

FOOD DONATION SYSTEM

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INTRODUCTION

Approximately one-third of all food produced globally is lost or wasted, amounting to roughly 1.3 billion tons per year. This wasted food could feed 2 billion people annually, highlighting the immense potential of food donation to address hunger and food insecurity. However, traditional food donation systems often face challenges like:

- Lack of transparency and coordination: Donors and recipients may be unaware of each other's needs and resources, leading to inefficiencies and missed opportunities.
- Logistical difficulties: Collecting, transporting, and distributing food requires significant resources and coordination, which can be a burden for smaller organizations.
- Limited data and reporting: Tracking the impact of food donations and identifying areas for improvement can be difficult without robust data collection and analysis.

This project aims to address these challenges by developing a comprehensive Food Donation System (FDS). This system will:

- Connect donors and recipients: Facilitate communication and collaboration between individuals and organizations involved in food donation.
- Streamline logistics: Provide tools and resources to optimize food collection, transportation, and distribution processes.
- Improve efficiency and effectiveness: Enhance the overall efficiency and effectiveness of food donation efforts, leading to reduced food waste and increased food security.

1.1 PURPOSE

The primary purpose of the FDS is to address the challenges of food waste and food insecurity by facilitating efficient and effective food donation practices. This system aims to achieve several key goals:

1. Reduce Food Waste:
The FDS connects donors with recipients more effectively, ensuring that surplus food is directed towards those who need it most. By reducing the amount of food that goes to waste, the system contributes to a more sustainable food system and minimizes the environmental impact of food production and disposal.
2. Increase Food Security:
The FDS empowers individuals and organizations serving food-insecure communities to access the nutritious food they need. This increased access to food promotes better health and well-being, particularly for vulnerable populations.
3. Improve Data and Reporting:
The system collects and analyzes valuable data on food donations, providing insights into the volume, type, and impact of these efforts. This data can be used to optimize donation programs, measure progress, and identify areas for further improvement.
4. Empower Stakeholders:
The FDS provides tools and resources for all stakeholders involved in food donation, including donors, recipients, logistical partners, and policymakers. This empowers individuals and organizations to make informed decisions, contribute to the system's success, and collectively work towards a food-secure future.

5. Enhance Efficiency and Effectiveness:

The FDS streamlines the entire food donation process, from matching donors and recipients to coordinating logistics and tracking donations. This reduces administrative burden, optimizes resource allocation, and maximizes the impact of food donation efforts.

1.3 INTENDED AUDIENCE AND READING SUGGESTIONS

The FDS will primarily benefit the following users:

- Food donors: Individuals, businesses, and organizations with surplus food to donate.
- Food recipients: Food banks, shelters, soup kitchens, and other organizations serving food-insecure communities.
- Logistical partners: Transportation providers, volunteers, and other parties involved in food distribution.
- Policymakers and researchers: Individuals and organizations seeking to understand and improve food donation practices.

1.4 PROJECT SCOPE

The scope of the FDS project encompasses the following key areas:

1. Functionality:

- Donor Management: Registering and managing donor information, including contact details, food type and quantity available, and preferred recipient criteria.
- Recipient Management: Registering and managing recipient information, including contact details, type of food needed, serving capacity, and eligibility requirements.
- Logistics Management: Facilitating transportation and distribution of donated food, including scheduling pickups and deliveries, tracking food movements, and managing logistics partners.
- User Management: Managing user accounts, authentication, access control, and role-based permissions.

2. Technology Stack:

- Front-end: Web-based user interface
- Back-end: Server-side infrastructure, database management system

3. Data Management:

- Secure storage and management of user data, donation information, logistics data, and reports.
- Implementation of data security best practices to protect sensitive information.
- Integration with existing data management systems, if applicable.

4. Project Deliverables:

- Fully functional FDS application with all core functionalities outlined above.

2. REQUIREMENTS SPECIFICATION

2.1 FUNCTIONAL REQUIREMENTS

Functional Requirements specify the functions and capabilities the Food Donation System should provide. Some examples include :

1. User Registration/Login - Donors or Agents can sign up or login to the system using their credentials. Secure user authentication mechanisms are implemented.
2. Making Donations - Donors can request to make donations by providing necessary details. They also have access to a dashboard for checking donation status.
3. Collecting Donations - Agents can collect donations by accepting them. They have access to a dashboard to check collection status.

