# Cloud Hosted Encrypted Blood Bank System

A major project report submitted in partial fulfillment of the requirement for the award of degree of

**Bachelor of Technology**

in

**Computer Science & Engineering / Information Technology**

*Submitted by*

**Ananya Dhangar (201101)**
**Ansh Goyal (201263)**

*Under the guidance & supervision of*

**Dr. Kapil Rana**


**Department of Computer Science & Engineering and Information Technology**

**Jaypee University of Information Technology,**

**Waknaghat,Solan - 173234 (India)**

# CERTIFICATE

This is to certify that the work which is being presented in the project report titled **Cloud Hosted Encrypted Blood Bank System** in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science & Engineering / Information Technology** submitted in the Department of Computer Science & Engineering and Information Technology**,** Jaypee University of Information Technology, Waknaghat is an authentic record of work carried out by Ananya Dhangar (201101), Ansh Goyal (201263) during the period from January 2024 to May 2024 under the supervision of **Dr. Kapil Rana**, (Assistant Professor, Department of Computer Science & Engineering and Information Technology).

**Ananya Dhangar (201101)** **Ansh Goyal (201263)**

The above statement made is correct to the best of my knowledge.

**Supervisor Name: Dr. Kapil Rana**

**Designation: Assistant Professor (SG)**

**Department: Computer Science & Engineering and Information Technology**

**Dated:**

# Candidate's Declaration

I hereby declare that the work presented in this report entitled **'Cloud Hosted Encrypted Blood Bank System'** in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science & Engineering / Information Technology** submitted in the Department of Computer Science & Engineering and Information Technology**,** Jaypee University of Information Technology, Waknaghat is an authentic record of my own work carried out over a period from August 2023 to May 2024 under the supervision of **Dr. Kapil Rana** (Assistant Professor, Department of Computer Science & Engineering and Information Technology).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Ananya Dhangar
Roll No.: 201101

Ansh Goyal
Roll No.: 201263

This is to certify that the above statement made by the candidate is true to the best of my knowledge.

Supervisor Name: Dr. Kapil Rana

Designation: Assistant Professor (SG)

Department: Computer Science & Engineering and Information Technology

Dated:

# ACKNOWLEDGEMENT

We are truly appreciative and wish my significant obligation to our Supervisor **Dr. Kapil Rana** (Assistant Professor, Department of Computer Science & Engineering and Information Technology Jaypee University of Information Technology, Wakhnaghat). His unending persistence, academic direction, persistent support, consistent and fiery management, helpful analysis, important counsel, and perusing numerous sub-par drafts and amending them at all stages have made it conceivable to complete this project.

We additionally stretch out our appreciation to Jaypee University of Information Technology, for giving us these important assets. I would likewise liberally invite every single one of those people who have helped me clearly or indirectly in making this project a success. In this extraordinary circumstance, I should thank the different staff people, both teaching and non-training, who have fostered their advantageous assistance and worked with my endeavour.

Ananya Dhangar

(201101)

Ansh Goyal

(201263)

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# ABSTRACT

Blood Donation and Blood Transfusion Services are essential for saving individuals lives. Overall endeavours have been attempted to use virtual entertainment to make the blood donation more convenient, offer additional services, and make networks around blood donation centers. Blood donation centers experience successive deficiency of blood. Thus, advertisements are frequently seen on social networks urging healthy individuals to donate blood for patients who urgently require blood transfusion. The blood donation process generally consumes a great deal of time and exertion from the two benefactors and clinical staff since there is no substantial data framework that permits donors and blood donation centers to impart proficiently and coordinate with one another to limit time and exertion expected for blood donation process.

In addition, most blood donation centers work in isolation and are not coordinated with other blood donation centers and wellbeing associations which influence the blood donation. The principal point of this project is to save lives of individuals by giving blood web-based utilizing innovation. Our venture Online Blood donation center framework utilizing Distributed computing is grown with the goal that clients can see the data of nearby donors, hospitals, blood banks. This undertaking is created by three points of view: hospital, blood bank and patient/donor. We have given security to authenticated clients as new clients need to login as indicated by their sort of viewpoint and existing clients need to login. While enrolling, to check whether the contributor is giving right data about his blood group we will request that the benefactor transfer his/her permit or any administration id evidence on which blood group is referenced. This venture requires web association.

We are likewise demonstrating a ready framework for serious mishaps as utilizing that capability an emergency vehicle will be sent off to your place with practically no wastage of time. Emails in regards to blood donation camps, health check examination drives and so on. This web application lessens the chance to a more noteworthy that is looking for the necessary blood through blood donation centers and hospitals. Subsequently this web application gives the expected data significantly quicker and furthermore helps in speedier choice. It essentially overcomes any barrier among contributors and the recipient. It gives

better blood to the executives and capacity. This project aims at developing a Blood Donation System based on the cutting-edge information technologies of cloud computing and Information Security.

# CHAPTER 1: INTRODUCTION

This chapter of the project report is the beginning of the content of this report. It contains the building up of the plot of this report. The problem statement along with the main objectivesof this project are discussed here. The significance of this project and the real motivation behind the intentions to take up this topic as our project are also listed in detail in this particular chapter. The organization of this project report is also listed in this very chapter.

## 1.1 INTRODUCTION

It is healthy to donate blood. In this way, we have made a Web application to work on the blood donation process. The donor can undoubtedly find where his or her blood group is required. At the point when there is an earnest requirement for a specific blood group, you can utilize the web application to contact only individuals with the necessary blood group. This framework contains various modules to keep up with endless blood contributors. Crisis circumstances, where mishaps happen, make a quick, basic requirement for explicit blood classifications. Notwithstanding crisis needs, progress in medication has expanded the requirement for blood in many on-going medicines and elective medical procedures. Not with a standing, expanding need for blood; just around 5% of the Indian population gives blood.

In our project, we propose a new and proficient method for defeating such situations. An enormous number of blood donors are drawn to utilizing a web-based application. Cloud-based administrations can demonstrate significant value in crisis blood conveyance since they can empower focal and prompt access to donor information and areas from any place and practically any gadget. Since nearly everybody carries a cell phone with him, it guarantees instant area following and correspondence. In this manner, the "Versatile Blood Donation Center' can end up being a shelter for blood requesters. The extent of the undertaking is that, in an extremely limited capacity to focus, it furnishes clients with numerous offices. It gives a rich administration of blood and a rundown of emergency hospitals, blood donation centers and contributors on the web.

The primary reason for this task is to interconnect all the blood donation centers, hospitals, and donors into a single organization, obtain approval, and store different information and data about the blood and wellbeing of every person. This framework is utilized to store information over unified servers, which comprise a data set where people's data can't be accessed by an outsider.

One of the issues that people are worried about is the security of blood transfusion in terms of health. Confidence of the public in its high-quality health care system is assured through ready availability of blood results for all blood types and how security is established. However, unavailability of these blood products and placing the harmful blood products on shit and death. Accordingly, a web-based system intended to improve or advance blood transfusion safety in the case of administration of blood donation centers has an objective. Replication would minimize or eliminate the losses. On the other hand, the sole reliance on the donor's document is dangerous. Other activities that will also be put in place include stockpiling, sorting out of blood packs, supply management, which will enhance the access to healthcare by the management officials.

## 1.2 PROBLEM STATEMENT

Despite technological advancements, the majority of blood donation center frameworks are still operated manually these days. There is a major problem in that regard with the availability of the necessary blood types. For example, when a patient requires a certain type of blood and the hospital does not have it available, family members use social media to notify those who can donate the blood, and this process takes longer than the patient's stay there. Furthermore, it seems that clinical histories and relevant paperwork on blood donors are missing. This could lead to blood sack contamination and compromise the security of blood transfusions. The primary goal of this study is to ascertain how using the online banking system enhances the security of blood transfusions.

### 1.2.1 PRIVACY AND SECURITY ISSUE

Robust procedures to safeguard the confidentiality and privacy of sensitive patient data are absent from conventional blood bank systems. There are many examples of data breaches, illegal access, and breached confidentiality, which raise serious moral and legal issues.

### 1.2.2 ACCURATE DOCUMENTATION AND REGULATORY COMPLIANCE

There are several obstacles in the way of meeting the strict regulatory criteria, which include paperwork and adherence to safety procedures. Manual record-keeping procedures can lead to discrepancies and hold up complying with regulations.

### 1.2.3 ABSENCE OF TRACEABILITY AND INTERCONNECTIVITY

Current blood bank systems frequently function in isolation from one another and lack interoperability across different healthcare facilities. Lack of a single system makes it harder to share vital information and track blood, which makes it more difficult for facilities to exchange blood units smoothly.

### 1.2.4 COST-FRIENDLY WEB APPLICATION

Healthcare facilities face financial challenges due to the development and maintenance expenses of modern blood bank systems. Traditional infrastructure necessitates large maintenance, software, and hardware expenditures. Creating a solution that is both economical and effective is still a problem.

### 1.2.5 USER-FRIENDLY INTERFACE

The lack of user-centric design elements and intuitive interfaces in current blood bank systems complicates daily operations, increasing the risk of errors and inefficiencies. Therefore, usability and ease of interaction within blood bank systems are critical for effective adoption and utilization by healthcare professionals.

## 1.3 OBJECTIVES

This research and exploration application entails setting up, building, and operating a safe online blood bank system.

#### 1.3.1 CREATE A SECURE AND COMPLIANT SYSTEM:

- To guarantee the highest level of security and confidentiality for patient data, use cutting-edge encryption techniques.

### 1.3.2 IMPROVE SCALABILITY AND ACCESSIBILITY:

- Facilitate easy access to particular blood types in a variety of medical settings, particularly in an emergency.
- Ensure that hospitals keep the right amount of blood bags on hand at all times for convenient access.

### 1.3.3 MAXIMIZE ECONOMY OF USE:

- Develop an affordable model for the Cloud-Based Encrypted Blood Bank System's setup and upkeep.
- Reduce hardware expenditures and operating expenses while keeping system efficiency by leveraging cloud infrastructure.

### 1.3.4 USER FRIENDLY INTERFACE:

- Create an intuitive and user-friendly interface to make it simple for medical professionals to engage with one another.
- Maintain thorough data records on blood donors, encompassing their prior three months of donation history.

### 1.3.5 ENSURE PERFORMANCE AND RELIABILITY:

- Carry out thorough testing and optimization to ensure reliable and effective operation in a range of scenarios.
- Make it possible to quickly search for compatible blood bags to find those who are in need.

### 1.3.6. PROMOTE TRACEABILITY AND INTERCONNECTIVITY:

- Establish systems for the smooth interchange of blood healthcare facilities.
- Use traceability tools to monitor the movement of blood units, improving accountability and transparency.
- Permit thorough recording of donor profiles and blood donation activities for through documentation.

## 1.4 SIGNIFICANCE AND MOTIVATION OF THE PROJECT WORK

The findings of this study will help blood donation centres manage blood shipments, donors, and donors' activities. This will allow the medical facilities to determine whether a specific type of blood is required but not now available within the facility or, alternatively, whether it is available at another emergency hospital in the vicinity. Additionally, handling the blood packets at the blood donation centre will be considerably simpler because each blood bag contains information about the donor, the details of the donation process, and the expiration date. This methodology can also be used by experts to check for donor complexity and provide blood packets to their patients.

