bring together individuals who have excess assets and liabilities and are eager to give back to the community to help those who are in need and willing to accept help and also provides a platform to post about those in need of food and other related things. Another advantage of this system is that it allows organizations to create funds within the system and raise funds for their charitable projects related to food insecurity and improving agriculture. The system always tries to avoid fake and fraudulent donations and requests by asking the approval of the admins. It also helps in improving the reliability and the trustworthiness of the users of the system. For an example organizations need to be verified by the admin to use the system. Also, each fundraiser program created by the registered organization will be reviewed by the admin before publish it in the system.

Keywords— Donation Management, Food Insecurity, Poverty, Fundraising, Donator, Nutrition, Food Donation, Web Application

I. INTRODUCTION

In this study, it has been developed a web application to stop food insecurity. There are more than 829 million people in the world who are undernourished. Due to covid-19 pandemic and other crisis situations the number of people who are starving increased rapidly. With the lack of food, it often results in malnutrition which children and women become mainly vulnerable.

People use computers and mobile phones in their day-to-day life, our application can be used from both mobiles and computers. The most common reason for food insecurity is poverty. Through our application users can create donations based on what they can give, users can

create requests if they know someone who needs support, and organizations can organize fundraisers and other campaigns to end hunger and promote sustainable methods to overcome food insecurity. The whole platform is managed by an admin to avoid scams and any other not related information from publishing. The total goal of our application is to end hunger, help people who are in need, and gradually create sustainable agriculture to overcome food insecurity.

II. LITERATURE SURVEY

The paper 'Surplus food donation' [1] which was published in 2021 discusses how food can be preserved and how a sustainable approach can be taken through it. As a result, this study compared the effectiveness, carbon footprint, and rebound effect of a food donation system run by a charity in Sweden to those of anaerobic digestion.

'Food Donation Portal' [2] is a paper published in 2017 by students of Thakur Polytechnic, Mumbai, India. This paper summarizes the evolution of food donation activities and provides a medium for donors to connect with NGOs. They have suggested an internet-based application to donate leftover food to people who are in need. The paper discusses food wastage in India and how organizations can be connected to preserve and help people in need.

The paper 'Giving to the giver' [3] describes implementing a donor nutrition education system. The paper was published in 2019 and their objective is to increase the nutritional value of food sent to the food bank by donor organizations using a Red-Yellow-Green (RYG) scale. They have gone through the Southeastern Virginia region to assist with the widespread problem of food insecurity.

III. RELATED WORK

- *'Food Donation Connection' Food Wastage Management Application*

‘Food donation connection’ is a website [4] that manages excess food and gives them to people who are in need. ‘Food Donation Connection’ manages food donation programs for restaurants that want to donate food. The donation process is based on donors receiving financial benefits through tax savings, as well as involvement in community and corporate goodwill. The problem with this application is, only restaurants can be donor and they must also team up with a charity organization.

• **‘Share the Meal’ Donation and Fundraising Application**

‘Share the meal’ is a donation and fundraising web application [5] where users can donate money to buy a meal for someone who is in need. There are fundraisers also created to help people and also to create sustainable agriculture. Users can donate money for a single meal and the minimum amount is 0.80 US dollars. The issue with this website is the user can donate only money to others to buy a meal, they cannot directly contact the person and help them.

some food. Donators can also get the location of food banks and donate food to them. The application is only available in the USA.

• **Application for Reducing Food Waste in India (No Food Waste)**

It is a food recovery and waste management network [7] that collects surplus food from individuals and businesses and gives those to people in need. They even collect food from weddings, parties, and other events. Only a call with the location is required from the organization and they come and pick up the food. They also have a vehicle name ‘Foodiva’ made especially for excess food collection.

IV. METHODOLOGY

To access the system, users need to be logged in to the system. After successful login, users can access the features of the system. Mainly there are three user roles in this system. They are Organization, Requester, Donator, and Admin.