2.2 INTERFACE REQUIREMENTS

Define the interactive and visual aspects of a system.

1. User Interface - clean and intuitive interface.
2. Navigation - easy navigation with a clear content structure, quick access to the dashboard.

2.3 PERFORMANCE REQUIREMENTS

Outline the expected performance features.

1. Database Performance - efficient database management for efficient system performance.
2. Scalability - system should handle a good number of users and should efficiently manage their data.
3. Response Time - pages should load easily.

2.4 DESIGN CONSTRAINTS

Specify limitations on the design.

1. Browser Compatibility - support for major browsers.

2.5 NON-FUNCTIONAL REQUIREMENTS

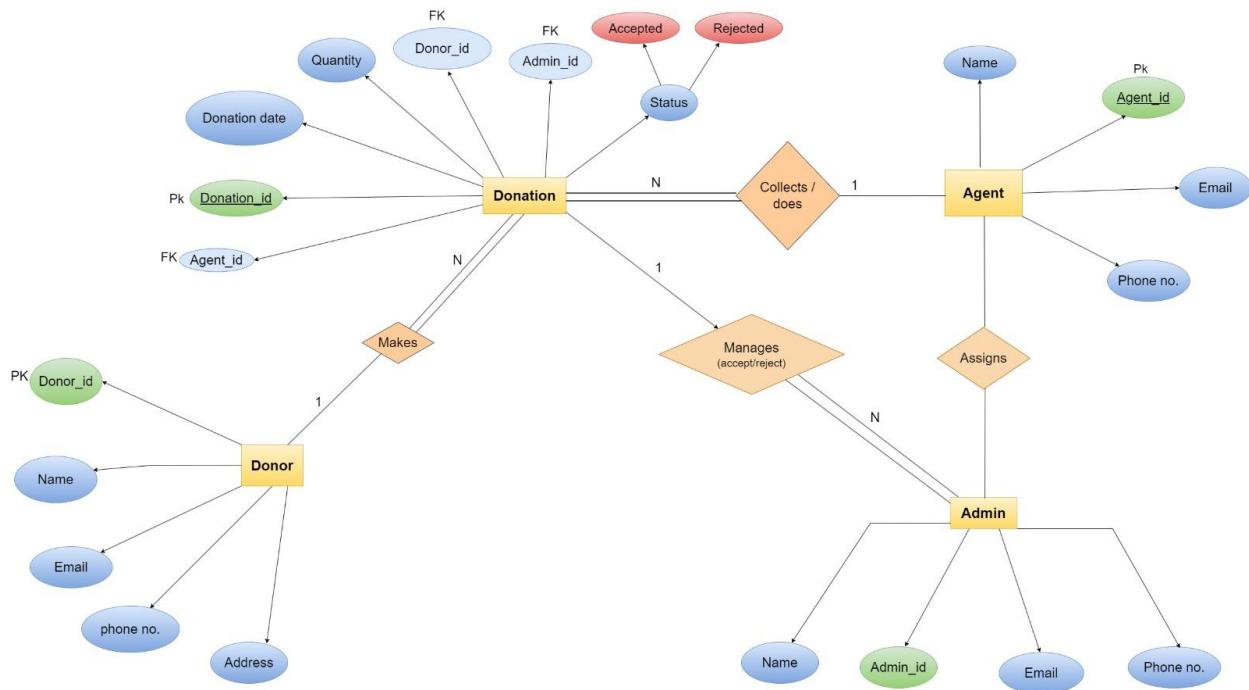
Includes behavioral aspects of the system apart from its functionality.

1. Security - implementation of secure authentication.
2. Reliability - system should be reliable.
3. Scalability - system should be scalable.