The potential for a cloud-based encrypted blood bank system to revolutionize the healthcare industry makes it an important implementation. This initiative uses technology breakthroughs to revolutionize blood management practices by addressing important issues that plague existing blood bank systems:

### 1.4.1 TECH ENABLED HEALTHCARE:

The adoption of a state-of-the-art cloud-based system denotes the infusion of state-of-the-art technology into the healthcare sector. This demonstrates how technology has the power to completely transform conventional healthcare procedures and underlines how flexible the sector is to new ideas.

### 1.4.2 SETTING THE STANDARD FOR DATA SECURITY:

By prioritizing encryption and safe data management, the initiative creates a standard for security procedures in healthcare systems. It establishes a standard for strict data security protocols that other industries may follow, guaranteeing data confidentiality and integrity across a range of industries.

### 1.4.3 PUBLIC HEALTH ENHANCEMENT:

By guaranteeing a sufficient and well-managed blood supply, a strong blood bank. The motivation needed to overcome the drawbacks of traditional blood banking systems is what

drove the development of this Cloud-Based Encrypted Blood Bank System.

### 1.4.4 ENCOURAGING DONOR PARTICIPATION:

The project's goal is to increase the number of people who donate blood by placing a strong emphasis on safe data management and an intuitive user interface. This increases the availability of blood while also fostering a culture of giving and community involvement.

### 1.4.5 EDUCATING AND INCREASING AWARENESS:

The project acts as an educational tool, increasing awareness of the vital relevance of blood banking systems and the role of technology in contemporary healthcare through its creative approach and possible social influence.

### 1.4.6 PUSHING BOUNDARIES IN HEALTHCARE TECHNOLOGY:

The creation of an advanced, encrypted cloud-based system is a significant advancement in this field of technology. This initiative establishes a standard for excellence in utilizing technology to address urgent healthcare concerns by pushing limits and embracing innovation.

## 1.5 ORGANIZATION OF PROJECT REPORT

### PROJECT REPORT INTRODUCTION:

- Providing accurate and real-time information on blood inventory to facilitate informed decision-making.
- Ensuring the availability of blood products when and where they are needed the most.
- Facilitating a coordinated effort in times of disasters or unforeseen medical crises.

### CONTEXT AND SETTING:

- **Patient Care:** How systems can improve patient care through timely access to blood products.
- **Emergency Response:** Discuss the important role of blood banks in emergencies and disasters.

## OVERVIEW OF CLOUD BASED ENCRYPTED BLOOD BANK SYSTEM:

### 1. INVENTORY MANAGEMENT:

● Real-time monitoring of blood inventory levels, ensuring an optimal balance between supply and demand.

● Automatic alerts when products are low or about to expire to reduce waste.

### 2. USER FRIENDLY INTERFACE:

● Intuitive interfaces for easy navigation and user engagement.

### 3. IMPROVED PATIENT CARE:

● Timely access to safe and compatible blood products, enhancing patient outcomes.

### 4. DATA ACCURACY AND COMPLIANCE:

- Ensuring accurate and up-to-date donor and inventory information.

## PROJECT OBJECTIVES:

The aim of our project on cloud-based encrypted blood bank system is to develop a secure and accessible platform that efficiently manages blood inventory, enhances donor engagement, and ensures compliance with regulatory standards, thereby improving the efficiency and effectiveness of blood transfusion services.

- **Enhanced security:** Enable strong encryption to ensure the confidentiality and integrity of sensitive patient information such as blood type, medical history and donor details. Ability to securely access bank information, expiration dates from anywhere and timely donate appropriate blood to complete distribution and utilization of blood supplies.
- **Simplify Blood donation process:** Create a user-friendly interface for registering and scheduling blood donors. Make appointments and track donation histories, thus encouraging regular blood donation and reducing administrative burden.

- **Scalability:** Create a design that can accommodate future growth in blood banking operations, including involvement of multiple donors, expansion of products and additional medical facilities.

**INSPIRING AND VITAL:**

- Our aim is to reduce blood waste and optimize the use of this valuable product by using smart product management strategies
- We envision a system where blood products are efficiently managed, ensuring timely access to safe and compatible units for every patient in need.
- We aim to foster a connected healthcare ecosystem, enabling seamless collaboration among healthcare facilities, blood banks, and emergency response teams on a global scale.

# CHAPTER 2: LITERATURE SURVEY

## 2.1 OVERVIEW OF RELEVANT LITERATURE

1.Abhilash Nikhil Kesarwani [1] in their Sharma, Abdi Mehdi Attri, study -

Based Blood Bank Management System" Issue May 2023.

It identifies challenges in the current manual system, leading to inadequate availability of blood types and reliance on social media platforms for donor location. Addresses the critical role of blood banks in emergency scenarios where prompt availability of blood is crucial for saving lives, it highlights the complexity of blood bank management and the need for strict compliance with quality standards and regulations.

2.Junaid Ahmed, Fuad Hasan, Hridoy Chandra Das, Md. Robin Hosseain, Md. Shahin Mia [2] in their study entitled "BLOOD MANAGEMENT SYSTEM" Issue October 2022.

Emphasizes the importance of BBMS in tracking blood, donors, blood groups, banks, and stock information. Describes the process of blood donation, including filling out a registration form and creating a username with a password for donors. Global annual collection of about 118.5 million blood units, but demand exceeds capacity.

3.Aman Walekar, Pratik Tekale, Chinmay Apte, Gufran Pathan [3] in their study entitled "Secure Web-Based Blood Bank Management System Using Cloud Computing" Issue May 2023.

Graphs and location services are used to visualize blood units in the blood bank and assist users in finding nearby hospitals. Bar graphs represent the amount of blood in the blood bank, aiding users in determining the availability of required blood groups. The system requires an internet connection and aims to address blood scarcity issues and improve overall blood management.

4.A. S. Iyer, D. C. Menaka, A. Faisal, A. Hussain, Chethan S.D [4] in their study entitled "CLOUD BASED ONLINE BLOOD BANK MANAGEMENT SYSTEM" Issue June

2022.

The paper focuses on the development and implementation of a cloud-based system for managing blood banks online. The system leverages cloud computing technologies to enhance the efficiency and accessibility of blood bank operations; it incorporates GPS technology for location-based services. Incorporates GPS technology for location-based services.

5.M. D. Kinge, H. H. Khadke, Sharda Dnyaneshwar, Jagruti Narayan Chaudhari, Pooja Naval [5] in their study entitled“SECURE BLOOD BANK ACCESS USING CLOUD COMPUTING " Issue April 2022.

This Paper explains the registration process for donors and acceptors, including providing proof of identity. Describing features such as searching for donors, blood banks, hospitals, making online requests, and updating stock it recognizes the benefits of using cloud computing technology in improving blood bank system efficiency and emphasizes the role of the system in bridging communication between donors and requesters.

6.S. Dhurwey, S. K. Tiwari, A. Upadhyay, Brijesh Choudhary, Lokendra Singh Masram, Palash Jharia [6] in their study entitled“Blood Bank Management System Using Cloud Computing" Issue March 2023.

Conducted a survey to gather information from different blood banks and hospitals. Provide notifications about blood camps. Allow only authorized users to make requests or donate. User registration involves filling in details like name, address, contact number, blood group, etc. Admin has authority for login/logout details, campaign details, and appointment booking.

## 2.2 KEY GAPS IN THE LITERATURE

### 2.2.1 INTEGRATION CHALLENGES AN INTEROPERABILITY:

The literature lacks comprehensive coverage regarding integration challenges when implementing online blood bank systems within existing healthcare infrastructures. Insights into the complexities of integrating these systems with diverse hospital databases, legacy systems, and varying data formats are missing. Additionally, the discussion on ensuring interoperability and seamless data exchange among different blood banks remains limited.

### 2.2.2 RISK ASSESSMENT AND SECURITY:

A significant gap exists in the thorough examination of data security and privacy within cloud-based blood bank systems. The literature overlooks in-depth discussions on risk assessments, potential vulnerabilities, and strategies to mitigate security threats. Insights into compliance with healthcare data regulations, encryption methods, and safeguarding sensitive donor information are notably absent.

### 2.2.3 USER ENGAGEMENT AND ADOPTION:

There is insufficient emphasis on user experience design strategies to enhance user engagement and adoption rates among donors, recipients, and healthcare professionals. The literature fails to explore user-centered design principles, training requirements, and user interface improvements necessary for seamless system adoption. Insights into addressing user resistance and improving usability are needed.

### 2.2.4 COST AND RESOURCE IMPLICATIONS:

The literature lacks comprehensive discussions on the cost implications of deploying and maintaining cloud-based blood bank systems. Insights into the allocation of resources, financial considerations, and operational costs associated with implementing these systems are missing. Additionally, there is a gap in addressing the technical expertise needed for system maintenance and operation.

### 2.2.5 IMPACT EVALUATION AND EFFECTIVENESS:

There is a dearth of comprehensive impact assessments to measure the tangible outcomes and benefits of online blood bank systems in real-world scenarios. The literature overlooks evaluation metrics that could measure the effectiveness of these systems, such as donation rates, emergency response efficiency, system reliability, and overall operational efficacy.

### 2.2.6 STANDARDIZATION AND ORGANIZATIONAL FRAMEWORK:

The literature falls short in discussing the need for standard operating procedures and organizational frameworks in blood bank management. Insights into establishing unified protocols, data standardization across various blood banks, and governing bodies for harmonizing operations are lacking.

Addressing these gaps through further empirical studies, comprehensive risk assessments, user-centric design strategies, cost analyses, impact evaluations, and the establishment of standardized protocols could significantly enhance the implementation and effectiveness of online blood bank management systems.

# CHAPTER 3: SYSTEM DEVELOPMENT

In this chapter, a thorough discussion regarding the requirements (both functional and non- functional) is done. The various steps along with the diagram are also briefed in this chapter. The implementation part of this project report is also shown in this very chapter. The major key challenges that we came across while working on this project are also mentioned in the end.

## 3.1 REQUIREMENTS AND ANALYSIS

**SYSTEM REQUIREMENTS:**

The development and implementation of a Secure Cloud-Based Blood Bank Administration Framework necessitate a meticulous assessment of both functional and non-functional requirements in order to ensure its feasibility, convenience, and security.

**FUNCTIONAL CONDITIONS:**

• The administrator should have access to every blood donor's information.

• Blood banks, hospitals, and other healthcare facilities can search for potential blood donors in their vicinity. The search results should only show people who have not donated blood in the previous three months.

• Following their blood donation, donors should be asked for their input on their health report based on the blood they donated. This will help future decisions on donor health.

• A user has to be a member of the website in order to view any donation data. The only places that should have access to donor contact information are hospitals, blood banks.

• The only information a blood donor should be able to view is their name and hometown. Additionally, if they need to seek another blood donor for assistance with blood donation, they should do so through the appropriate administrative channels, and the donor should

fill out a form for the purpose.

**FUNCTIONAL REQUIREMENTS:**

**CLIENT CONFIRMATION AND ACCESS CONTROL:** The framework should include job-based authorization controls and secure client confirmation mechanisms (passwords and usernames) in order to safeguard sensitive donor and patient data.

