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REDLINE– An Application on Blood Management

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Abstract:- Accidents nowadays are not so uncommon. In some cases, the person met with an accident may have a severe loss of blood and be in serious need of blood. The existing apps for blood donation only focus on registering the person with the app and the rest of the donors so that there will be an initiation for communication in between the donor and patient. This app in our abstract alerts all the nearby hospitals of the location of the accident to make ready the respective blood if it is available and if not, notify the rest of the donors available in the app. All the user needs to do is press the SOS button. The app uses GPS tracking for location and a real-time database for registering and holding the user details.

Keywords:- *SOS, GPS Tracking, Real-Time Database.*

I. INTRODUCTION

Blood management plays a pivotal role due to its paramount importance on multiple fronts. Foremost, it serves as a guardian of patient safety by meticulously minimizing the risks linked to blood transfusions. It strategically helps in optimizing the availability of individuals genuinely requiring blood. It also contributes significantly to the judicious allocation of healthcare resources, fostering financial sustainability within healthcare systems. The app ‘Redline’ is a mobile application that serves a good usage to the blood management. This holistic approach not only safeguards patient well-being but also underscores the responsible and efficient utilization of a critical healthcare asset, highlighting the essential role blood management plays in the broader landscape of healthcare delivery.

II. RELATED WORK

The study led by Khan, introduces a groundbreaking Blood Bank Management System customized for rural areas in India, harnessing the capabilities of Cloud Computing. Tailored to address the unique challenges of resource-constrained regions, the system seeks to redefine blood donation processes. It optimizes inventory management, donor information, and communication through the integration of cloud-based technologies, promising to enhance accessibility, efficiency, and overall blood bank management. By leveraging the cloud's capabilities, the system ensures real-time data availability, facilitating prompt responses to emergencies and improving the equitable distribution of blood resources. Beyond overcoming logistical challenges in rural healthcare, this model underscores the transformative potential of Cloud Computing in revolutionizing blood bank management, ultimately enhancing healthcare services in India's rural landscape [1].

Clemen Teena's study on Blood Bank Management is a crucial initiative aiming to collect and distribute blood efficiently from diverse sources to those in need. The project focuses on implementing a robust software application to streamline day-to-day transactions within the blood bank. This software will oversee donor registrations, blood collection details, and issuance records, with the primary goal of automating all blood bank operations. The system is designed to handle a significant volume of records while ensuring rapid and efficient searches for instant access to necessary information. With an adaptable design, Teena's project serves as a model for future implementation in other blood banks across the given city, contributing to enhanced and standardized blood bank management practices [2].

K M Akkas Ali's work focuses on the development of a comprehensive Blood Donation Management System, encompassing both web and mobile applications. The system acts as a vital communication tool, bridging patients in urgent need of blood with willing donors. Donors register by providing key details, including name, blood group, email, password, and precise location through Google Map integration. The mobile app ensures real-time updates of the donor's location, facilitating the automatic identification of registered donors. Visitors can efficiently search for donors based on blood group and location, accessing crucial information such as contact details and donation expiration dates. The system streamlines communication through email and mobile messages, with appointment confirmation preceding blood donation. The primary objective is to simplify and expedite the process of locating blood donors during emergencies [3].

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The study led by Aware Sachin B focuses on a web-based blood donation system designed to maintain precise records of bloodstock. In contrast to manual systems, this web-based approach addresses the challenges associated with the time-consuming process of arranging specific blood types when unavailable in a particular blood bank. This delay can have critical implications for patients, especially in emergencies where time is crucial. The web-based system offers an efficient solution, allowing users to quickly check the availability of a specific blood type in stock and provide its location. This real-time accessibility ensures prompt and effective responses to blood requests, ultimately contributing to improved patient care and well-being, particularly in urgent and critical medical cases [4].

