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SMART BLOOD BANK MANAGEMENT BASED ON GPS

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Abstract—

The paper presents a novel smart blood bank management system leveraging GPS technology to mitigate the challenges posed by blood scarcity and inefficient blood donation practices. The system employs location-based services to establish real-time connections between blood donors and seekers, enabling a more streamlined and time-sensitive blood supply. The system's architecture comprises a geolocation-based blood donor application and a centralized database. The application facilitates donor registration, profile updates, and targeted donor searches based on specific blood requirements and geographical proximity. The centralized database maintains real-time information on blood inventory, donor profiles, and blood donation requests. To optimize donor identification, the system integrates GPS and nearest neighbor algorithms to pinpoint the most suitable donors based on the user's location and blood type requirements. This location-aware approach enhances search efficiency and ensures the timely availability of blood when needed. The proposed system aims to transform blood bank management by fostering a more efficient, transparent, and reliable blood donation process, ultimately contributing to lifesaving interventions.

Keywords - Location-based Services, Geolocation based blood donar, GPS, Neighbor algorithms.

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1. INTRODUCTION

Blood is referred to be the "river of life" since it is such an important aspect of human life. Many scenarios necessitate the immediate availability of a blood donor. During these trying times, a mobile application that provides an optimal option for identifying donors depending on the user's desired area and submitting requests will be invaluable. The application is primarily designed to save time and make the process of seeking a donor as simple as possible. The application operates by allowing users to submit a request for seeking a donor using the application. The user enters the details of the blood requested, as well as their own information and the selected location, and the system sends a pop-up message to all specified users of the required location from the search results listed in the app using GPS. FCM API (firebase cloud messaging) is used to send the message. The donor's information and data are kept in the Google Firebase cloud store.

Currently, the system simply allows users to look for and browse donors; there is no reliable way to request blood other than sending text messages, which may not be the most trustworthy method. The current systems have the disadvantage that donor requests are not sent in an efficient manner because sending via text message will not capture all users' attention, and there is no feature to obtain a response from the user for the request being raised. When blood is required at the hospital, it is frequently not available on time, resulting in inconsistencies. The current state of blood donation often faces challenges due to a lack of communication and coordination between hospitals, blood banks, donors, and recipients. This communication gap can lead to situations where patients are in urgent need of blood, but suitable donors are unaware of their availability at nearby hospitals or blood banks. To address this critical issue, a comprehensive blood management system is essential to effectively connect the various stakeholders involved in the blood donation process.

The application uses a location-based search strategy to discover donors. Based on the required stated location, the programme displays the donor's data. This includes proposing contributors based on the donor's GPS location. The latitude and longitude values are used to find this place. This method provides a faster response than a text or SMS-based system, a simple database system application, or the internet. Rather, the goal of this project is to create an application that allows a user to search for a blood group directly through the app by inputting the information of the requirement in the designated location.

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This search strategy includes an application that lists all of the donor's details in the user-specified location, as well as a function to make a broadcast request to all of the listed donors, as seen below. An alert notification is sent through the application after a broadcast request is sent. Accept or decline is included in this alert pop-up notification. If the requested users accept these requests, the approved users' contact information and location will be provided and viewable through the application's "Response tab."

2. PROPOSED MODEL

The goal of this application is to construct an Android application that allows users to identify blood donors by inputting the needed blood group and location Pin code and searching via the app. The user-specified list of donors is displayed in the search results. Under the list of donors displayed after the search, there is a feature called "Request all." An alert notification will be issued to the chosen required donors when you click the "Request

Fig 1.1: System Architecture

all" button. This alert notification will be presented with the choice to "Accept" or "Decline." The users who have been asked to accept or deny the request can do so. If accepted, the accepted user's (donor's) information is communicated with the requested user via the application.

Application Gateway:

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The gateway is where a user is authenticated for the first time. In the programme, there are two sorts of gateways: enrolled logon channel and signup user gateway.

User Login Gateway:

The user login gateway is used to log into the application using the credentials that the user has registered. To log in to the application, the user must provide an email address and a password.

User Sign up Gateway:

The application's sign up gateway includes users who are new to the app. To log in, the user must first register with the application and generate a login credential. To sign up for the app, you'll need a username, an email address, a phone number, a password, a blood group, and a pin code. The user is registered in the programme after inputting the following credentials.

Application Services:

The user enters the application by either the application logon in gateway or the gateway login and searches for the required abo blood in the selected place. The list of contributors in the desired location is then displayed, followed by a tool to send requests to all of the mentioned donors. When a broadcast request is sent, all users see an alert pop-up notification.