**DONOR REGISTRATION AND PROFILE MANAGEMENT:** Those who wish to donate may provide comprehensive information such as blood type, medical history, and contact details using an intuitive interface.

**STOCK ADMINISTRATION:** Skillful in batch tracking, real-time updates, executive oversight of blood inventories, and termination alerts.

**BLOOD REQUEST AND COORDINATION:** Robust structure to manage blood requirements, searches, and matching capabilities considering blood type, location, and urgency.

**ADMINISTRATOR DASHBOARD:** The Administrator Dashboard is a reliable point of contact for managing client accounts, filtering framework exercises, and generating detailed reports on stock levels, donation trends, and benefactor measures.

**NON-FUNCTIONAL REQUIREMENTS:**

**SECURITY AND CONSISTENCY:** Strict information encryption, adherence to medical care protocols, and routine security audits to ensure information integrity and categorization.

**FLEXIBILITY AND PERFORMANCE:** The system should be able to accommodate growing amounts of data and customer traffic while maintaining optimal performance levels at all times, especially during peak usage.

**DEPENDABILITY AND ACCESSIBILTY:** The framework should provide continuous access to essential functions, good accessibility, and a limited amount of maintenance time.

**ANALYSIS:**

The requirements of the framework were formed by a thorough analysis of partner meetings, space mastery discussions, and current blood donation center frameworks.

Moreover, a market analysis and customer input about current frameworks exposed the gaps in the work, emphasizing the need for a cloud-based solution to streamline blood donation center operations.

The requirements were prioritized based on their importance, feasibility, and alignment with the project's goals in order to provide a client-driven, secure, and efficient cloud-based framework for managing blood donation centers.

## 3.2 PROJECT DESIGN AND ARCHITECTURE

**SYSTEM DESIGN:** The Cloud-Based Blood Bank Management System's multi-tiered system design makes use of cloud technologies to provide scalability, flexibility, and dependability.

**PARTS**:

1. Presentation Layer: This layer includes the user interface that is available through web browsers. It guarantees hospitals, administrators, and donors a responsive and user-friendly interface.

2. Application Layer: This layer houses the system's essential features, such as inventory control, donor registration, user authentication, processing blood requests, and communication modules.

3. Data Layer: This layer stores and manages donor profiles, blood inventory data, user credentials, and system logs using a powerful database management system (DBMS), such as MySQL.

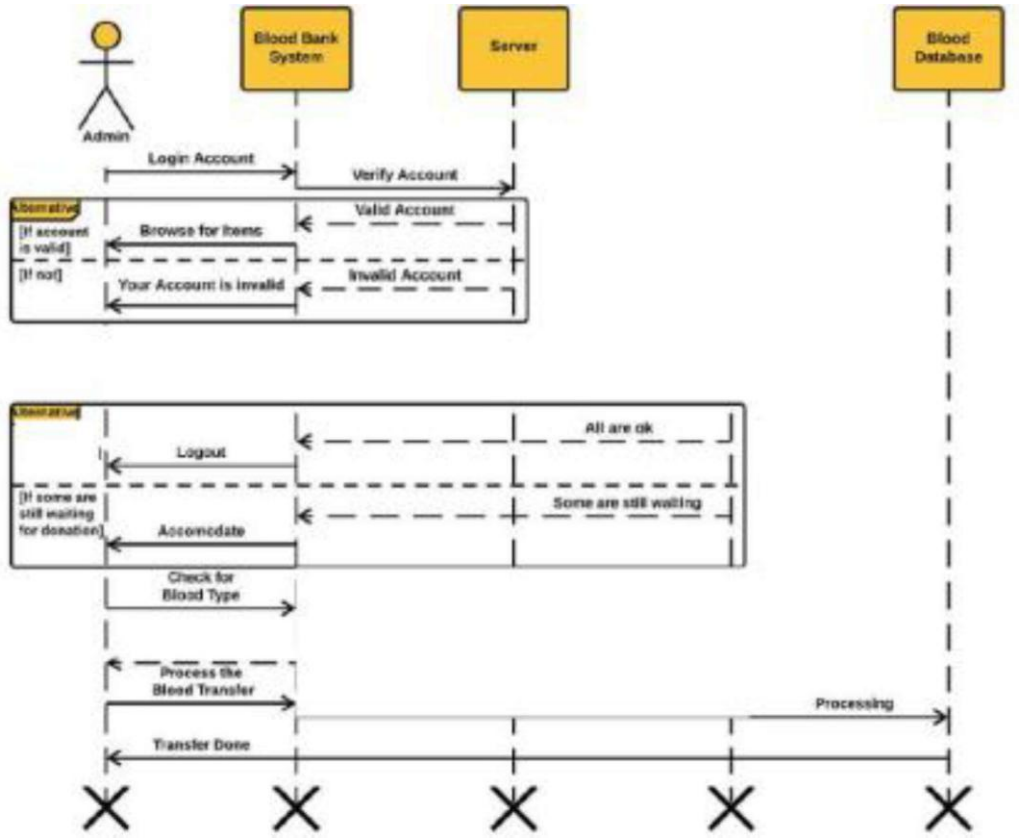



**Fig 1: Activity Diagram of blood bank system**

**USER MODULES:**

1. Donor Module: Enables users to sign up, make changes to their profiles, plan donations, and get in touch with blood banks or recipients.

2. Hospital Module: This module gives hospital employees the ability to monitor donor details for blood matching, manage blood requests, and update inventory.
3. The admin module gives administrators total control over analytics, system setup, and user administration.

**KEY FEATURES:**

1. Secure Authentication: Protecting sensitive data by using secure login procedures and encryption techniques for user authentication.

2. Responsive Interface: Utilizing responsive web design concepts to guarantee usability across a range of screens and devices is known as a responsive interface.

3. Scalable Cloud Infrastructure: Making use of cloud services such as AWS to guarantee system uptime and scalability.

**SYSTEM FLOW:**

The registration of donors and the fulfillment of blood requests are handled seamlessly by the system flow. Hospitals submit requests, donors register and update their profiles, the system matches blood types, and it helps with communication to ensure that blood transfusions happen on time.

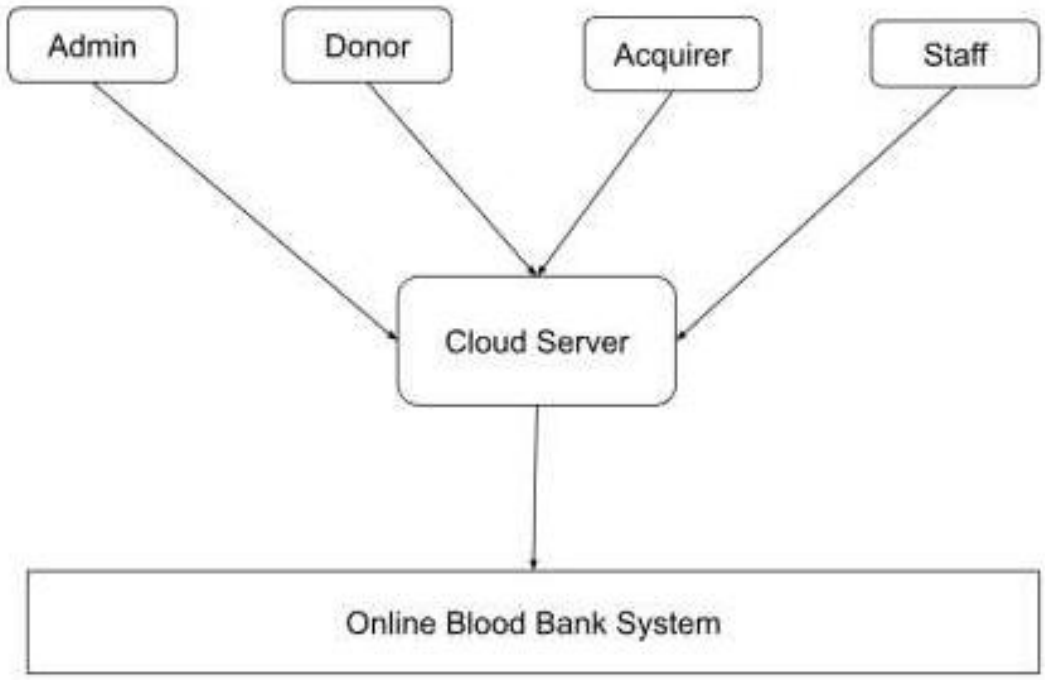



**Fig 2: Block diagram of blood bank system**

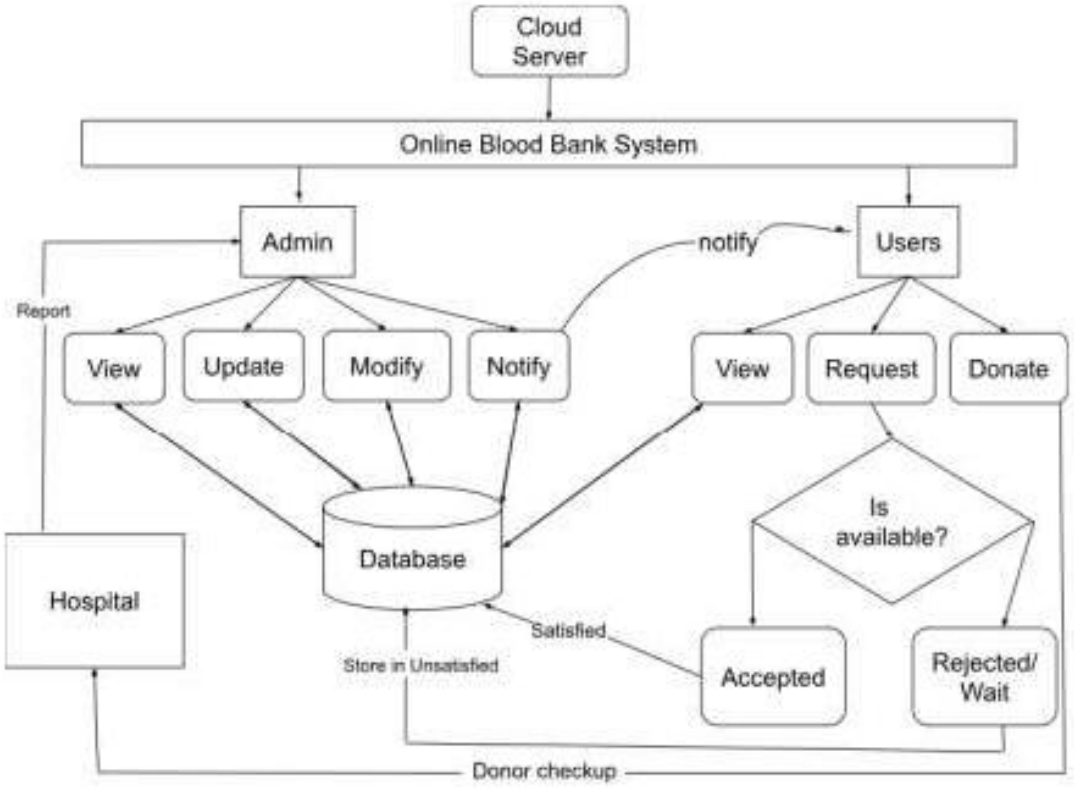



**Fig 3: System Architecture of blood bank system**

## Technology Stack:

- Frontend: HTML5, CSS3
- Backend: PHP
- Database: MySQL
- Cloud Services: AWS EC2 for hosting

**PROPOSED SYSTEM**

The program must first be downloaded by the user. There would be two possibilities available to him/her. Sign in and Log in. In the event that the individual has already registered, they must Log in. If not, they should register by entering some basic information such as their name, email address, contact information, date of birth, blood type, and so on. The user has the ability to update their personal data. The user may verify the locations of different blood banks after registering.