André Smith's research explores the disparity between altruistic personality traits and the limited success of campaigns appealing to altruism in substantially increasing blood donation rates. Utilizing the concept of social capital, the study perceives blood donation as a social phenomenon intricately embedded in community contexts. Centering on Canada's national blood donation agency in two cities with notably high donation rates, the research employs in-depth interviews with staff, donors, and non-donors, along with ethnographic observation. The findings suggest that campaigns highlighting how individuals can enhance their profiles in communities and workplaces through blood donation, rather than conventional appeals to altruism, can significantly impact donation rates. This research yields valuable insights into the role of social capital in shaping blood donation behavior [5].

The study led by Sundaram utilizes data mining modeling techniques to analyze blood donor classification, extending the results to establish real-time blood donor management through dashboards integrating blood profiles and geo-location data. The implemented approach empowers decision-makers to efficiently oversee and plan blood donation activities, leveraging crucial metrics. The dashboard's scoring algorithm optimizes the allocation of budget resources, aiding strategic decision-making and budget allocation for blood donation campaigns. The real-time insights derived from this methodology play a pivotal role in planning and executing targeted and effective blood donation campaigns, ultimately improving the overall efficiency of resource utilization and management in blood donation initiatives [6].

The paper by Sultan Turhan emphasizes the pivotal role of blood donor volunteers in sustaining a dependable blood supply chain, especially during emergencies. The expectation is that blood will be readily available when needed, with volunteers being the primary source through their donations. In cases of insufficient stocks during emergencies, voluntary donors become the immediate source of blood supply. Time sensitivity is crucial, prompting health care centers to swiftly contact the nearest available donor. To address this need, a smartphone application has been developed, aiming to identify the closest blood donor volunteer and facilitate communication in emergency scenarios where blood cannot be supplied from existing stocks. The paper provides a detailed presentation of this application, highlighting its significance in ensuring prompt and efficient blood supply during critical situations [7].

The study led by Vikas Kulshreshtha conducted a comprehensive review of existing web-based information systems for blood banks, examining their features, merits, and drawbacks. It emphasizes the inefficiencies inherent in manual systems when contrasted with computer-based information systems, particularly in terms of time, labor, and cost. The study goes on to provide a comparative analysis of different existing systems, shedding light on their strengths and weaknesses. Furthermore, the paper proposes ideas for enhancing these systems, with the ultimate goal of contributing to the improvement of web-based blood bank management systems. This research aims to address the challenges faced by traditional methods and pave the way for more efficient and technologically advanced solutions in the field of blood bank management [8].

III. REQUIREMENTS

A. *Hardware Requirements*

- Modern Operating System (Windows 7 and above)
- Processor - i5 and above
- Disk Space - 4GB SSD
- RAM - 8GB

B. *Software Requirements*

- Android Studio
- Google Firebase
- Google Maps
- Java (Programming Language)
- XML (Extended Markup Language)

