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WHERE SURPLUS MEETS PURPOSE A HYPERLOCAL DONATION PLATFORM

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Abstract - *Relink is a localized upcoming application meant to address the surging issue of surplus products in the trash heap. The system allows the users to register and log in safely, which ensures that every exchange is safe and authenticated. Users have an option of donating things by filling out a form. formulated form following a logging in that requests information. regarding the type, quantity of the item and condition. The "Receive" section is where other users or non-governmental. such donated items can be seen and owned by organizations. according to their needs. Search filters of the site. improve the user experience and efficiency by helping the user to. locating certain items fast. ReLink's robust backend, based on Spring Boot and a PostgreSQL database, and its current frontend, which is made using HTML, Tailwind CSS, etc. JavaScript, ensures smooth storage, retrieval and data. secure authentication. by pairing donors with needy. the platform not only minimizes the amount of people and organizations. not only does it waste but encourages participation among the locals, social. accountability, and a solution that would scale and can be improved. in the future with such functions as analytics, gamification, and admin approvals.*

1.INTRODUCTION

In the modern world that is rapidly moving we simply do not have the means to redicate properly so, much of the unused stuff which can be used, food, clothing, books and furniture among others just rot in the trash heap and cannot find any efficient means of redistribution in the busy world today. In spite of the fact many organizations and individuals are ready to give all surplus goods, there is no reliable and united system, which would help to properly find new patrons and non-government organizations, 1 need. The gap inspired the development of ReLink, a web-based platform that is hyperlocal, aimed to bridge the gap between the donor and the recipient.

1.1 Historical Background

The issue has been the wastage of goods in the garbage bin and particularly in the urban areas over a number of years. Informally food, clothing, books and furniture were thrown away or given out and this usually caused inefficiency and misappropriation. Whereas, Feeding India, GiveIndia and ShareTheMeal had a focus on food assistance, local product sales or donation on the websites such as OLX and Quikr sold or donated local products via technology. The re-allocation of apparels and furniture was supported by the help of such websites as TurtleBag and GoodCycle. Most, not all of them, were not in favor of different kinds of items, the local interest, and the right user verification.

To overcome these problems, ReLink was created to provide a centralized and secure, hyper localized ecosystem. The user can create an account, log in and make donations and receive donations within a short time. The site used is HTML to make sure that its operation and data security is smooth. Tailwind CSS, JavaScript, Spring Boot and PostgreSQL ReLink shares the waste in a responsible way and minimizes the quantity of waste by a mixture of a wide range of item categories and authentication. It is a contemporary activity of taking advantage of the majority resources.

2. LITERATURE REVIEW

The idea of waste minimization through the assistance of redistribution has been researched by a number of authors and applied to a number of digital platforms. Although the majority of the extant systems are designed to bridge between donors and recipients, the distance and scope of technology and targeted systems are highly likely to vary. Both ShareTheMeal and Feeding India are focused on food delivery and reducing hunger, but their analogs like OLX and Quikr will possibly contribute to purchasing and selling used products most of all. Though these systems reduce wastage, they have the tendency of handling specific areas, and they lack the holistic approach, which can be applied hence covering all types of excess resources.

2.1 Meal Match-A food donation platform

Vishaal A. K. and Mahisha S. in their paper Meal Match: A Food donation platform (2025) will focus on minimizing food waste by matching the donors with the needy and the local NGOs. The site will assist users primarily to give excess food through an online system where the level of donations is calculated and collections are ensured in a timely manner. Nevertheless, the system lays emphasis on food donations as opposed to other needs such as clothing, books, or furniture. It does not also have a high level of features such as user verification, gamification, and moderation of an administrator to avoid abuse. Also, the functionality of the platform in terms of personalization and interaction is relatively low, so it is not as versatile in terms of extensive use by communities as more comprehensive systems such as ReLink.