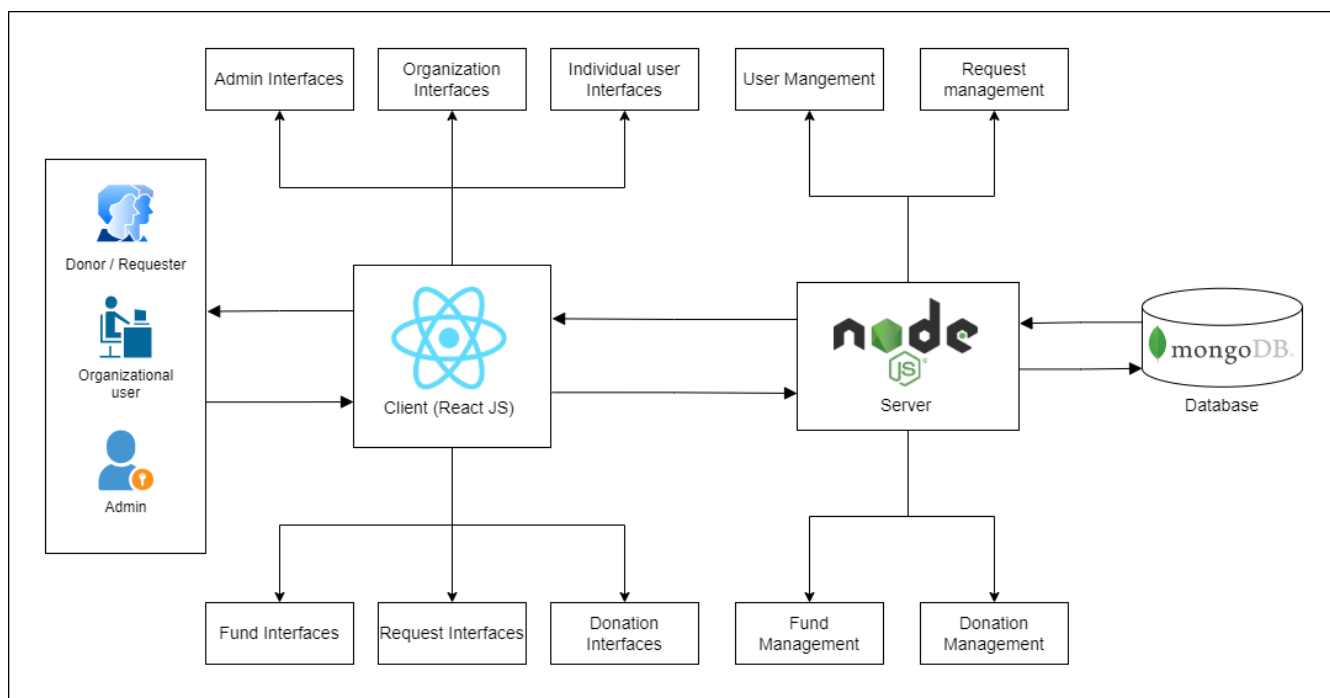


Figure 1: System Overview

• **‘Feeding America’ US Hunger Relief Organization**

About 33 million people in the US are suffering from hunger due to food insecurity [6]. ‘Feeding America’ is an organization that connects with food banks, food pantries, and local food programs to help people. It helps to connect with local food banks and people can get their location and grab

To access the system as an organization, the organization should be registered with the system providing the right details. Then admin should review the details. If the admin approved the organization details, then only the organization can log in to the system. After successful login Organization can create fundraiser programs. The fundraiser programs also need to be