The application services includes

Login & Registration

Request for blood

Request all (send request)

Response for blood

Login & Registration:

This module is for creating sign-in and sign-up screens. A registered user and a new user are the two categories of users. To create traditional screens in the app, Android used xml. The customer's sign in page displays their id and password, which they must confirm before allowing them to access the app. If the password does not match, an error dialogue will appear, and the user will be notified. After confirming that the id and password match, the programme will be allowed to run; otherwise, an error dialogue will appear and a message will be sent to the user. The new user must fill out the relevant information, register, and then log in using the credentials they created.

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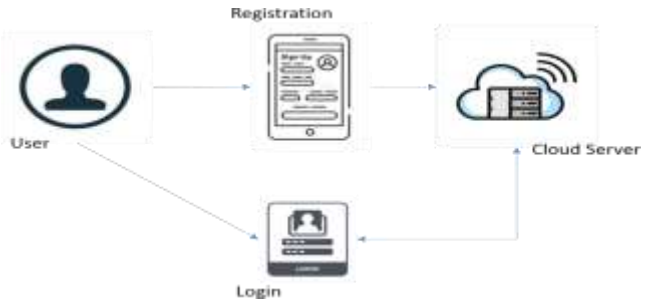

Fig.1.2: Login/registration module

Request for Blood:

The application's request for blood screen includes a drop-down box with multiple blood groups, as well as text areas with the requestor's location pin code and mobile number. To submit a request, the user must first select the type of blood that is required, then input the location code and mobile number. In the required location, a list of all available donors is displayed.

Request all:

The application displays a list of donors, and an option called request all is provided on the screen for sending requests to all of these donors. When a user presses the request all button on the screen, an alert pop notice is delivered to all users in the search, as well as other users.

Response for blood:

This module must create a solution for facial expression recognition that uses a combination of particular picture pre-processing steps when the user's face input appears on the screen. It described an ingenious approach for efficient facial expressiveness.

Database Cloud services:

Firebase is used to access database services, from authentication to all other data-related services. The firebase location service uses GPS and the Google Position API to determine the user's location and retrieve the user's latitude and longitude values.

Using the FCM API Firebase cloud messaging functionality, send a multicast blood request alert message with a response option to record the user's answer to the request.

Google Map API – The Google Map API is utilised to locate the donors as well as the donor location, which is dependent on the requestor's location on the blood search.

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Firebase Cloud Messaging - FCM (Firebase Cloud Messaging) is a cross-platform messaging service that allows users to send messages consistently and for free. The blood request alert pop-up messages are delivered to all of the donors mentioned in this section.

3. RESULTS AND DISCUSSIONS

ALGORITHM USED:

GPS (Global Positioning System)

The Global Positioning System (GPS) is a revolutionary satellite-based navigation system developed by the United States Department of Defense. It enables users to determine their precise location on Earth, providing accurate measurements of latitude, longitude, and altitude relative to sea level. The system relies on a network of satellites orbiting the globe, each covering a specific geographic area. To pinpoint a user's location, GPS transceivers, which function as both signal transmitters and receivers, communicate with these satellites. At least three satellites are required to determine a user's position in two dimensions (latitude and longitude), while four satellites are necessary for three-dimensional positioning (latitude, longitude, and altitude).

The greater the number of satellites involved in calculating a position, the greater the accuracy. The GPS devices must be placed in an open region to receive the most signals. The existence of barriers, such as buildings, tunnels, and other obstacles, affects the signal received, reducing the accuracy of position estimation. In GPS, the KNN (K-Nearest Neighbor) algorithm is used.

K-Nearest Neighbors (KNN) algorithm

K nearest neighbors (KNN) is a machine learning algorithm that is supervised. The purpose of supervised machine learning is to train a function with the formula f(X) = Y, where X is the input and Y is the result. The KNN can be used for both classification and regression.

KNN has the qualities of a slow learning algorithm and a non-parametric technique. Because it simply stores the data from the training stage, lazy learning means that the algorithm requires almost no time to learn (no learning of a function). After that, the stored data will be used to evaluate a new query point. A non-parametric method is one that does not make any assumptions about the distribution. As a result, KNN does not need to find any distribution

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parameters. In the specified action, the model discovers new parameters, which are then utilised to make predictions.

KNN contains only one hyper parameter (given by the user to the model): K, which is the number of points that must be examined for comparison.