3. DESIGN

3.2 LOW-LEVEL DESIGN

3.2.1 ENTITY RELATIONSHIP DIAGRAM



Entities: -

Donor:

Attributes - Donor_id(pk), Name, Email, Phone no, Address

Agent:

Attributes - Agent_id(pk), Name, Email, Phone no, Address

Admin:

Attributes – Admin_id(pk), Name, Email, Phone no, Address

Donation:

Attributes – Donation_id(pk), Donation Date, Quantity, Status(accepted,rejected),Donor_id(fk),
Agent_id(fk), Admin_id(fk)

Relationships: -

Donor makes Donation

- 1 to many
- A donor can make multiple donations, but each donation is associated to a particular donor

Agent collects/does donation

- Many to 1

- An agent can collect or make multiple donations, but each donation done or collected will belong to a particular agent

Admin manages donation

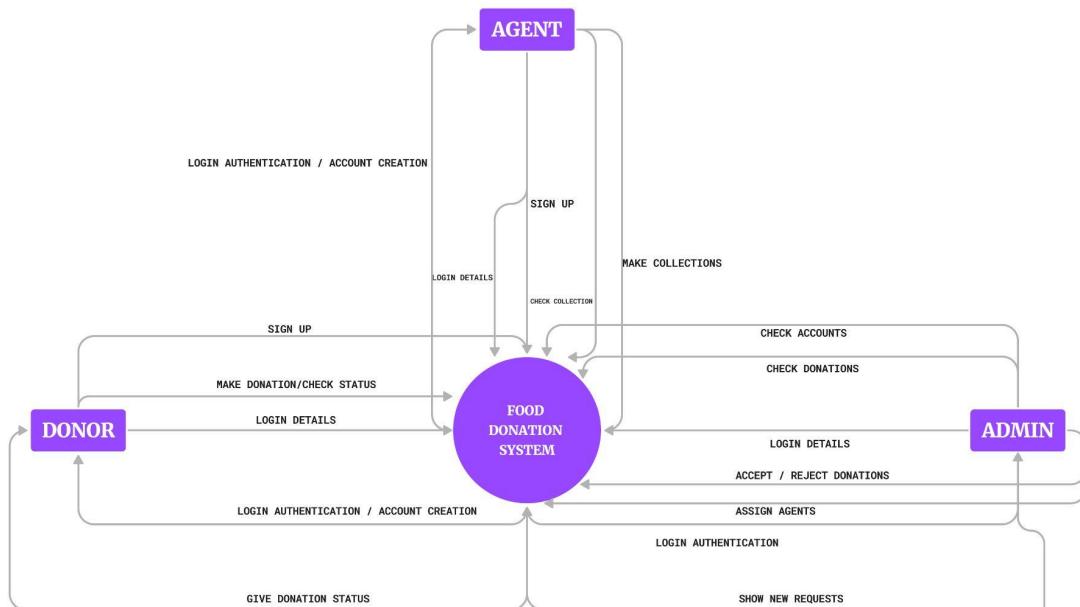
- Many to 1
- An admin can manage multiple donations, but a particular donation is managed by a particular admin