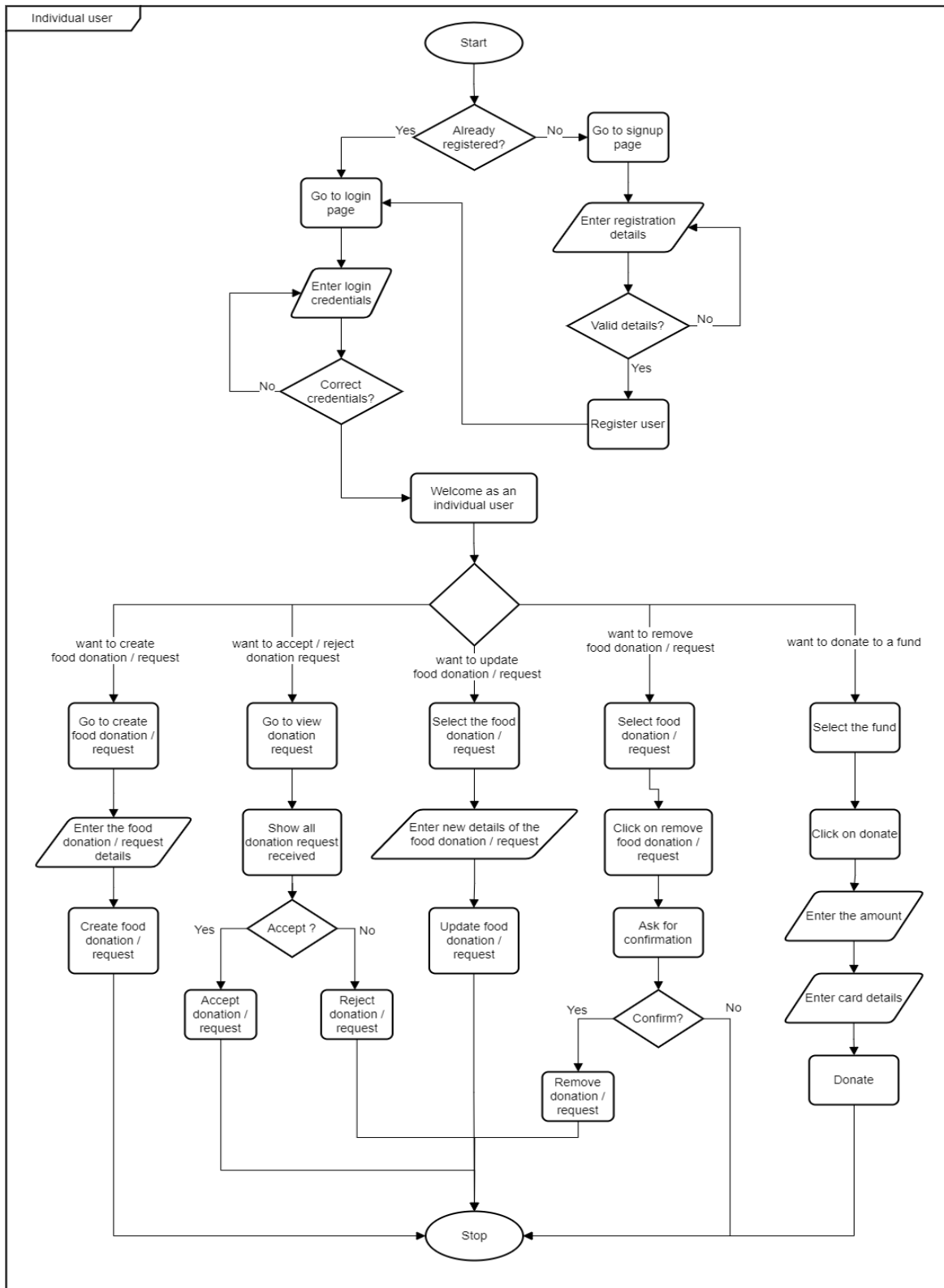


Figure 2: User flow of Individual User

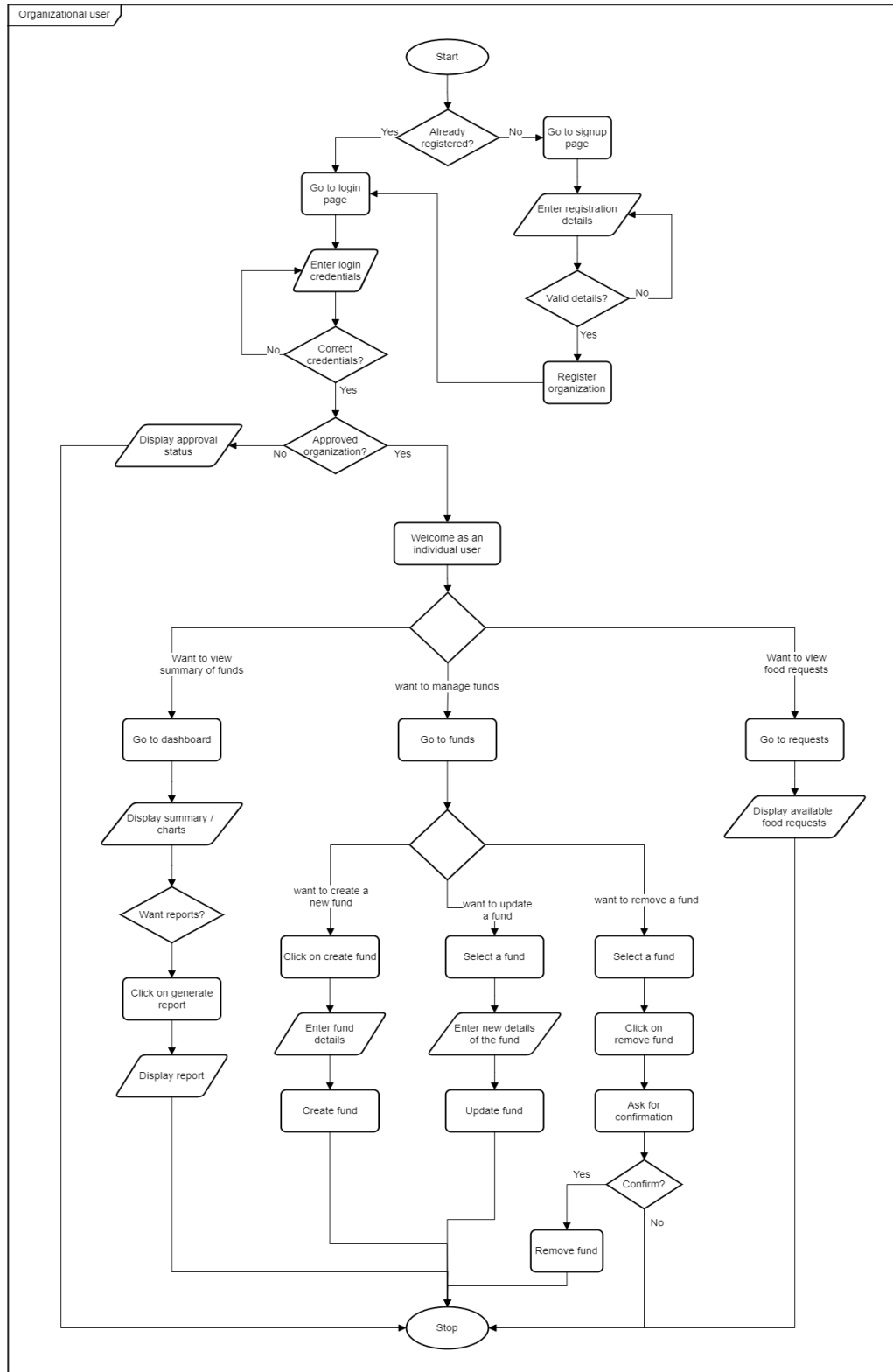


Figure 3: User flow of Organizational User

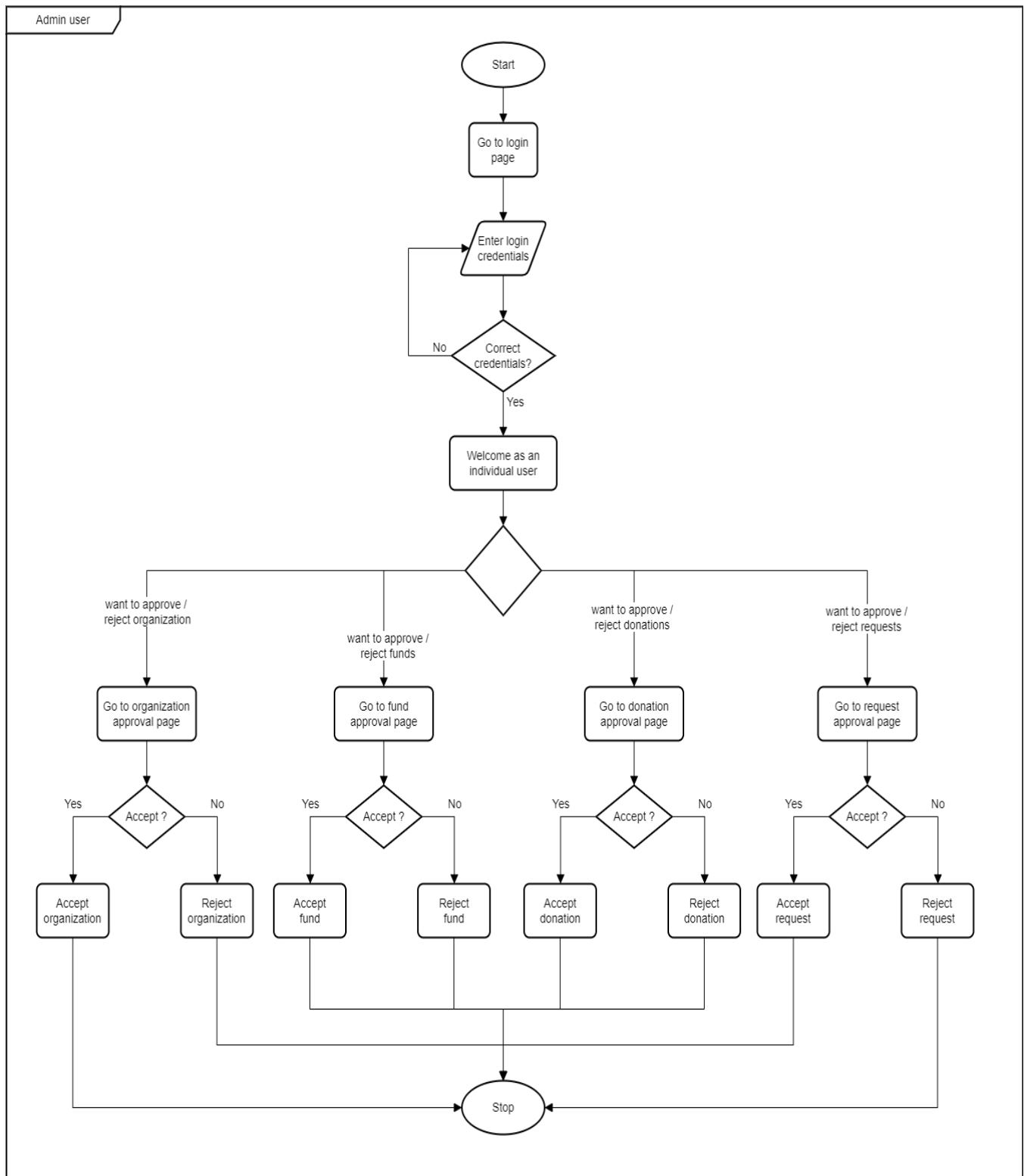


Figure 4: User flow of Admin User

verified by the admin. If the admin approved the fundraiser program, all the other users can see it. To donate, Donators should register to the system, and then, donators can donate to the above fundraiser programs. And also, if the user logged in as a requester, they could post donation requests. All the other users can see them.

A. Technologies

The system overview [Figure 1] shows the technologies used in the application. For the client-side implementation, ReactJS was used. Bootstrap is the UI library, and some third-party libraries were used to develop features