IV. WORKING

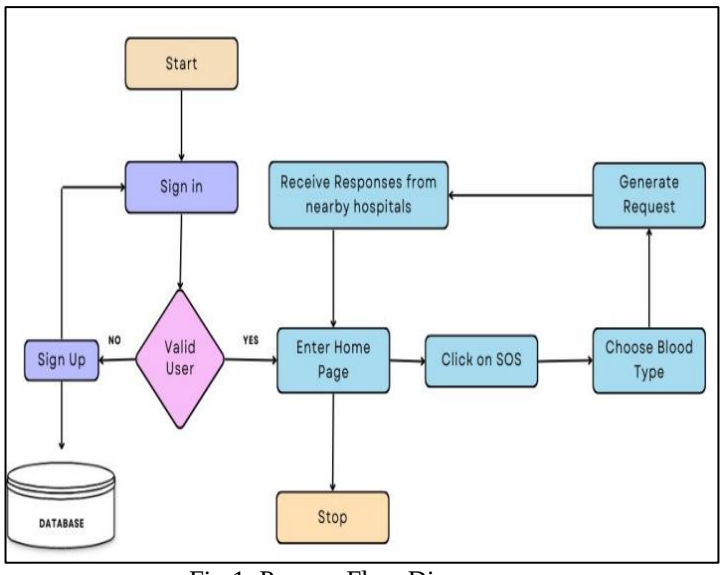

Fig 1: Process Flow Diagram

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In this section, we elucidate the working of our mobile application REDLINE. Before using the app, a user must sign in with the app. The user might be a new user or an existing user. The app works on two users –blood bank personnel and common people. Whenever a new user that comes under common people shows up, the app prompts the Sign-up page, wherein the user must enter his/her details. All the data entered by the user will be stored and secured in Google Firebase. The app's services can be enjoyed by only registered users. Whenever an existing user signs in, the user is then redirected to the homepage. Whenever a user taps on the SOS button, he/she will be prompted to enter his/her blood type. The app then sends an alert to all the nearby hospitals' blood bank personnel. Google Maps comes into play here to know the details of the nearby hospitals with the available blood type. Based on the availability, the user will be given the details of the hospital and can receive medical support within no time.

V. DISCUSSION

As mentioned earlier the application supports two types of users – Blood bank staff and common people. The former users will be approached and given privileges of the app by the administrator to provide medical assistance to the users of the latter category. The sign-in page for common people is as shown in Fig 2.

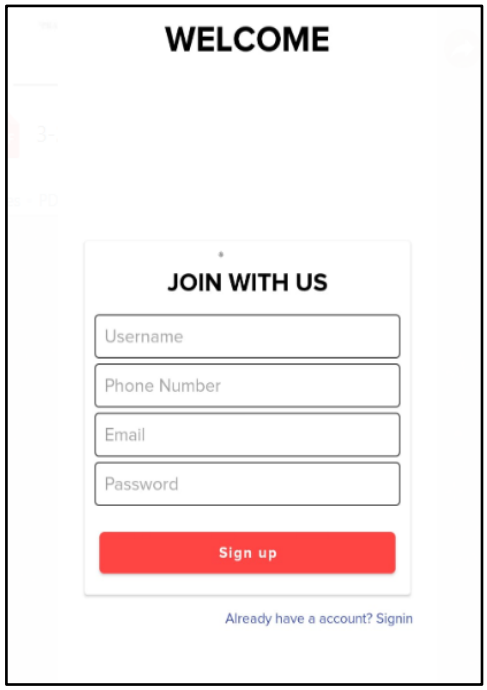

Fig 2: Sign-up Page

The user must enter their username, phone number, email, and password. After a user successfully signs up, the sign-in page is prompted to enter the username and password.

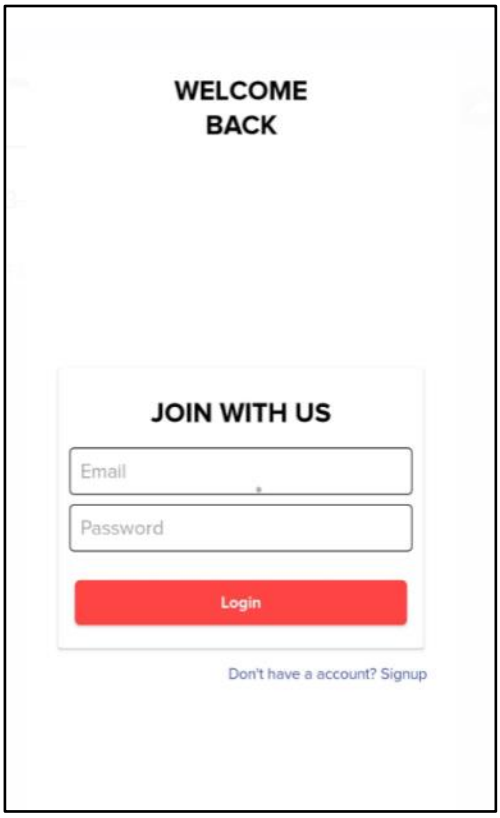

Fig 3: Sign-in Page

Fig 4 shows the home page. In this page, it shows the map and the current location of the user. It shows the nearby hospitals that have been registered to the app. The users can benefit from these hospitals.