**1. Registering Users**

This is the next step whereby the user is supposed to undertake the registration process that entails mentioning personal data like name, address, telephone number, blood group, age, and medical history among others in the application form.

**2. Make a Blood Request**

The second stage involves sending a request for blood. This is done through specifying one's desired blood group, phone number, and geographical position as provided by the application. After making a request, a notification will be sent to nearby donors with a list of nearby donors which users will be able to see.

**3. Donor of Blood**

The third phase will involve seeking for blood from a near blood inquiry (user) who will then notify the donator about the request with a call, as well as displaying the responder's contact details to the application. Moreover, the donor may choose to use the program at his or her convenience for one-time donation of blood with that will.

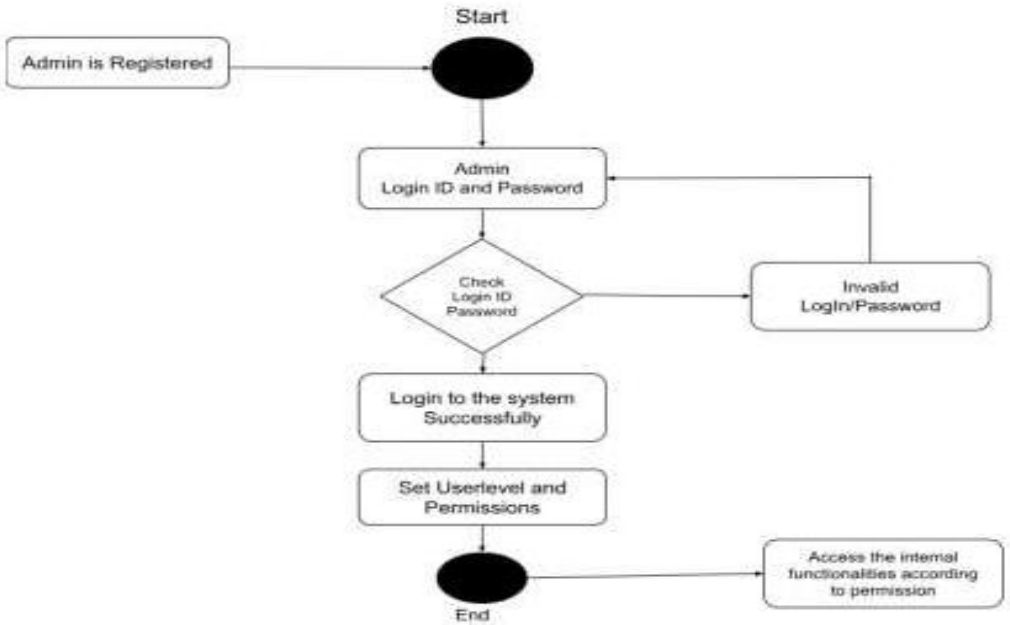



**Fig 4: User Interface Development**

## 3.3 DATA PREPARATION

Quick data input allows us to capture the correct donors and effective resource management in this encrypted cloud-based blood bank management system. Potential donors are required to provide information like blood types, contacts, medical history, and general information through a user-friendly web application in order to be enrolled. The application form has undergone a careful design to ensure it is accurate and complete before the data is introduced into the system. Also, data on medical facilities as well as blood inventories can be retrieved either manually or by interacting with medical facility management systems authorized personnel. Real time Inventory tracking ensures real-time updates via the synchronization techniques. This includes various blood types, availability, expiry dates, and stocks.

**DATA COLLECTION:**

**1. DONOR INFORMATION:**

Method of Collection: Potential donors can fill out an online registration form to provide information about themselves. Personal information, medical history, contact data, blood type, and the verification of eligibility requirements are among the fields it contains.

Verification and Validation: In order to guarantee correctness and completeness, the system checks and validates the information submitted against predetermined criteria once it has been submitted.

**2. HOSPITAL AND BLOOD INVENTORY DATA:**

Integration Process: Hospital inventory data is collected manually by authorized staff members or through cooperative interfaces with hospital administration systems.

Constant Updates: To guarantee accurate stock levels, expiration dates, and availability, the system is built to update inventory data on a regular basis and synchronize real-time modifications.

### 3. SYSTEM LOGS AND USER ACTIVITIES:

Logging Mechanism: The system database securely stores all user actions, such as blood requests, logins, donor registrations, and administrative work.

Audit Trails: System logs allow traceability and accountability for each system interaction by keeping thorough records for auditing purposes.

## DATA STORAGE AND MANAGEMENT:

### 1. DATABASE SCHEMA DESIGN:

Entity Relationship Diagram (ERD): To guarantee an organized database schema, a thorough ERD is created to specify entities (donors, hospitals, and blood inventories), their relationships, and their properties.

Normalization Techniques: To reduce duplication and preserve data integrity, the database structure adheres to the first three normalization principles (1NF, 2NF, and 3NF).

### 2. DATA ENCRYTION AND SECURITY:

Encryption Protocols: Before being stored, sensitive data, including donor details and personal health information, is encrypted using industry-standard encryption techniques.

Access Control: Only authorized workers are able to see or alter particular information thanks to the implementation of role-based access control methods, which limit unauthorized access to sensitive data.

**DATA GOVERNANCE AND COMPLIANCE:**

**1. COMPLIANCE WITH REGULATIONS:**

Regulatory Adherence: The system conforms to industry standards for data management, encryption, and transmission as well as data protection regulations.

Frequent Compliance Audits: To guarantee continued adherence to legal requirements and data governance guidelines, audits and evaluations are carried out on a regular basis.

**2. DATA BACKUP AND RECOVERY:**

Backup Strategies: Redundant storage solutions are used to maintain data resilience and availability in the event of system failures or natural catastrophes, and regular automatic backups of the database are planned to prevent data loss.

**DATA QUALITY ASSURANCE:**

**1. TESTING AND VALIDATION:**

Data Validation Suites: Comprehensive validation suites are used to verify that data is accurate, consistent with predetermined criteria, and both before and after it is inserted into the database.

Unit Testing: To ensure accuracy and efficiency, database operations and query functionality are put through a thorough testing process.

**2. PERFORMANCE MONIITORING:**

Monitoring Tools: To continually track database performance indicators, such as response times, throughput, and query optimization for effective data retrieval, performance monitoring tools are incorporated.

**DETAILS ABOUT BLOOD:**

A) The Various constituents of blood are represented as follows

**1) PLASMA:** The fluid that carries blood cells throughout the body is called plasma. About five to five percent of your blood is made up of plasma, which is the biggest component. Blood plasma is a pale-yellow liquid that resembles straw when it is separated. Plasma contains salts, enzymes, and water. Transporting proteins, hormones, and nutrients to the body's necessary regions is plasma's main function. Additionally, cells release waste materials into the plasma. In turn, the plasma aids in the body's elimination of this waste. All of the components of blood are likewise transported through the circulatory system via blood plasma.

**2) RED BLOOD CELLS:** They transport oxygen. The oxygen-carrying protein found inside red blood cells is called hemoglobin. In addition, red blood cells carry carbon dioxide from your body to your lungs so you may exhale it. The bone marrow, located inside your bones, produces red blood cells. They usually have a lifespan of 120 days before passing away.

**3) PLATELETS:** This lessens the need for blood transfusions as well as blood clotting. Only 20% of red blood cells' diameter is made up of platelets. Although platelets make up just a small portion of blood volume, their typical count ranges from 150,000 to 350,000 per microliter of blood. Preventing bleeding is the main job of platelets.

**4) WHITE BLOOD CELLS:** The biggest and rarest blood cells are called white blood corpuscles. White blood cells are scarce between 5,000 and 10,000 per microliter. White blood cells come in a variety of forms, but they are all connected to immunity and preventing infection.

**5) HAEMOGLOBIN:** This substance, which transports oxygen from the lungs to other areas of the body, is vital to life. It is an iron-containing protein found in red blood cells. It is involved in the movement of oxygen throughout the body.

B) Need for Blood Transfusion:

Transfusions of blood are rather common. Nearly 5 million Americans require blood transfusions annually. All ages are served by this treatment. Due to blood loss after surgery, a large number of patients require blood transfusions. For instance, approximately one-third

of patients undergoing heart surgery receive a transfusion. Blood transfusions are often necessary for patients who suffer severe injuries such as those sustained in auto accidents, wars, or natural disasters in order to replenish blood lost during the injury.

C) Factors to be considered for blood donation:

A potential donor must be between the ages of 18 and 60. Additionally, the haemoglobin control level needs to exceed 12.5 g/dl. Blood pressure and body temperature should be normal, and weight should not be less than 45 kg. The donor must be healthy and free of any illnesses, having not taken any medication in the previous 48 hours. Additionally, donors shouldn't have any jaundice from the previous three years. Furthermore, the donor shouldn't have a drug addiction.

D) Blood Types - There are four blood types:

1. A
2. B
3. AB, and
4. O

Each individual has one of the four blood types listed above. Furthermore, the blood of every individual is either. either Rh-negative or Rh-positive. Thus, for instance, a person's blood type might be either type A positive or type A negative. Universal blood donors of type O. Blood that is type O-negative is safe for most people. Blood that is type O negative is utilized in situations when it is not possible to test a person's blood type; those who have this type of blood are known as universal donors. recipients of type AB blood universal.

People with blood type AB-positive are known as universal receivers. This implies that any kind of blood can be given to them. Rh-deficient and Rh-positive. Rh-positive blood donors can receive either Rh-positive or Rh-negative blood. A person should only get Rh-negative blood if they have Rh-negative blood. When a person's Rh type cannot be determined in time, Rh-negative blood is utilized in emergency situations.

## 3.4 IMPLEMENTATION

### PROPOSED ALGORITHMS FOR ENCRYPTED BLOOD BANK SYSTEM

#### Advanced Encryption Standard (AES)


The suggested work applies the Advanced Encryption Standard (AES) algorithm for database security and encryption, and leverages cloud computing technology to create an online blood bank system. The suggested method keeps a central repository with a variety of blood deposits that are accessible and relevant data stored on a cloud server. These details, which include blood type, storage location, date, and location, among other things, help to maintain and track blood deposits. The proposed AES-based blood bank system with cloud approaches is an online system that authorizes handlers to use a cloud server to verify whether the necessary blood deposits of a certain group are present in the blood bank.

Aside from that, the system offers additional features including patient information, blood reservations, and even a tool that posts the requirement for a certain blood group on the website so that potential donors may be found in an emergency. In addition, the system incorporates the idea of database encryption utilizing the AES

Algorithm to guarantee user data security and confidentiality. This will assist us in safeguarding their donation records against any threats or unanticipated risks to the data security, including those from those who may have malevolent intentions. The primary goal of the planned study is to shorten the time needed to give required blood to those in need during emergencies. The utilization of the AES Algorithm will aid in safeguarding their donation records from potential attacks and unanticipated risks to the data security. This online system, which uses cloud-based techniques and an AES-based blood bank, facilitates the successful management of various blood bank procedures.