Admin assigns agent

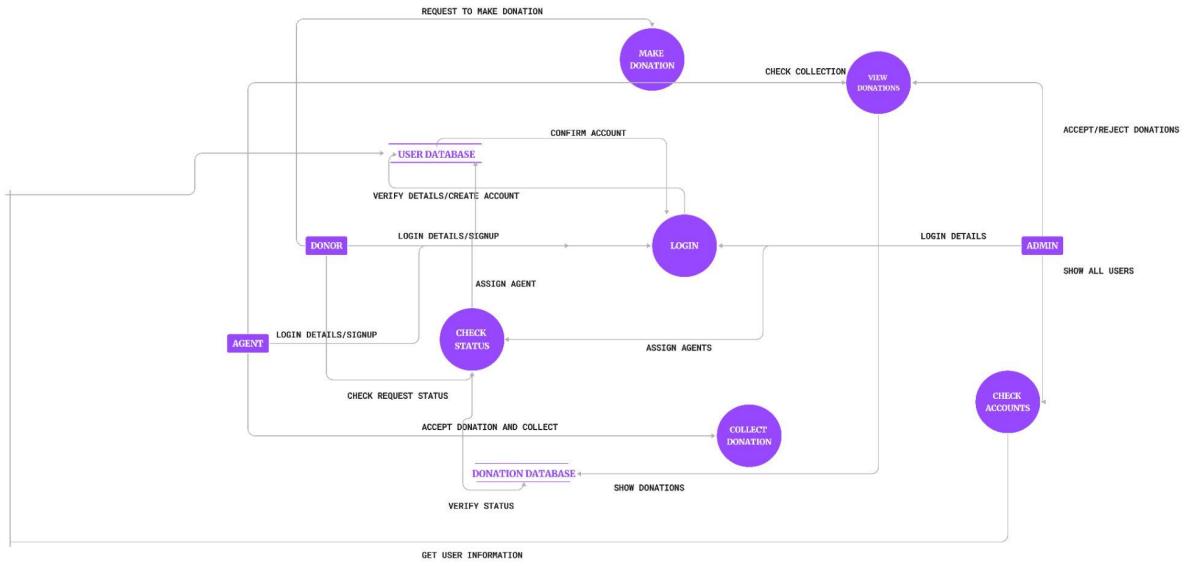
- 1 to 1
- An admin can assign a single agent for a donation, and an agent assigned is done by a single admin