like report generation and API connections. The backend server is developed with NodeJS and ExpressJS. MVC architecture was used when implementing the server. The Cloudinary server handles the image uploads. MongoDB acts as the database of the system. MongoDB cloud was used to store the data of the application.

B. Proposed System

The proposed system is a web-based system that serves as a platform for people who want to donate food to those in need. This proposed system will eliminate all disadvantages of the current donation system and benefit all users. The system has four types of users. These users are,

- Individual user:
 - Food requester
 - Donor
- Organization
- Administrator

Food Requester

The food requester is a stakeholder who submits their food requests via this web-based system. Two types of food requesters use this system to raise their food requirements.

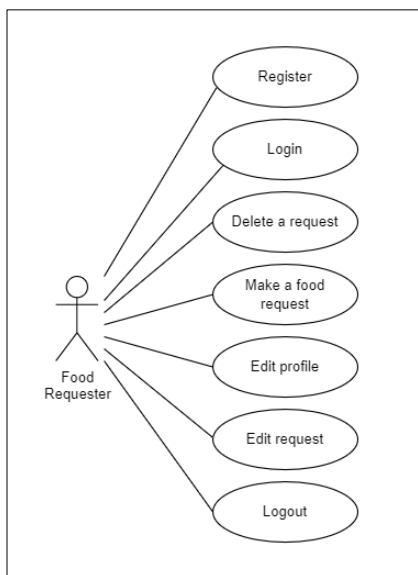


Figure 6: View all requests

The first is the requester who requests food or other related items for himself/herself. The other requester is the one who makes food requests for needy people who cannot afford their food needs.

Requesters can make food requests by filling out a simple food request form. This includes all the request's necessary details as well as the beneficiary's information. When compared to other donating platforms, requesters can freely and without hesitation request their needs through our platform.

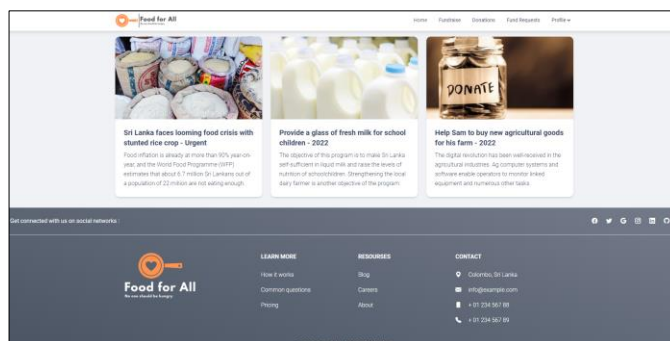


Figure 5: Usecases of Food Requester

The above [Figure 6] shows the Food requester's basic functionalities that operate in the web-based system.