**K-nearest algorithm**

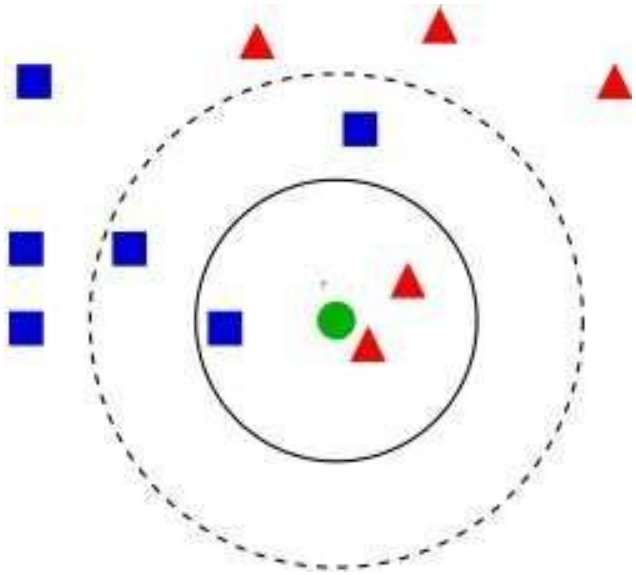


**Fig 5: Class Diagram of blood bank system**

One of the most fundamental yet simple machine learning arrangement calculations is K-Nearest Neighbors. It fits well with the field of controlled learning and has significant applications in information mining, acknowledgment, and interruption detection, for instance.

All things considered, it is largely unnecessary because it is non-parametric, meaning it doesn't assume anything about the way information is conveyed (as opposed to other algorithms, like GMM, which assume a Gaussian distribution of the given information).

Problem Description: This Algorithm computes the Blood Bank System.

Input: ID, Password, is of character type.

Output: Outcome is contact to the donor and Response to the requestor from the blood bank System.

Step 1: In the event that the user is already registered, please provide their ID and password; if not, please create a new account.

Step 2: Locate the user in the event that they make a blood request.

Step 3 Verify and notify neighboring registered donors via the blood bank system if a blood donor is available.

Step 4: Verify the requirements for donating blood, such as HB, weight, and other variables, as well as the date of the prior donation.

Step 5: Accept it if the requirements are met.

Step 6: Notify other nearby donors in the event if the conditions are not met.

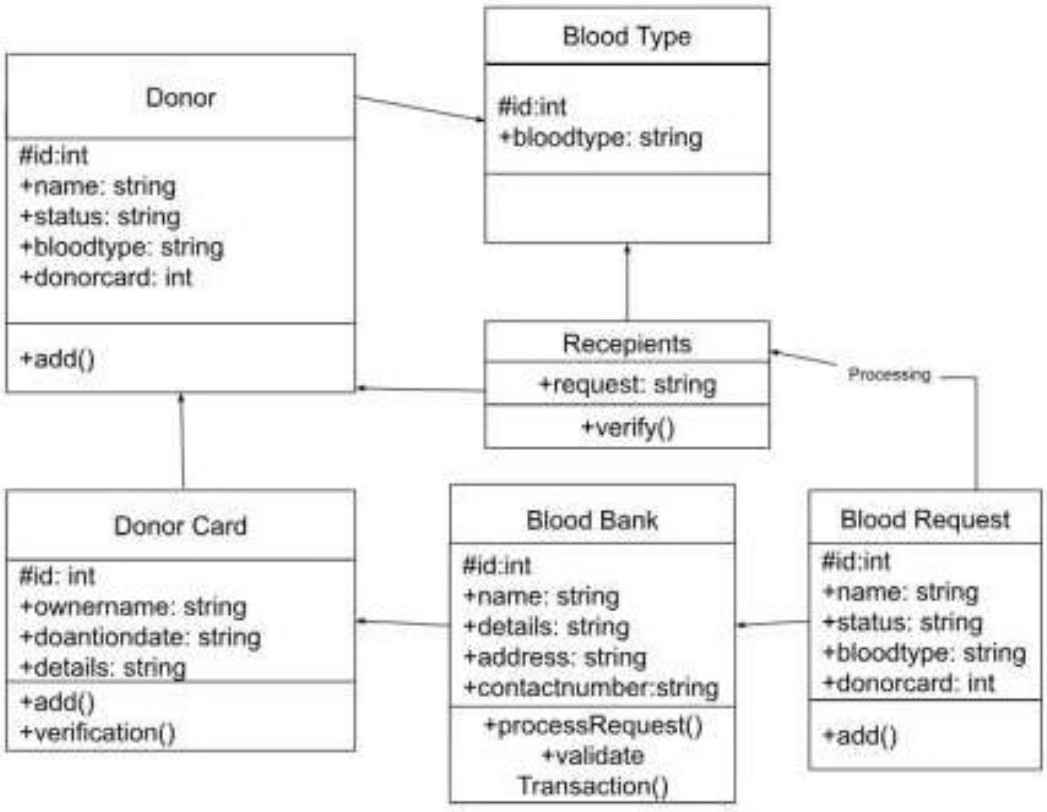



**Fig 6: Class Diagram of blood bank system**

## CODE SNIPPETS

```
<h1 class="mt-4 mb-3">Contact</h1>
<div class="row">
  <div class="col-lg-8 mb-4">
    <h3>Send us a Message</h3>
    <form name="sentMessage"  method="post">
        <div class="control-group form-group">
            <div class="controls">
                <label>Full Name:</label>
                <input type="text" class="form-control" id="name" name="fullname" required>
                <p class="help-block"></p>
            </div>
        </div>
        <div class="control-group form-group">
            <div class="controls">
                <label>Phone Number:</label>
                <input type="tel" class="form-control" id="phone" name="contactno"  required >
            </div>
        </div>
        <div class="control-group form-group">
            <div class="controls">
                <label>Email Address:</label>
                <input type="email" class="form-control" id="email" name="email" required>
            </div>
        </div>
        <div class="control-group form-group">
            <div class="controls">
                <label>Message:</label>
                <textarea rows="10" cols="100" class="form-control" id="message" name="message" required  maxlength="999" style="resi
            </div>
        </div>
        <button type="submit" name="send"  class="btn btn-primary">Send Message</button>
    </form>
```

**Fig 7: Code Snippet 1**

```
<div id="page-container" style="margin-top:50px; position: relative;min-height: 84vh;">
  <div class="container">
  <div id="content-wrap" style="padding-bottom:50px;">

<div class="row">
    <div class="col-lg-6">
        <h1 class="mt-4 mb-3">Need Blood</h1>

      </div>
</div>
<form name="needblood" action="" method="post">
<div class="row">
<div class="col-lg-4 mb-4">
<div class="font-italic">Blood Group<span style="color:red">*</span></div>
<div><select name="blood" class="form-control" required>
  <option value=""selected disabled>Select</option>
  <?php
    include 'conn.php';
    $sql= "select * from blood";
    $result=mysqli_query($conn,$sql) or die("query unsuccessful.");
  while($row=mysqli_fetch_assoc($result)){
   ?>
   <option value=" <?php echo $row['blood_id'] ?>"> <?php echo $row['blood_group'] ?> </option>
  <?php } ?>
</select>
</div>
</div>
```

**Fig 8: Code Snippet 2**

```
$bg=$_POST['blood'];
$conn=mysqli_connect("localhost","root","","blood_donation") or die("Connection error");
$sql= "select * from donor_details where donor_blood='{$bg}' order by rand() limit 5";
$result=mysqli_query($conn,$sql) or die("query unsuccessful.");
  if(mysqli_num_rows($result)>0)   {
  while($row = mysqli_fetch_assoc($result)) {
    ?>
    <div class="row">
    <div class="col-lg-4 col-sm-6 portfolio-item" ><br>
    <div class="card" style="width:300px">
        <img class="card-img-top" src="image\blood_drop_logo.jpg" alt="Card image" style="width:100%;height:300px">
        <div class="card-body">
          <h3 class="card-title"><?php echo $row['donor_name']; ?></h3>
          <p class="card-text">
            <b>Blood Group : </b> <b><?php echo $row['blood_group']; ?></b><br>
            <b>Mobile No. : </b> <?php echo $row['donor_number']; ?><br>
            <b>Gender : </b><?php echo $row['donor_gender']; ?><br>
            <b>Age : </b> <?php echo $row['donor_age']; ?><br>
            <b>Address : </b> <?php echo $row['donor_address']; ?><br>
          </p>

        </div>
      </div>
</div>

<?php
  }
}
  else
  {

      echo '<div class="alert alert-danger">No Donor Found For your search Blood group </div>';

  } ?>
</div>
```

**Fig 9: Code Snippet 3**

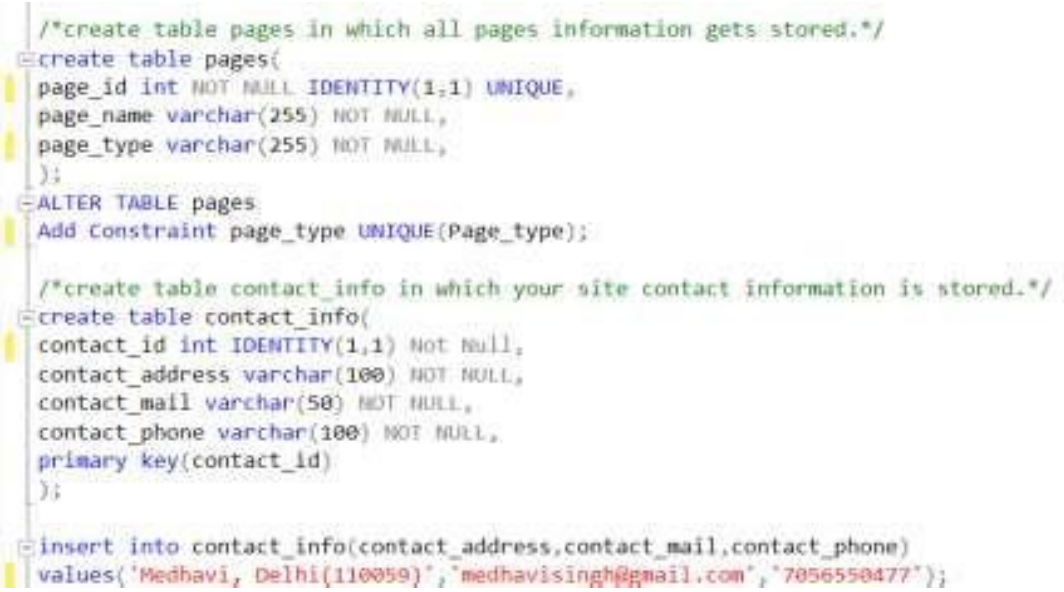
```
create table admin_info(
admin_id int NOT NULL UNIQUE IDENTITY(1,1),
admin_name varchar(50) NOT NULL,
admin_username varchar(50) NOT NULL UNIQUE,
admin_password varchar(50) NOT NULL,
Primary key(admin_id)
);

/*  insert admin data into admin_info table*/
insert into admin_info(admin_name,admin_username,admin_password)
values('Ananya','ananyadhangar05',123);

/*create table blood in which all blood group is stored.*/
create table blood(
blood_id int IDENTITY(1,1) Not Null,
blood_group varchar(10) NOT NULL,
primary key(blood_id)
);

/* insert all blood groups*/
insert into blood(blood_group)
values('B+'),('B-'),('A+'),('O+'),('O-'),('A-'),('AB+'),('AB-');
```

