MERN Stack Blood Bank Website

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Abstract: *This paper is focused on Blood blank and donor management system using modern engineering which is a modern React application named Rudhiram. Rudhiram is a web-based application which creates a link between donor and patients who needs blood. Rudhiram is built on using modern java-script front-end framework React.js, with modern state management tools like Redux and uses Node (Express.js) for back-end with new-age database like MongoDB. Rudhiram provides donors a list of nearby blood camps from its database where a person can schedule a visit and donate blood easily with no paperwork. Rudhiram also provides a list of nearby hospitals and users from its database who can provide and donate blood respectively, when a patient needs the blood of a particular type with an advanced searching algorithm it also checks for compatible blood type in hospitals and registered user too. Rudhiram provides an easy registration process for hospitals, blood banks, and blood camps with self-created API. Users can register on Rudhiram using the sign-up form, google using OAuth and can update their profile and also check their schedules and history of donated blood if, donated to get help in future. Rudhiram also provides email, message, and location services using Google-API or third-party applications for all registered hospitals, blood camps, and users so that they can be contacted when needed. It also provides a search option for users in the same state and an article page where blood information is displayed. Rudhiram can also provide the data in a categorized and standard form for further data mining which can be useful for blood camps awareness etc. The goal of this paper and web application is to reduce the latency in the process of blood donation by reducing the complexity of the management system and making blood donation and finding blood donors a smooth process.*

Keywords: Online blood donation, React.js, Redux, Restful API, Node, Mailing, Express.js, OAuth, Google, Web application, Cloud Computing, Data Analysis, JSX

I. INTRODUCTION

The MERN Stack Blood Bank Website stands at the forefront of a transformative approach to blood donation management, combining cutting-edge technology and user-centric design to address the critical need for efficient blood supply systems. With the ever-growing demand for blood transfusions, there is an increasing imperative to streamline the donation process, connect donors with recipients seamlessly, and empower administrators with powerful tools for effective resource management.

The MERN stack, comprising MongoDB, Express.js, React.js, and Node.js, serves as the technological backbone of this innovative platform. This stack is chosen for its ability to provide a scalable, responsive, and dynamic web application that can handle the complexities of blood donation management with agility.

The primary objective of the MERN Stack Blood Bank Website is to bridge the gap between blood donors and recipients, leveraging the power of real-time data processing and intuitive user interfaces. This platform goes beyond conventional blood bank management systems by incorporating advanced features such as donor registration, blood type matching, appointment scheduling, and a robust notification system.

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II. LITERATURE SURVEY

1. "A survey on Blood Bank management system" by professor Animesh Tayal, Harshad Gahre, Akshay Patel, Sagar Jog, Pratik Jain, Jaya Dhawale [5]. They have developed a website and an android app by which a solution to the ever-growing requirements of blood supply can be fulfilled. They have used JSP, Bootstrap & Java for the frontend & MYSQL for the backend 2. "CBBR Centralised Blood Bank Repository" by Ibrahim Fawze Akar, Tukur Anas Mohammad, Mohammad Ismail Z. They have developed a centralized web-based system using HTML5/CSS & JSP on WWW Platform [6]. H2 Database is used by them and has hosted it on Apache Web Server. This also supports transactions on both acceptors and donor's side, an acceptor can pay for the transfusion fee and Centers fee and a donor can also be paid for his services. 3. "Blood Donation Management System" by KM Akkas Ali, Israt Jahan, Md. Ariful Islam, Md. Shafaatpravez[7] have developed a web-enabled andmobile-based application to maintain day to day transaction in the blood bank. It creates an e information about the donor and the organization that is related to donating the blood. They have used ASP.net for the entire front-end and SQL server 2008 for the backend. 4. "Implementation of Blood Donation Application using android Smartphone" by Monika Mandole, Pradnya Jagtap, Prachi Mhaske, Sonali Vidhate [8] . They have developed an android application that is designed to store, process, retrieve and analyze the information concerned with the admin. They have used Java, JDK, GCM, database in their project.

III. EXISTING SYSTEM

As of my last knowledge update in January 2022, I don't have specific information on existing MERN stack blood bank websites. However, I can provide a general overview of the components and features that are commonly found in blood bank management systems developed using the MERN stack based on the typical requirements of such systems.

1. User Authentication and Authorization:

- Most blood bank websites have secure user authentication mechanisms to ensure that only authorized personnel (administrators, donors, and recipients) can access and manage the system.

2. Donor Registration and Profile Management:

- Donors can register on the platform by providing their personal information, contact details, and blood type. A profile management system allows donors to update their information and track their donation history.

3. Blood Type Matching Algorithms:

- Sophisticated algorithms are implemented to match donors with recipients based on blood type compatibility. This ensures that recipients receive blood from compatible donors, minimizing the risk of adverse reactions.

IV. PROPOSED SYSTEM

A proposed MERN stack blood bank website aims to integrate advanced technologies and user-centric design to streamline blood donation processes, enhance user experience, and ensure efficient blood supply management. The following are key components and features of the proposed system:

1. User-Friendly Registration and Profile Management:

- Donors can easily register on the platform, providing essential information such as personal details, contact information, and blood type.
- Intuitive profile management allows donors to update their information, view donation history, and set preferences for communication.

2. Dynamic Blood Type Matching Algorithm:

- Implement sophisticated algorithms for real-time blood type matching between donors and recipients.
- Ensure that the system intelligently identifies compatible matches, optimizing the allocation of blood resources.

V. SYSTEM ARCHITECTURE

Admin manages and supervises the working of every department and layer of Rudhiram. Admin control, create, update, delete and verify the records of users, hospitals, and blood camps as per need. All of these different modules are connected together as React components which in turn connected with Redux a state management tool. Redux provides a centralized store and the whole app is connected with this store, some components can update the state in-store and some can receive the state of the components and hence the data can easily be shared between different components of the app. API requests are handled by the Express server created using Node JS. Database connectivity is created with MongoDB using Express and all of the NoSQL queries are executed and sent back to the client in JSON format which is rendered smoothly by React. It's also used for searching algorithms handling the compatible blood type HTTP request query and hospitals or blood camps in user state. Express is also used for session management and cookies. All of the data is being stored in the database using Axios and HTTP requests. This data can be used further for medical and research related to blood. E-mail, phone call, location service is provided to the end-user of registered hospitals and donors.

VI. ALGORITHM

Express is used for the creation of the backend with Node. REST full API is created with support for get, post, delete, and update routes using Express. The API is used to server the HTTP request by the client for the transaction of data with the database. Passport and npm package is used for session management, cookies management, and password encryption (salting + hashing). Google OAuth 2.0 is implemented using passport strategy for google. Passport local strategy for authenticating client locally and session management using serializing and de-serializing tokens. A different algorithm is used for answering different queries, java-script in Express is used for this purpose.

VII. RESULT

The project is deployed and hosted on Heroku public server and anyone can visit this application at https://rudhiram.herokuapp.com/ . A detailed guide is given bellow about how the app works for different users and different purposes.

VIII. CONCLUSION

The project mainly focuses on the issue of Blood availability when someone needs it on an urgent basis and when someone wants to donate blood and don't have proper guidance for the same. The Blood Donation Management System is a 24×7 system that is essential for different kinds of people like blood donation system personnel, doctors, donors, recipients, and other general users [7]. Rudhiram provides a very efficient and advanced way for blood transfusion between hospitals/donors and patients. The purpose of the project is to simplify and automate the process of searching for blood and to maintain a centralized record of blood donors, recipients, blood donation camps, and the availability of stocks of blood in hospitals and blood banks.

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