When considering the advantages of using this proposed system for donation management, requesters can easily request their funds, and also, they can save time and money. Because there's no organizing cost because these fund requests are raised through an online platform. And the number of donations may increase because user engagement is much higher than physical events.

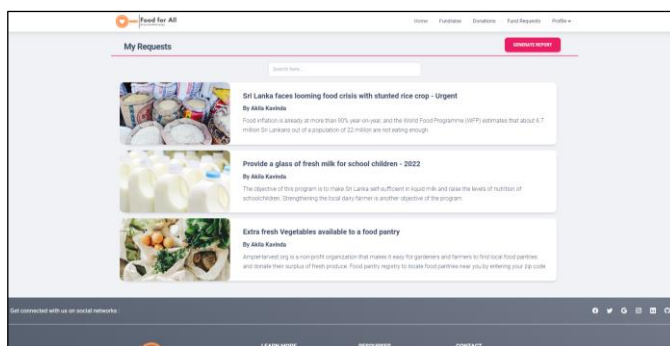


Figure 7: View my requests (Individual user)

The above interfaces show all the fund requests requested by the requester [Figure 7] and the view of all fund requests posted by users. [Figure 5].

Donor

People in need of food, agricultural goods, or financial assistance for food can upload their offer to be donated using the web-based system, which includes images and basic information. Donors can donate for the food requests raised by the requesters and the fundraisers raised by organizations. The most important thing is this system allows donors to post about their extra food and then they can donate them to needy people who cannot afford their food requirements. Also, the food requester and the donor are separate user roles, but a user can be a donor and a requester at the same time. When a user logs in and posts a request for asking some food requirements and at the same time donates to some needy people. So, the requester and the donor will act as a user, and it has 2 user roles.

When compared to other platforms, donors have the freedom to donate and raise food requests via this platform.

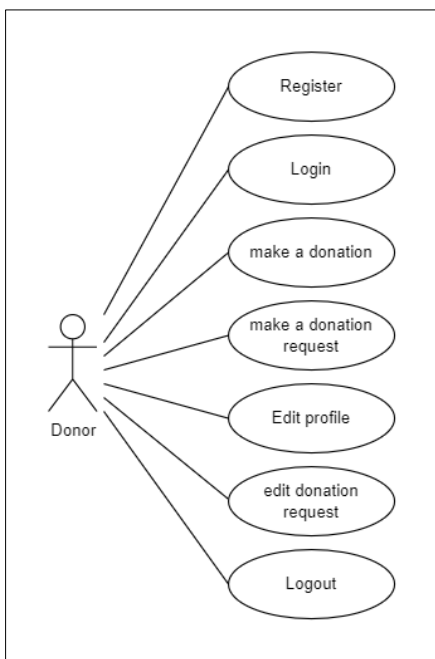


Figure 8: Usecases of Donor

The above use case [Figure 8] shows the Donor’s functional activities. These are the basic functionalities that donors can operate in the web-based system.

When considering the advantages of the system for donating, It also saves time for the donors because sometimes physical donation programs may little bit time-consuming. To get rid of that problem, the online platform is the best way to handle donations. Not only that but also another advantage is the security of the system when making donations.

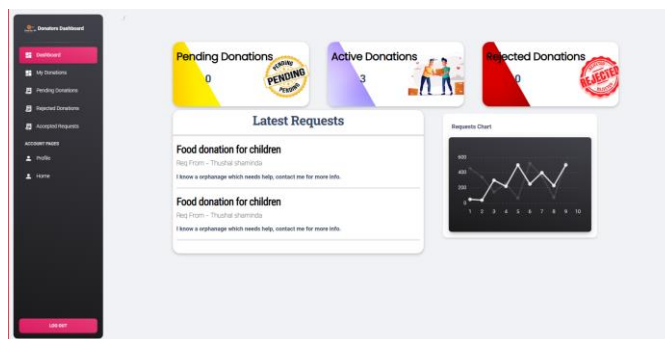


Figure 9: Dashboard (Individual user)

This interface [Figure 9] displays the donators' dashboard. The user can view the active donations, pending donations, and rejected donations. Users can also view the latest requests received for his/her donations. There is also a chart showing the statistics of the requests sent to the donations. The donator can navigate to other tabs using the side navigation. This interface is used to give the user some brief information about the donations they have created and about the requests they have received. The user can move on to specific functionalities through the side navigation.