**Fig 10: Code Snippet 4**



```
/*create table pages in which all pages information gets stored.*/
create table pages(
page_id int NOT NULL IDENTITY(1,1) UNIQUE,
page_name varchar(255) NOT NULL,
page_type varchar(255) NOT NULL,
);
ALTER TABLE pages
Add Constraint page_type UNIQUE(Page_type);

/*create table contact_info in which your site contact information is stored.*/
create table contact_info(
contact_id int IDENTITY(1,1) Not Null,
contact_address varchar(100) NOT NULL,
contact_mail varchar(50) NOT NULL,
contact_phone varchar(100) NOT NULL,
primary key(contact_id)
);

insert into contact_info(contact_address,contact_mail,contact_phone)
values('Medhavi, Delhi(110059)','medhavisingh@gmail.com','7056550477');
```

**Fig 11: Code Snippet 5**

**TOOLS AND TECHNOLOGIES USED -**

**1. HTML5**


HTML5 is the core language for organizing material on web pages. It is important because it gives definitions to components like lists, forms, headers, and paragraphs. Better readability, search engine optimization, and accessibility are made possible by HTML5's semantic elements and properties. HTML5 serves as the foundation for the user interface of the Blood Bank Management System, providing the structure for administration panels, hospital interfaces, and donor registration forms.

**Goal:** By specifying the structure and content of web pages, HTML5 serves as their foundation.

**Use in the Project:** This tool is utilized to create the front-end layout, organization, and content display of the Blood Bank Management System. makes use of semantic tags to improve organization and accessibility.

**2. CSS**

CSS enhances HTML5 by controlling the visual display and layout of online pages. Its job is to specify layouts, colors, styles, and responsive designs in order to improve the Blood Bank Management System's visual appeal and user experience. Designers can ensure uniformity and an appealing interface across a range of devices by customizing fonts, colors, and spacing with CSS.

**Goal:** CSS improves how HTML components are presented and look.

**Use in the Project:** In charge of creating the blood bank management system's user interface (UI) components' aesthetics and designs. adjusts responsiveness, color schemes, fonts, and layout to guarantee a visually appealing and user-friendly experience.

**3. PHP**

PHP is a server-side programming language that gives web apps dynamic capability. PHP manages server-side functionality in the Blood Bank Management System, including handling database transactions, processing donor registrations, and putting business rules into practice. It serves as the background engine, running programs to get and modify data, verify user identity, and safely handle transactions.

**Goal:** PHP is a server-side scripting language that is frequently employed in web

development.

**Use in the Project:** used in the backend to manage server-side functions for the Blood Bank Management System, including donor registration processing, user authentication, database interactions, and server logic.

**4. MySQL**


The database management system used to store and handle structured data is called MySQL. Its responsibilities in the Blood Bank Management System include transactional data, hospital records, blood inventory, and donor information management. MySQL supports crucial functions such as data searching and storage, guaranteeing data integrity, retrieval, and effective administration.

**Goal:** The following are the objectives of MySQL, an open-source relational database management system (RDBMS).

**Use in the Project:** Acts as the data for transactions, login credentials, medical documents, blood inventory, and donor information database foundation for the Blood Bank Management System. supervises the integrity, storage, and retrieval of data.

**5. AWS EC2**


Scalable cloud computing resources are available in the division of Amazon Web Services (AWS) EC2. EC2 is the hosting environment for Blood Bank Management System, providing the availability, scalability and reliability of the application. The system works perfectly well in the cloud by providing resources on-demand so that it becomes accessible from anywhere with connectivity to the Internet.

**Goal:** AWS EC2 provides resizable cloud computing capacity.

**Use in the Project:** It is used as the Blood Bank Management System deployment hosting environment. provides the program with on-demand resources, scalability, and dependability, making it accessible from any location with an internet connection.

## 3.5 KEY CHALLENGES

**1. DATA SECURITY AND COMPLIANCE CHALLENGES:**

Challenge: Ensuring regulatory compliance and data security.

Addressed by: To strengthen data security, strong encryption methods, access controls, and frequent security audits should be put into place. By coordinating the system's design with pertinent legal frameworks and carrying out routine evaluations to uphold adherence, compliance was guaranteed.

**2. SCALABILITY AND PERFORMANCE CHALLENGES:**

Challenge: Developing a system that can manage different workloads while maintaining optimal performance.

Addressed by: The use of scalable architecture with load balancing, auto-scaling, and effective resource usage techniques is how this issue is addressed. Identification of bottlenecks and improvement of system responsiveness were achieved through performance testing and optimization.

**3. TRAINGING CHALLENGES:**

Challenge: Providing sufficient training and ensuring user-friendly interfaces.

Addressed by: To help with user acceptance and comprehension, conduct user feedback sessions and offer thorough training and support resources.

**4. PERFORMANCE OPTIMIZATION CHALLENGES:**

Challenge: Optimizing system performance for scenarios with heavy traffic or concurrent user access.

Addressed by: To improve system responsiveness, this is addressed by using caching techniques, reducing resource-intensive operations, and streamlining database searches. accelerating the delivery of material by making use of content delivery networks (CDNs).

**5. MAINTENANCE AND UPDATES CHALLENGES:**

Challenge: Keeping up with updates and maintenance without interfering with system operation.

Addressed by: The issue is resolved by streamlining updates and maintenance procedures through the use of release management techniques, version control, and automated deployment methods. To reduce disturbance, routinely do maintenance during off-peak hours.

## 6. PERFORMANCE TESTING CHALLENGES:

Challenge: Performing extensive performance testing to guarantee system dependability.

Addressed By: Stress testing the system to find performance bottlenecks and simulating real-world usage patterns with load-testing tools and scenarios. enhancing system performance iteratively in response to test findings.

# CHAPTER 4: TESTING

## 4.1 TESTING STRATEGY

The process of executing a programme to identify faults is called testing. In order to ascertain whether the project is operating as planned, a series of tests are conducted throughout the process, and the website's output is assessed. Testing operates under the reasonable presumption that the objective will be accomplished if every component of the module is accurate. Testing takes place following the conclusion of the coding stage. The project was put to the test by entering various kinds of data at each stage, starting from the very beginning. During the testing phase, certain errors were discovered that were not discovered when the project was being coded. Next, modifications were made to the project's coding to enable it to process all pertinent data and provide the desired outcome. Every paper is examined individually, and any necessary adjustments are done.

**LEVELS OF TESTING:**

1. Unit Testing: In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures are tested to determine whether they are fit for use.

Objective: Validate individual components like database operations, business logic, and functionalities.

Approach: Use PHP-based functions ensuring each unit works independently as intended.

Focus Areas: Check donor registration, blood inventory management, user authentication, and data validation.

2. Integration Testing:

Objective: Assess the interaction between different modules or components. Approach:

Verify how various units interact, ensuring seamless communication and data transfer.
Focus Areas: Test data flow from donor registration to blood inventory update and request processing.

3. System Testing:

Objective: Validate the entire system against specified requirements and functionalities.

Approach: Run test scenarios covering all user interactions, both normal and exceptional.

Focus Areas: Validate user login/logout, blood request process, donor information retrieval, and admin functionalities.

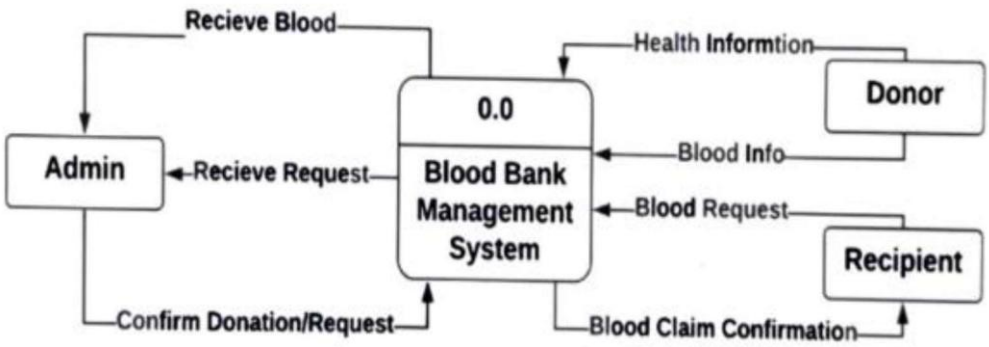



**Fig 12: DATA FLOW DIAGRAM LEVEL 0**

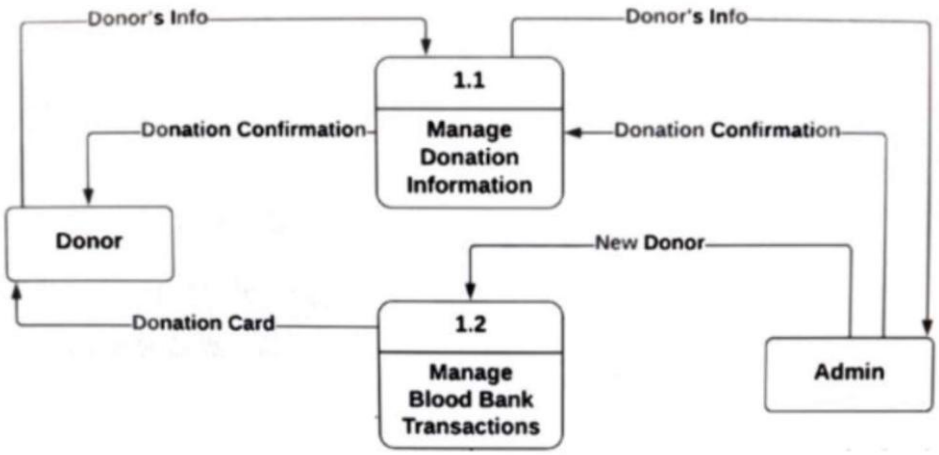



**Fig 13: DATA FLOW DIAGRAM LEVEL 1**

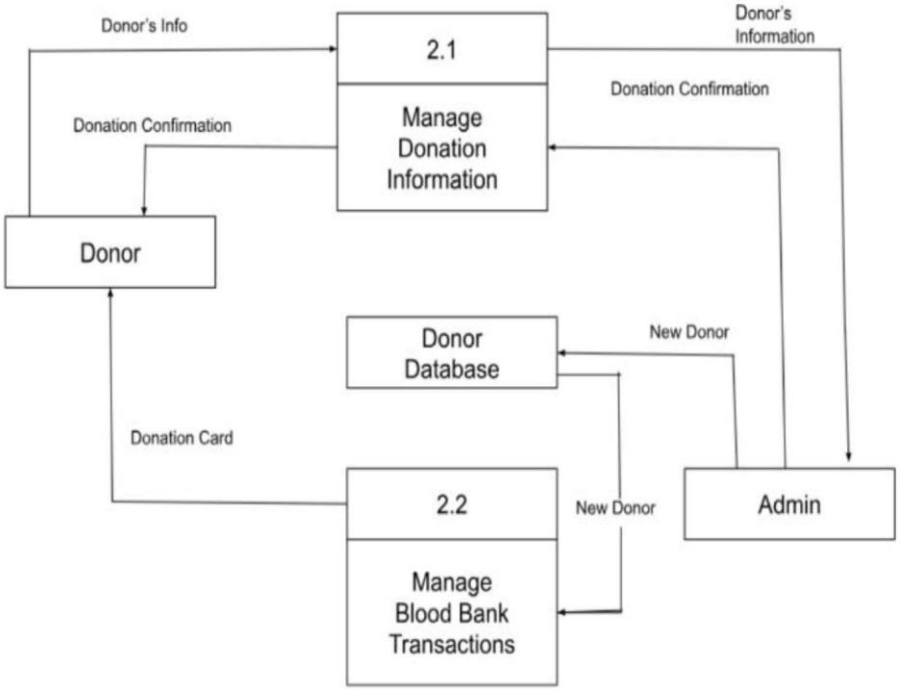



**Fig 14: DATA FLOW DIAGRAM LEVEL 2**

## 4.2 TEST CASES AND OUTCOMES

### 1. DONOR REGISTRATION:

Positive Test Cases

Valid Donor Registration: Verify that a donor can successfully register with all mandatory fields filled correctly.