Fig 4: Home Page

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When the SOS button is tapped, the request will be taken for the required blood type. The app requests the user regarding which blood type he/she needs as shown in Fig 5.

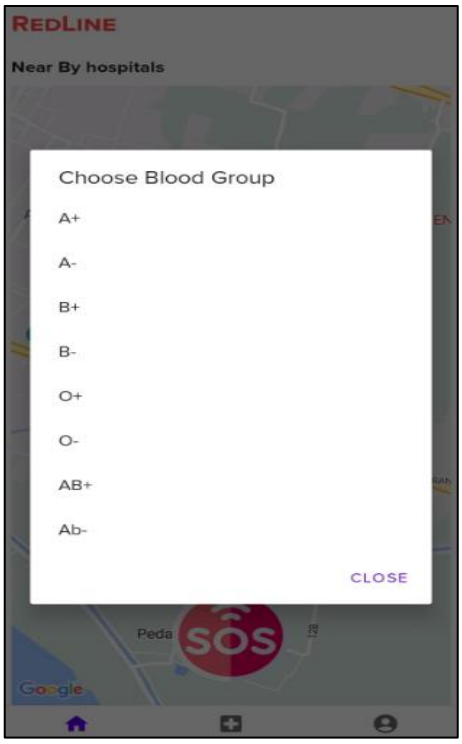

Fig 5: Blood Request

Fig 6 shows the requests that have been made by the common user. All the requests that have been received with corresponding responses are shown above the current request.

Fig 6: Request Page of Common User

After a request has been generated, the hospitals receive the notification of the blood requirement. The management can proceed with their known availability of the blood to generate a response to the user whether they have the blood or not. Fig 7 shows the corresponding page.

Fig 7: Response Page for Blood Bank personnel

The responses of the current request made by the user will be shown in this page with the hospital name and its contact number as shown in Fig 8.

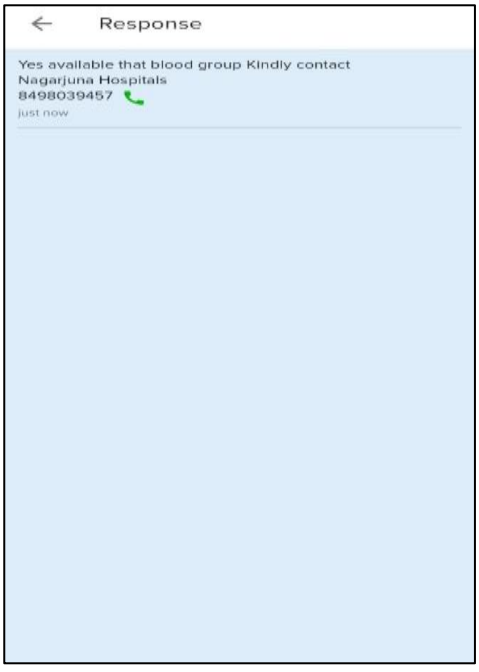

Fig 8: Response Page for Common User

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VI. CONCLUSION AND FUTURE WORK

There are many instances where many patients have gone through critical stages due to unavailability of blood. It can be either during their operation or during their blood-related diseases. Even it is difficult for hospitals to maintain the statistics of blood availability and to know beforehand about the patients who need blood. This app can be a lifesaver for those who require blood whenever they are new to a city, town, or any of their locality. By doing so it enables the doctors and other medical staff to treat patients. This app can be even endorsed further for bringing mass awareness. It can also include linking with third-party donor systems to create a network and community of blood management.

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