3.2.2 DATA FLOW DIAGRAMS

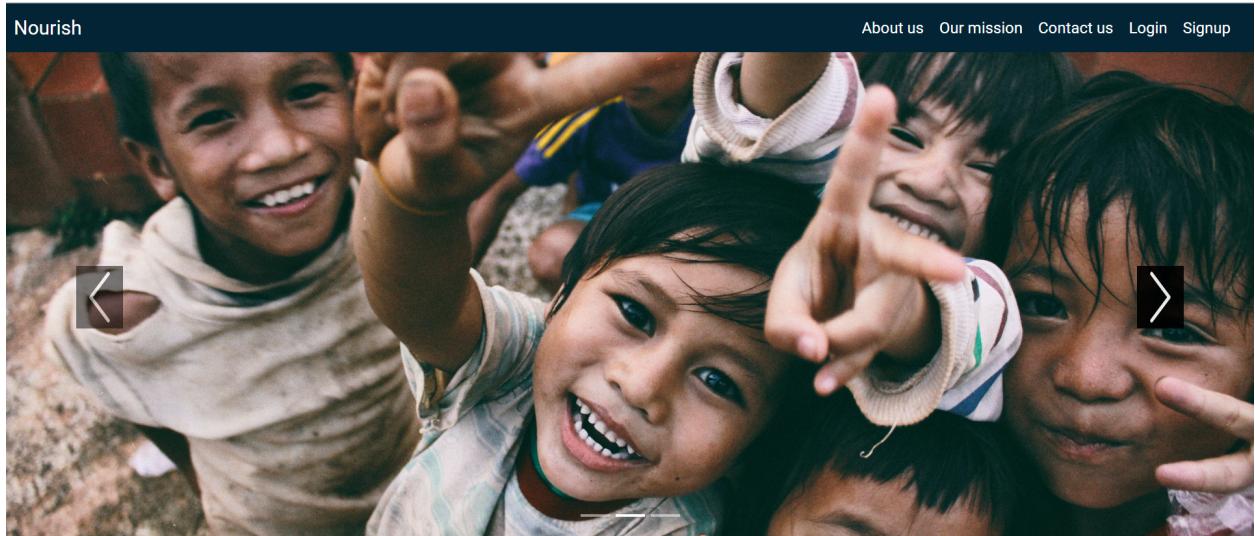
LEVEL 0 DFD

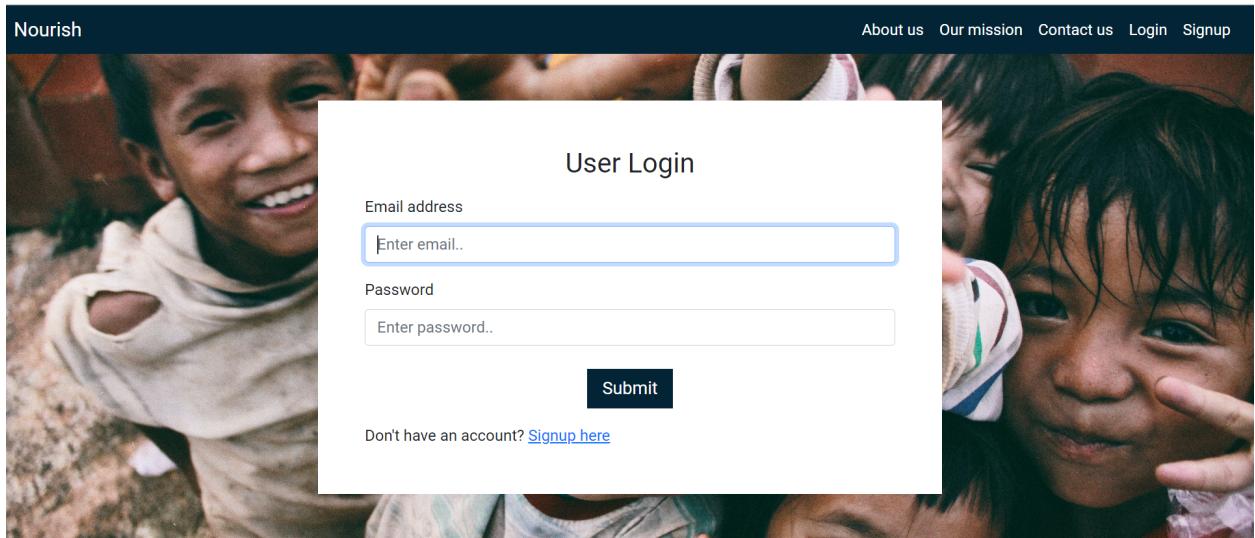


LEVEL 1 DFD



3.2.3 USER INTERFACE DESIGNS





A screenshot of the Nourish dashboard for user Arshiya. The left sidebar shows a welcome message "Welcome Arshiya" and links for "Dashboard", "Donate", "My Pending Donations", "My Previous Donations", "My Profile", and "Logout". The main area is titled "Dashboard" and displays three summary cards: "0 donations by you" (green), "0 donation requests not processed yet" (blue), and "0 donations accepted and to be assigned to agent" (green) and "0 donations not collected yet" (red).

4. METHODOLOGY/IMPLEMENTATION

4.1 FLOWCHART OF WORKING APPLICATION

Donor/Agent Registration :

1. Donor/Agent initiates the registration process.
2. System asks for required information like email address, password, name.
3. Donor/Agent provides the information.
4. System validates the information and creates a new user account.

Donor/Agent Login :

1. Donor/Agent enters login credentials.
2. System verifies the credentials.
3. If the credentials are valid, the user is logged into the system, otherwise, an error message is displayed.

Check Profile :

1. Logged in donor/agent can update/check their profile information.
2. The system then updates the account information.

Make Donation/Check Donation Status :

1. Logged-in donor navigates to the specified section on the dashboard.
2. If a donation is to be made, the donor enters the required information.
3. The donation request is generated till the time it is not accepted/rejected by the admin.

Collect Donation/Check Collection Status :

1. Logged-in agent navigates to the specified section on the dashboard.
2. If a collection is made, the agent accepts it.

4.2 WORKING AND IMPLEMENTATION OF THE APPLICATION

Frontend :

- Developed using EJS for a responsive and interactive user interface.

Backend :

- Built with Node.js and Express.js
- MongoDB used as the database for storing information

4.3 GITHUB LINK FOR THE APPLICATION

<https://github.com/swarnil870/Food-donation-system>

6. FUTURE WORK

1. Feedbacks

Feedbacks from donors for agents and feedbacks from agents for donors can be incorporated into the system for efficient working.

2. Donor Accessibility

Donors can be provided with alternatives in case the agent does not reach to make the collection on the specified date and time.

3. Mobile Application

Dedicated mobile application can be developed for a better experience.

4. Integration with NGOs

Collaboration with NGOs can be done to create a platform for donors and social-workers to engage in donation activities directly, thus, making the system more efficient.