Donor Contact Information: Ensure the donor's phone number and email validation during registration.

Unique Donor ID Assignment: Check if a unique donor ID is generated upon successful registration.

Donor Age Validation: Test the system's response when entering invalid ages or age limits.

Blood Group Selection: Validate that only recognized blood groups are selectable during registration.

Negative Test Cases

Empty Fields Submission: Verify the system prompts for mandatory fields if left empty

during registration.

Invalid Email or Phone Number: Test how the system handles incorrect or improperly formatted contact information.


**Fig 15: Alert on wrong username or password**

**2. USER AUTHENTICATION AND SECURITY:**

Positive Test Cases

Valid Login Credentials: Check if registered users can log in successfully with valid credentials.

Authorization Checks: Validate that unauthorized users cannot access administrative functions.

Negative Test Cases

Invalid Login Attempts: Test system behavior when incorrect login credentials are entered.

Session Timeout Handling: Verify how the system handles sessions that remain inactive for a long time.


**Fig 16: Successful Login Form**

**3. ADMIN FUNCTIONS:**

Positive Test Cases

Admin Access: Ensure that admins can manage donor records, blood inventory, and user permissions effectively.

Data Management: Verify that admins can add/delete/edit donor information and update blood inventory.

Negative Test Cases

Unauthorized Admin Access: Test if unauthorized users are restricted from accessing admin-level functionalities.

Data Integrity Check: Validate the system's response when admins attempt to delete essential or critical data.

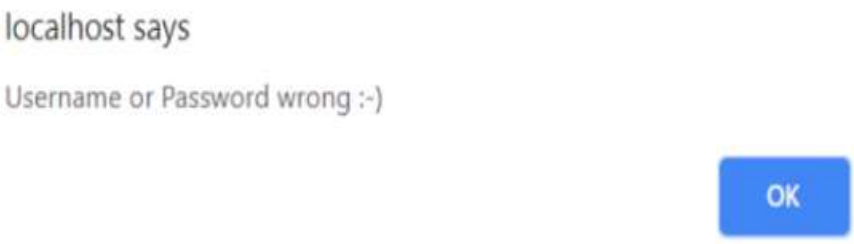



**Figure 17:**

**Alert on password mismatch**

# CHAPTER 5: RESULTS AND EVALUATION

## 5.1 RESULT

A 5-point Likert scale was employed in the questionnaire, with 5 representing highly agree, 4 agreeing, 3 neutral, 2 disagree, and 1 representing severely disagree. Following the questionnaire's administration, the researchers tallied the frequency of each item and calculated the average, or mean. In terms of mean, highly agree is defined as 4.51 to 5.00, agree as 3.51 to 4.50, neutral as 2.51 to 3.50, disagree as 1.51 to 2.50, and severely disagree as 1.00 to 1.50.

The findings of the questionnaire that was given out are listed below:

## BANK MANAGEMENT SYSTEM

Overall, Table 5.1.1's average mean for the manual method was 2.82, suggesting that respondents' opinions of the manual system were largely neutral. The fact that the capacity to offer thorough documentation on blood donation and donor activities received the lowest rating suggested that most files and records in manual systems are likely to be lost or misplaced. Even though respondents gave the system's capacity to create reports the highest rating in the manual system, the outcome indicated that they still thought the manual system's report generating process was time-consuming and labor-intensive. The findings demonstrated that respondents were neither in agreement or disagreement with the manual-based system's efficacy and efficiency. In contrast, Table 5.1.1 demonstrates that the average mean of 3.91 in the online blood bank management system indicates that the participants agreed that the online system can offer a variety of features, including the ability to generate reports, track issued blood bags, identify expired blood bags, monitor blood bag availability, monitor donors and their activities, and maintain an organized and systematized record system, to mention a few. The capacity of the online system to provide a systematized and organized file or record system was regarded as the lowest criterion by respondents, while the ability to know when blood bags expire was scored as the greatest criterion. The outcome demonstrated that the participants were in agreement with the efficacy and efficiency of the online blood bank management system.


**Fig 18: Blood Bank & Donation (1)**


**Fig 19: Blood Bank & Donation (2)**

| | | Manual Blood Bank System | | Online Blood Bank Management System | |
|---|---|---|---|---|---|
| No | Questions | Mean | Interpretation | Mean | Interpretation |
| 1 | The system provides good documentation about the blood donor and its blood donation activities. | 2.65 | Neutral | 3.92 | Agree |
| 2 | The system can search fast the list of possible blood donors through its donors' files. | 2.77 | Neutral | 3.92 | Agree |
| 3 | The system can clearly monitor the availability of blood bags or products of all blood types. | 2.85 | Neutral | 3.92 | Agree |
| 4 | The system has the ability to track to whom the blood bag/product has been given using the patient record. | 2.85 | Neutral | 3.85 | Agree |
| 5 | The system allows user to know easily the period of expiration of blood bags/products. | 2.85 | Neutral | 4.08 | Agree |
| 6 | The system has the ability to generate medical reports or statistics easily. | 2.96 | Neutral | 3.77 | Agree |

| | | | | | |
|---|---|---|---|---|---|
| 7 | The system offers an organized and systematized filing or record system. | 2.88 | Neutral | 3.81 | Agree |
| 8 | The system provides easy to use, efficient, effective system to the users. | 2.73 | Neutral | 3.88 | Agree |
| 9 | The system allows user to know easily if the person donate blood for the last 3 months. | 2.85 | Neutral | 4.00 | Agree |
| Average Mean | | 2.82 | Neutral | 3.91 | Agree |

**Table 1: Level of Perceptions on Manual and Online Blood**

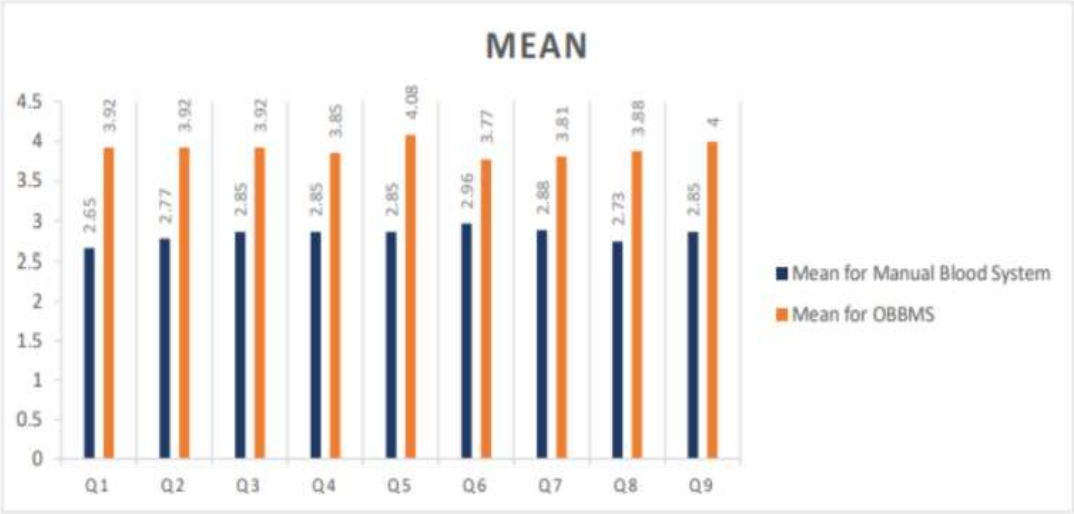



**Fig 20: Comparison of Means between the Manual Blood System and the Online Blood Bank System**

The respondents thought that the online blood bank system was far superior to the manual-based one, as demonstrated by Table 5.1.1 and Figure 5.1.1. The difference indicated that the respondents thought and felt that an online blood bank management system was superior to a manual one in terms of benefits and advantages. These results do, in fact, corroborate earlier research that noted the several drawbacks of the manual approach for both hospitals and users. Users therefore choose online systems over manual ones.

| | Manual Based | Online Blood Bank Management System |
|---|---|---|
| Average Mean | 2.82 | 3.91 |
| Standard Deviation | 0.0910 | 0.0944 |
| No. of Questions | 9 | 9 |

**Table 2: Average Mean and Standard Deviation of Both Systems**

To find out if there is a significant difference between the means of two groups that could be connected in some way, an inferential statistic called a t-test was employed. The t-test is a method for testing hypotheses that enables the system of an assumption to a population.

$$t = \frac{(x1-x2)}{\sqrt{\frac{(s1)^2}{n1}+\frac{(s2)^2}{n2}}}$$

T - value = a ratio of the difference between the mean of the two sample sets and the variation that exists within the sample sets.

The computed t-value, based on Table 5.1.2 and the t-test procedure, is 24.94, but the tabulated t-value at 5% significance (95% confidence) is 1.86. Therefore, it is decided to reject the null hypothesis H0 and adopt the alternative hypothesis H1, as the computed t-value is bigger than the tabular t-value. This indicates that, in comparison to the manual approach, the online blood bank administration system provides a great deal of advantages and benefits to the users.

## 5.2 COMPARISON WITH EXISTING SOLUTION

**EXISTING SYSTEM -**

Based on the information we got from the blood bank and the hospital, we were able to understand how the blood bank operated. The need for blood is growing, yet it cannot be produced in a lab. Donor donations are essential to hospitals and blood banks in order to promote blood donation. Blood banks and hospitals organize blood donation sessions, or donors can be called at the number they provided on the form. Donors must first come to the hospital to be assessed for the following conditions under the present manual procedure.

- Submitting the form
- Giving blood
- Seeking records

Issues with the Research:

- Dealing with false calls
- Combating fraudulent contributors
- Managing high user traffic volumes
- Absence of a standardized database
- Blood is required.
- People are hurling blood bottles outside the hospital.