Organization

Organizations can collect funds from individual users rather than other users. Organizations must verify that they are genuine organizations and ensure their registration. The system will ask for the organization's registration certificate to confirm it. Organizations must be approved by the admin user before raising a fund in this system, otherwise, they cannot raise funds in the system. This procedure is used to prevent the registration and fundraising of fake organizations. It also improves the reliability of individual users.

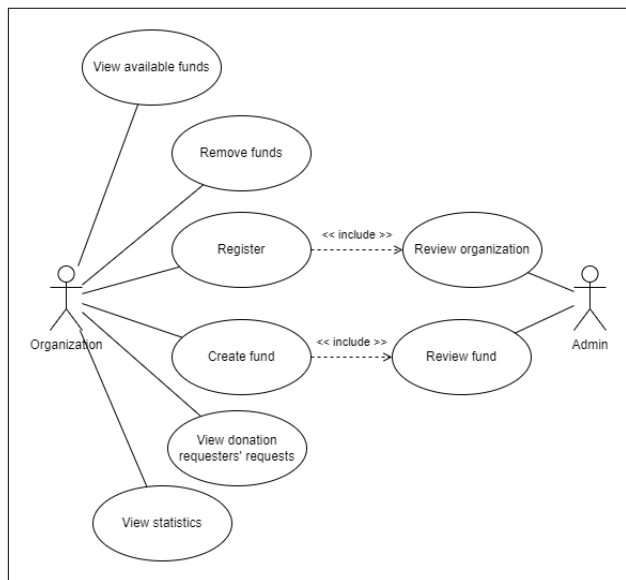


Figure 12: Usecase for Organizational User

After admin approval, organizations can create fundraisers for their charitable projects related to the main goal of the system. Organizations should mention the title of the fundraising project, the goal, a brief description, and the amount of funds required for the fundraising project. Created fundraisers also need admin approval as this app wants to maintain its main goal of ending hunger.

The use case diagram shown above [Figure 10] depicts the functionalities of the organizational users. In the registration process, the admin will review the registration form as well as the fund creation process. Other than that, the organizational users can view available funds, remove funds, view donation requesters' requests and view statistics of the funds.

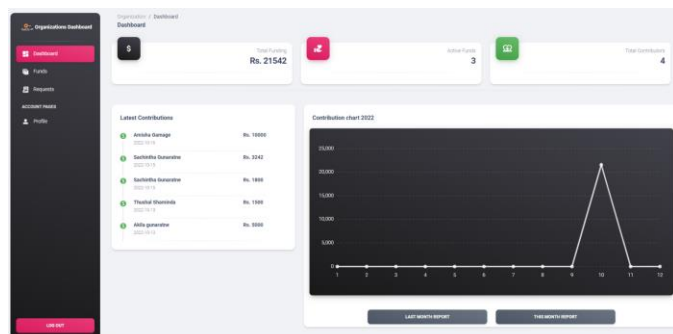


Figure 10: Dashboard (Organization)

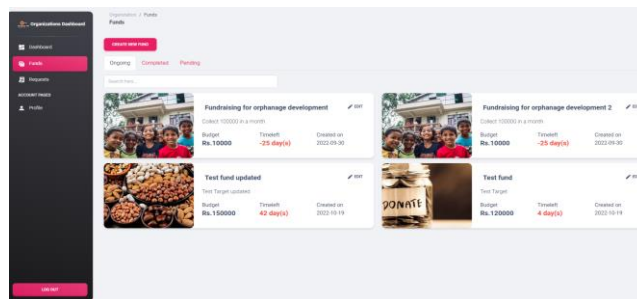


Figure 11: Created funds by the Organization

The above [Figure 11] is the dashboard of the organizational users and there they can see a summary of their funds and collected amounts. Also, they can see the latest donations they have received from the donors, and a chart of received donation amounts each month. In the bottom of the chart there are two buttons that can use to generate reports for the current month and the previous month. That report can be used to analyze the data of each fund.