Working of KNN

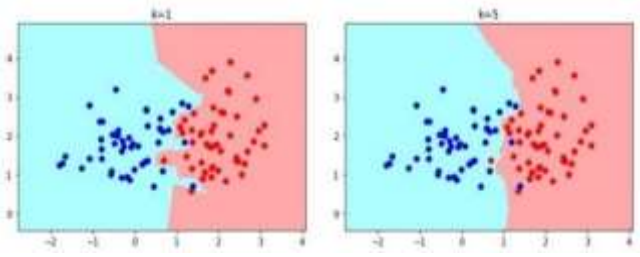
$$d(\mathbf{p},\mathbf{q}) = d(\mathbf{q},\mathbf{p}) = \sqrt{(q_1 - p_1)^2 + (q_2 - p_2)^2 + \cdots + (q_n - p_n)^2}$$

$$= \sqrt{\sum_{i=1}^{n} (q_i - p_i)^2}.$$

Based on the data, other Euclidean distance such as Manhattan, Hamming, and Chebyshev distance can be utilized.

The technique for computing the query point class is as follows:

1. The distance of all the 500 points is calculated from the query point.
2. Based on the value of K, K nearest neighbors is used for the comparison purpose.
3. Let's say K=7, 4 out of 7 points are of class 0, and 3 are of class 1. Then based on the majority, the query point p is assisned as class 0.



K=1 denotes that the question point will be classified based on its nearest neighbor. The surface separating the courses will be uneven (many vertices). The issue here is that if there is an outlier in the data, the decision surface treats it as a data point.

K=5 denotes that the query point will be classified based on one nearest neighbor. The surface separating the courses will be uneven (many vertices). The issue here is that if there is an outlier in the data, the decision surface treats it as a data point.

Applications of KNN

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1. Recommendation Systems can benefit from KNN. Although, in the actual world, the recommendation system employs more advanced algorithms.
2. KNN can look for documents that are semantically comparable. Each document is treated as if it were a vector.

4. Conclusion and Future Work

This project's goal is to present a dependable application with an optimum approach. Because a blood request may be quickly made using this application, a rapid alert is issued to users of the app, and their responses are collected. As a result, the disadvantages of present approaches will be overcome by this method. Users will save more time with this technique since they will receive a faster response and the urgent necessity will be more reliable.

5. References

[1] "A GPS-Based Blood Bank Management System for Emergency Situations" by M.A.S. Habib, M.S.A. Rahman, and M.A. Islam in the International Journal of Computer Applications, Volume 86, No. 9, pp. 9-13, 2014.

[2] "Real-Time Blood Bank Management Using GPS Tracking" by P.R. Patil, D.S. Yadav, and S.S. Patil in the International Journal of Advanced Research in Computer Science and Engineering, Volume 4, No. 7, pp. 234-238, 2015.

[3] "GPS-Based Blood Bank Management System for Efficient Blood Distribution" by B.S. Jadhav and B.K. Pawar in the International Journal of Innovative Research in Science, Engineering and Technology, Volume 2, No. 4, pp. 312-315, 2013.

[4] "Smart Blood Bank Management System Using GPS and RFID" by P.K. Mishra and S.K. Verma in the International Journal of Computer Science and Information Technology, Volume 5, No. 3, pp. 1212-1216, 2015.

[5] "GPS-Based Blood Bank Management System for Smart Blood Donation and Distribution" by S.K. Maurya and P.K. Mishra in the International Journal of Advanced Research in Computer Science and Engineering, Volume 6, No. 6, pp. 182-186, 2017.

[6] "Smart Blood Bank Management System Using GPS and Mobile Technology" by S.P. Singh and S.K. Verma in the International Journal of Advanced Research in Computer Science and Applications, Volume 8, No. 4, pp. 63-66, 2017.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 8, Issue 2, 2019

[7] "GPS-Enabled Blood Bank Management System for Efficient Blood Availability and Distribution" by S.K. Sharma and S.K. Yadav in the International Journal of Innovative Research and Development, Volume 5, No. 10, pp. 261-263, 2016.

[8] "Smart Blood Bank Management System Using GPS and GIS" by P.K. Maurya and P.K. Mishra in the International Journal of Advanced Research in Computer Science and Engineering, Volume 5, No. 5, pp. 1336-1340, 2016.

[9] Prof. Snigdha, Varsha Anabhavane, Pratiksha lokhande, Siddhi Kasar, Pranita More, “Android Blood Bank” in International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 4, April 2016.

[10] “BLOOD DONATION SYSTEMFOR ONLINE USERS” San San Tint and Htoi Mai in Computer Applications: An International Journal (CAIJ), Vol.2, No.1, February 2015.