3. LITERATURE REVIEW

Current Methodology Ten thousand meal matching, After Stars, and other AI-based food donation applications are just some of all the currently existing dining donation and management systems utilizing standard methods with little to no coverage. The typical issues noted are:
Restricted Item Scope Most platforms do not focus on any other types of things, including clothing, books, or furniture, but solely focus on food donations.
Weak User Verification This is usually the case where the donors and receivers are not checked which may lead to fraud or abuse.
Minimal Hyperlocal Matching Inefficient redistribution and delays result from many systems' lack of fine-grained location-based filtering.
Absence of Interactive Features Current strategies barely ever rely on gamification, rewards, or engagement tools in order to make users willing to make regular contributions.
Limited Search & Filtering The usability reduces as a user cannot well search and filter objects by several categories.
Security Issues: Unauthorized entry and mishandling of data is more probable on servers which do not go through stringent authentication process.
Inadequate Monitoring & Analytics Most of the systems provide the administrators with very minimal data with regards to donations, claims, and man traffic.
Problems with scalability Scalability may result in problems where platforms struggle to handle a large user base or other categories of items simultaneously

3.1 Overview of Methodology

It was named ReLink and was effective web-based hyperlocal system which links donors and individuals, non-governmental or organizations with surplus goods (food, clothing, furniture and books). Its great aim is to minimize wastes and encourage the sharing of resources in an effective and safe manner. The approach used on ReLink is the multi layer multi level architecture since it has high level of performance scalability and maintenance. The three most important elements that the system brings together in the core are the database, frontend, and backend. Frontend is created with HTML, Tail Wind CSS and JavaScript, which make it intuitive, interactive and responsive. Tailwind CSS provides normal design system which is styled in contemporary manner and JavaScript is utilized to validate the forms, update the content and communicate with the back-end API. The backend is implemented by the use of the Spring boot, which provides a reliable and high-speed environment on how to handle the API requests and business logic.

It has a tiered structure Core business logic, including that required to process donations, to authenticate a claim and to handle user interactions, is found in the Service Layer. Entity Layer: It contains the models of users, Donations and Listing and provides consistency and order in the storage of the data.. Repository Layer communicates with the database via JPA (Java Persistence API), which permits security and performance CRUD operations. Parallel The Controller Layer responds to incoming HTTP requests and forwards them to relevant services. ReLink employs PostgeSQL and the H2 in the local development of database management. The database model is in normalized tables to store the information regarding the users, records of the donations and the records of the campaigns and so on effectively.

4. IMPLEMENTATION

The implementation phase aims at transforming the design and methodology of ReLink into an actual fully functioning system. This stage will involve implementing the platform to be used in practice, ensuring safety of communication between the parts, and relating the frontend, backend, and database layers. The system was created in a modular way in order to make it scalable, flexible, and easy to debug.

4.1 Implementation of Frontend

A smooth experience on all devices is guaranteed by the frontend's responsive, clear, and user-friendly design. Elements Pages for Registration and Login Permit users to register and safely log in. Before submitting, use JavaScript to implement input validation.
Page of the Donation Form Allows contributors to enter item information, including name, quantity, and category. Incorporates field validation to guarantee accurate data entry Page of the Receiver Shows the most recent donations that were obtained from the backend API. Items can be browsed and chosen by users according to location or category. Section for Search and Filtering Enables users to apply dynamic JavaScript filters to refine results. improves user experience by using real-time search without page reloads. The History Page Shows every donation the user who is logged in has made in the past. Tailwind CSS:

Provides utility classes that are pre designed and faster and more responsive to use in designing a UI. JavaScript: JavaScript is used to control the rendering of the data, API calls, and dynamic content updates. Fetch API: Fetch is a safe connection between the frontend and backend, which makes use of JWT.

4.2 Implementing the Backend

The system's backend, which handles data management, business logic, and security, is its central component. For improved concern separation, it uses a tiered architecture.

Layer of the Controller Manages HTTP requests, including those for donations, logins, and registration. Endpoints such as /register, /login, /donate, and /campaigns are mapped by each controller. Defines endpoints using annotations like @RestController, @PostMapping, and @GetMapping.
Layer of Services Carries out the primary business logic, such as managing donations, user registration, and authentication. Includes functions for processing donation entries, verifying user input, and communicating with repositories. Makes use of dependency injection to guarantee appropriate communication between the controller and repository layers (@Autowired).
Layer of Repositories Communicates with the database using Spring Data JPA. Interfaces that extend Jp a Repository are used to handle CRUD operations. Data retrieval and manipulation are accomplished through annotations such as @Repository and JPA queries (@Query).
Layer of Entities Outlines the User, Donation, and Campaign data models. @Entity, @Table, and @Column annotations are used to map objects to relational tables. uses constraints like @NotNull and @Email to guarantee data integrity. Integration of Security Secure, scalable, and stateless access is guaranteed by JWT (JSON Web Token) authentication. Flow: After the user logs in, a JWT is issued. A token has been added to the header. Every request is validated by the server. Prevents unwanted access and guarantees that only authenticated users are able to carry out donation-related tasks.