The other interface [Figure 12] shows the funds created by the organization. There are three types of funds: ongoing, completed, and pending. Ongoing funds are the approved and currently, active funds of the organization, and the completed funds have received the expected amount of funds for the project. The pending tab on that page shows the created funds of the organization, but not yet been approved by the admins. If an organization user updates an approved fund, it also moves to the pending status and shows in the pending tab of that page.

System Admin

The system admin manages and controls the system and also can review the created donations by the donator. If they meet the requirements and after admin guarantees that it is not a fake donation the donation can be accepted and if it is not acceptable the donation will be rejected. The requester's requests are also reviewed by the admin to make sure that they are not scams.

The organization registration process and created fundraisers are also reviewed by the admin, the admin can view the organization registration certificate and he/she can determine if the organization is reliable. The admins' functionality helps to make the system more trustworthy.

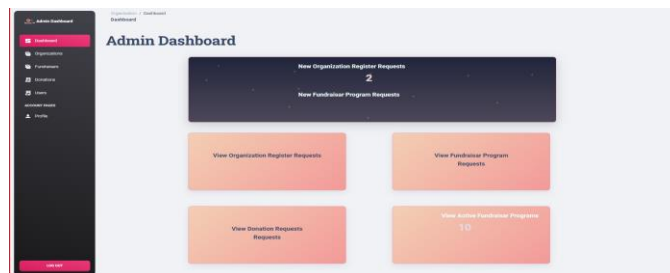


Figure 13: Dashboard (Admin)

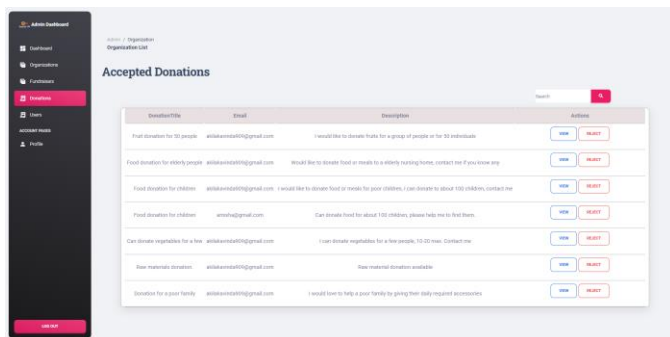


Figure 14: Accepted Donations

The above interface [Figure 13] shows the admin dashboard. It contains organization register requests, fundraiser program requests, donation requests, and the number of active fundraiser programs. The above interface [Figure 14] shows the list of accepted donations. The admin can view these donations by clicking on the view button.

V. DISCUSSION

This donation management system was developed to achieve food security for all the people who face problems in finding meals. This system will encourage donators to donate more by making trustworthiness because many actions of the users of the system will be monitored and reviewed by the system admin. For example, each organization will be reviewed before registering with the system. Then only approved organizations can post fundraiser programs. Each fundraiser program will be reviewed by the admin. So, irregularities are hard to be done in this system. Therefore, donators can donate to the fundraiser programs without any hesitations.

For this system developed, used the MERN stack as the technology. For the front end, used ReactJS, and for the back end used ExpressJS and Node.js. All the data is stored in the MongoDB database. Some libraries like Axios, mongoose, and express are used. Bootstrap, material icons, and other external CSS are used to stylish the user interface. Interfaces are simple and user-friendly. We used side navigations, menus, various icons, and buttons to easily navigate and understand.

VI. CONCLUSION AND FUTURE WORK

Based on the results of the research conducted, it can be concluded that a ‘Food for All’ web application has been successfully implemented. The main objective of this project was to build a platform to connect donators and requesters and help organizations to promote their fundraisers and eventually help to make sustainable agriculture. As an overall of the developed system users can

create donations, send requests for donations, create fundraisers, donate to fundraisers, and many more features are also included. As a result, the proposed system will aid in the fight against hunger and will serve as an excellent kick-start to this project at the outset for those eager to assist those in need.

In the future,

- **The system will be globalized.**
Make the application available worldwide so anyone can help and find the needed people from anywhere in the world.
- **Increase the security of the application.**
Adding two-step verification to our system will help make the application more trustworthy.
- **Add food banks to the system**
Addition of food banks to our application so if the users cannot find someone to donate, they can give the food to a food bank, and it will also help to manage food wastage.

This application will help to overcome hunger and eventually build sustainable agriculture, thereby permanently resolving hunger issues. That contributes to making the world a better place for all people.

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