4.3 Implementation of Databases

Configuring a Database Because of its in-memory nature and quick testing speed, the H2 database is used for local development. Reliability and scalability are provided by PostgreSQL, which is used for production deployment. Switching between databases is achieved via application. properties.
Design of Entities ID, name, email, password, and role are among the attributes that make up a user entity.
Instruments ID, itemName, category, quantity, date, and userId are all included in the donation entity. Campaign Entity: Uses fields like goalAmount, description, and title to manage campaigns.

5. RESULTS AND DISCUSSION

The system performance, functionality and the usability of the ReLink platform were verified by the successful implementation and testing. The results provide the level of the collaboration between the database, frontend, and backend elements. The backend ensures the integrity of the data, its security, as well as its efficient storage, whereas the interface is simple, responsive, and accessible to everyone.

In order to ensure that the objectives of the project involving the coming together of the donors and recipients through a web-based platform were achieved, every module was implemented, tested, and validated.

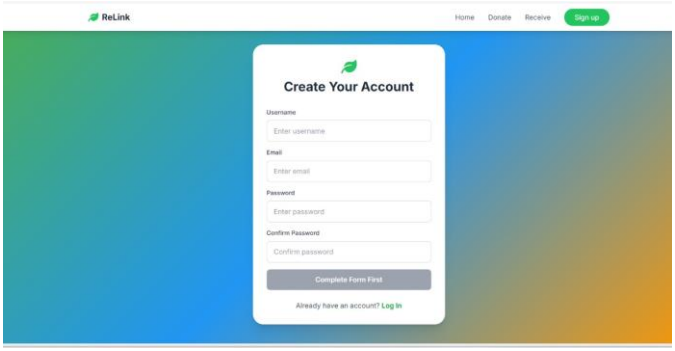

Fig -1: Registration Page

5.1 Registration Page Description:

New users are able to create an account with the registration page by inserting their name, mail address, password, and role (Donor or Receiver). To develop the frontend form, HTML, Tailwind CSS, and JavaScript are utilized in order to have a responsive layout. The form uses input validation to prevent inaccurate or missing data. When a POST request is submitted to the /register endpoint, which is operated by the Spring Boot backend, a POST request is sent.

5.2 Login Page:

The login module issues a JWT token after the successful authentication of a user. The token is stored and utilized in any future API request on validated credentials. Error warnings are also activated by non- viable credentials giving the users security and clarity.

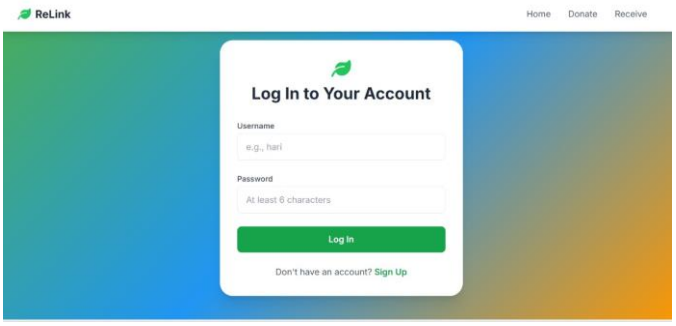

Fig -2: Login Page

Secure access control is guaranteed by the login feature. The donation or recipient modules are only accessible to authenticated users. The dependability of JWT tokens across sessions was validated through testing.

5.3 Donation Page

By providing information like item type, category, quantity, and description, users can contribute excess items through the donation form. JavaScript was used for form handling and Tailwind CSS for layout. Following submission, the information is POSTed to the /donate API endpoint. Annotations are used to validate input fields on the front end and back end.

Different data inputs were used to test the donation process. Every submission was appropriately saved in the PostgreSQL database and retrieved via API queries. Duplicate or incomplete entries are efficiently filtered out by the system.

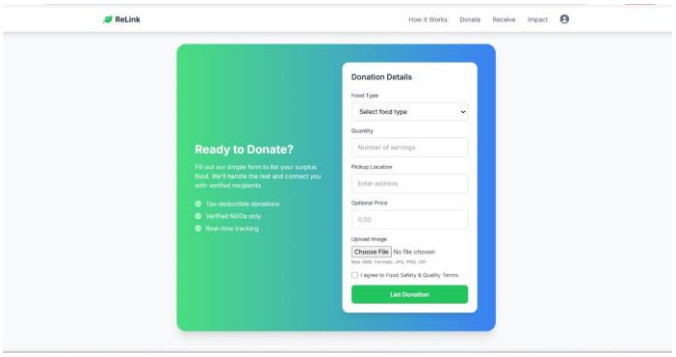

Fig -3: Donation Page

5.4 Receive Page

Receive Page Description: All of the donations that donors have listed are shown in the "Receive" section. The /donations GET endpoint is used to retrieve the data. Items can be searched or filtered by users according to availability, location, or category. Details like the item name, category, and donor details are included in every donation entry. Discussion of the Results: Since the listings of donation were dynamic, the users had access to the latest items that they could get. The filters made the browsing experience smooth as the filters worked well and did not require much time to load

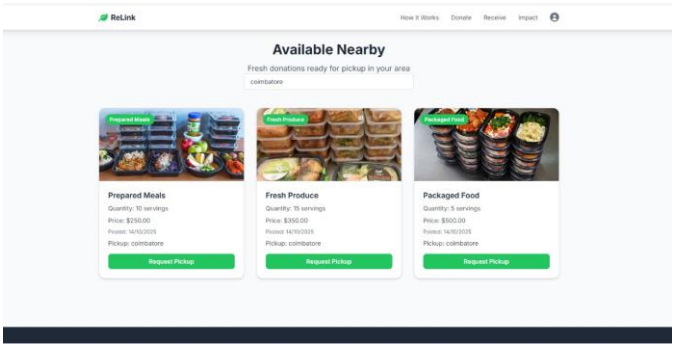

Fig -4: Receive Page

6. CONCLUSIONS

The purpose of the ReLink project was the creation of a hyperlocal platform of donation and redistribution that would connect the donors with the people or organizations requiring the excess of goods such as food, clothing, books, furniture. The project efficiently employs technology in bridging the need and generosity to promote social welfare and sustainability. The application is user-friendly and reliable in data management; and it combines a secure database, an interactive frontend, and a robust backend. Due to the combination of Spring Boot, PostgreSQL, and Tailwind CSS, ReLink is a modernized, scalable and powerful platform to use across a real-life community.

To guarantee safe, stateless user authentication, a comprehensive login and registration module was created utilizing JWT (JSON Web Token). A comprehensive donation form makes it simple for donors to send in their goods. Every entry is verified and safely kept in the database. Receiving and Filtering System: To enhance discoverability and usability, the receive section enables users to peruse and filter available donations by location and category. Database Connectivity: Testing and deployment were made easier and data handling was made seamless by the combination of PostgreSQL (production) and H2 (development).

User Interface Responsiveness: The HTML, Tailwind CSS, and JavaScript frontend provides a user friendly and responsive interface. System Security: To protect user privacy and stop unwanted access, JWT authentication, input validation, and controller-level access checks are in place.
Future Enhancements The following improvements are suggested in order to increase the system's scalability, usability, and community impact.

Claim Feature Integration Provide users with the opportunity to claim instantly donors and automatically change the availability status. Admin Dashboard with Analytics: configure an administration dashboard to track donations, authenticate them, and generate information. Payment Gateway Integration: They are safe when it comes to payment processing and allow sales of surplus inventory at a very low cost. Send emails and SMS notifying users about successful donations, item receipts, or even new donations in the area. AI-Based Recommendation System: With the help of machine learning algorithms, suggest the suitable donation to recipients, depending on their previous activity or taste.

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