Processes in the Current System: Blood Donation Camps and Phone Contact: In order to adopt this strategy, blood donation camps must be set up, or potential donors must be contacted. This could cause delays in the event of an emergency.

Manual Processing and Evaluation: When there are urgent demands, it might be inconvenient and time-consuming for donors to visit hospitals for evaluation.

**PROPOSED SYSTEM -**

When the user visits the site, there will be two possibilities available to him/her: Sign in

and log in. In the event that the individual has already registered, they must log in. If not, they must register and fill out a form with their name, address, phone number, birth date, blood type, email address, and other personal information. The user has the ability to update their personal data. The user may verify the locations of different blood banks after registering. The screen will present the user with a number of options:

1. Blood camps
2. Search donors
3. Search blood banks
4. Request for blood
5. Nearby hospital
6. View notification
7. Emergency contact details

**PROCESSES IN PROPOSED SYSTEM:**

Authentication and Verification: To reduce the possibility of fraudulent donations or calls, the Cloud-Based System uses sophisticated authentication methods to validate donors.

Scalability and Traffic Handling: Makes advantage of scalable architecture to guarantee responsiveness in times of high demand while effectively managing substantial user traffic.

Centralized Database and Inventory Management: Provides a centralized database for efficient data administration, guaranteeing efficient tracking and use of donor and blood information. Centralized Database and Inventory Administration.

Effective Blood Matching and Blood Disposal methods: Offers quick blood matching algorithms and effective blood disposal methods to cut down on waste and guarantee moral management of blood bottles.

# CHAPTER 6: CONCLUSION AND FUTURE SCOPE

## 6.1 CONCLUSION

In order to investigate and assess how online blood bank management systems can improve the safety of blood transfusions, the researchers carried out an applied study. Both descriptive and experimental design techniques were employed by the researchers. Additionally, t-values, means, and standard deviations were calculated using the collected data. Analysis and interpretation were done on these computed values. The online blood bank management system is far superior to the manual system, according to the study's findings.

The results demonstrated that, due to the online blood bank management system's numerous benefits and features that contribute to its efficacy and efficiency, respondents favored using it over the manual system. It emerges from the users' growing confidence in the system that the online blood bank management system improves blood transfusion safety by offering more effective methods for managing the blood bank's numerous procedures.

**LIMITATIONS -**

Dependability and Unavailability:

- Reliance on internet access creates worries about system failures due to network disruptions or malfunctions.
- Maintenance plans or server outages may prevent emergency personnel from accessing vital information in real time.

Validation and Human Error:

- The accuracy of donor information or blood supply may be jeopardised by incomplete or inaccurate data entry.
- In order to guarantee the precision and dependability of recorded data, verification and validation processes are essential.

Restricted Donor Base:

● The availability of necessary blood types may be limited if all blood donors are voluntarily registered in the system, particularly in times of emergency. ● Maintaining and growing a steady stream of donors could be difficult.

Allocating and Maintaining Resources:

● Continuous resource allocation, including server maintenance, updates, and security advancements, is necessary to maintain an efficient cloud- based system. ● Over time, resource constraints may have an impact on the system's scalability and performance.

Emergency Management and Reaction Time:

● Rapid answers to urgent requests may be impeded by server overloads, system lags, or ineffective routes of communication.

● It's still difficult to guarantee timely information and replies to urgent circumstances.

## 6.2 FUTURE SCOPE

**The Application:** The blood banks' existing web-based systems are not mobile-friendly. Mobile apps for Android provide access while on the go, which is essential in emergency or trauma circumstances.

**Location Precision:** Although smartphone apps offer direct access to blood banks, web-based platforms only list blood banks by city. The app's GPS-based position identification provides exact directions to the closest blood bank.

**Extensive Training Dataset:** The software is supported by a well-structured dataset that contains donor/patient details such as blood type, date of last donation, contact information, etc. Data retrieval is improved by advanced search functions based on hospital, blood bank, and criteria.

**Warning System:** The app's alert feature ensures prompt information retrieval and route direction to the needed destination during crises by giving users instant access to the closest blood banks and hospital.

# REFERENCE

[1] Abhilash Sharma, Abhishek Attri, Nikhil Kesarwani, Shivam Kasaudhan, Gunjan Agarwal Information Technology (NBA Accredited), Raj Kumar Goel Institute of Technology https://www.ijnrd.org/papers/IJNRD2305659.pdf

[2] Hridoy Chandra Das, Md. Robin Hosseain, Md. Shahin Mia

DOI:10.13140/RG.2.2.31997.33768

https://www.researchgate.net/publication/367179538_BLOOD_MANAGEMENT_SYSTEM

[3] P. Mishra, A. Walekar, P. Tekale, C. Apte, and G. Pathan, "Secure Web-Based Blood Bank Management System Using Cloud Computing," YMER, vol. 22, no. 05, May 2023. [Online]. Available: http://ymerdigital.com. ISSN: 0044-0477.

[4] A. S. Iyer, D. C. Menaka, A. Faisal, A. Hussain, and C. S. D. Chethan, "CLOUD BASED ONLINE BLOOD BANK MANAGEMENT SYSTEM," Journal of Emerging Technologies and Innovative Research (JETIR), vol. 9, issue 6, June 2022. [Online]. Available: www.jetir.org. ISSN: 2349-5162.

[5] M. D. Kinge, H. H. Khadke, S. D. More, J. N. Chaudhari, and P. Naval, "SECURE BLOOD BANK ACCESS USING CLOUD COMPUTING," International Journal of Research Publication and Reviews, vol. 3, no. 4, pp. 1840-1843, Apr. 2022. [Online]. Available: www.ijrpr.com. ISSN: 2582-7421.

[6] S. Dhurwey, S. K. Tiwari, A. Upadhyay, B. Choudhary, L. S. Masram, and P. Jharia, "Blood Bank Management System Using Cloud Computing," in Department of Information Technology, Jabalpur Engineering College, Jabalpur (M.P.), India, vol. 11, no. 1, Mar. 2023, ISSN: 2320-9984 (Online). Available: www.ijmemr.org

[7] R. Kumar, S. Singh, and A. Ragavi, Blood Bank Management System, 2017. Accessed: Apr. 20, 2022. [Online].

[8] J. Akhtar, M. Alony, P. Scholar, and J. Akhtar Khan, A New Concept of Blood Bank Management System using Cloud Computing for Rural Area (INDIA), 2015. Accessed: Apr.22,2022.[Online].Available:https://researchtrend.net/ijeece/ijet21/ijetnew/5%20JAVED

%20AKHTAR%20KHAN.pdf

[9] S. A. Chaudhari, S. S. Walekar, K. A. Ruparel, and V. M. Pandagale, A Secure Cloud Computing Based Framework for the Blood Bank, IEEE Xplore, 2018. https://ieeexplore.ieee.org/abstract/document/8537351 (accessed Apr. 26, 2022).

[10] V. M. PandagaleS. S. Walekar, S. A. Chaudhari, and K. A. Ruparel, "A Secure Cloud Computing Based Framework for the Blood Bank, IEEE Xplore, 2018. https://ieeexplore.ieee.org/abstract/document/8537351 (accessed Apr. 18, 2022).

[11] K. Akkas, I. Jahan, A. Islam, and Shafa-At Parvez, Blood Donation Management System American Journal of Engineering Research (AJER), vol. 4, no. 6, pp. 123–136, 2015, Accessed: Apr. 25, 2022. [Online]. Available: https://www.ajer.org/papers/v4(06)/O04601230136.pdf

[12] WHO Voluntary Non-remunerated Blood Donation, 2011. https://www.who.in t/bloodsafety/voluntary_donation/en/

[13] M.S. Hossain, E. Raheem, T.A. Sultana, S. Ferdous, N. Nahar, S. Islam, M. Arifuzzaman, M.A. Razzaque, R. Alam, S. Aziz, H. Khatun, A. Rahim, M. Morshed, Thalassemias in South Asia: clinical lessons learnt from Bangladesh, Orphanet J. Rare Dis. 12 (2017) 93.

[14] M.S. Hossain, E. Raheem, M.H. Siddiqee, The forgotten people with thalassemia in the time of COVID-19: South Asian perspective, Orphanet J. Rare Dis. 15 (2020) 265

[15]Bhuiyan, Abdullah Bin Kasem, and Ms Rahman. "Bangladesh Blood Services Management System (BBSMS)." (2019).

[16] Abhijeet Moharkar 1, Akanksha Somani 2," Automated Blood Bank Using Embedded System", International Journal of Innovative Research in Science, Engineering and Technology (A High Impact Factor, Monthly, Peer Reviewed Journal) Visit: www.ijirset.com Vol. 7, Issue 1, January 2018.

[17] Lokeswari.S1, Navya Sree.B2 Rishikaa.M.D3 , Saranya.A4 and A.S.Rashmi5, "Design and Implementation of Automated Blood Bank Using Embedded Systems", International Journal of Innovative Research in Science, Engineering and Technology, March 2018.

[18] Dr.J. Shanthini1 Santhoshi A1 Manjula T2 Pavithra R3,'' Computer Aided Emergency

Service System'' IJIRST || National Conference on Networks, Intelligence and Computing Systems || March 2017

[19] Shubham Pande1, Shweta Mate2, Pradnya Mawal3, Ayusha Jambhulkar 4, Prof. N. S. More5 1,2,3,4,5 Department of Information Technology, Smt. Kashibai Navle College of Engineering,India "E-Blood Bank Application Using Cloud Computing" International Research Journal of Engineering and Technology (IRJET),Feb-2018.

[20] Sayali Dhond, 2Pradnya Randhavan, 3Bhagyashali Munde, 4Rajnandini Patil, 5Prof. Vikas Patil, "Android Based Health Application in Cloud Computing for Blood Bank", International Engineering Research Journal (IERJ), 28th October 2015.

[21] Ekanayaka EM, Wimaladharma C. Blood bank management system. Technical session-computer science and technology & industrial information technology. 2015 Jan

[22] Blood donor selection Guidelines on assessing donor suitability for blood donation. Annex 3. Geneva: World Health Organization:2012[17 August 2012]

[23] Kumar, R., Singh, S. and Ragavi, V.A. (2017).). Blood Bank Management System

[24] Healthcare facilities: preparing for community transmission. 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-hcf.html Available at: Accessed May 15, 2020.

[25] Security Reema Agarwal, Sonali Singh Chanchal Atal, Dr. Danie Kingsley "Blood Bank System using Database" (2020)

# JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

## PLAGIARISM VERIFICATION REPORT

**Date: …….**

**Type of Document (Tick):** PhD Thesis | M.Tech Dissertation/ Report | B.Tech Project Report | Paper

**Name:**_____ **Department:**_____ **Enrolment No** _____

**Contact No.**_____ **E-mail.**_____

**Name of the Supervisor:** _____

**Title of the Thesis/Dissertation/Project Report/Paper (In Capital letters):** _____

_____

_____

## UNDERTAKING

I undertake that I am aware of the plagiarism related norms/ regulations, if I found guilty of any plagiarism and copyright violations in the above thesis/report even after award of degree, the University reserves the rights to withdraw/revoke my degree/report. Kindly allow me to avail Plagiarism verification report for the document mentioned above.

**Complete Thesis/Report Pages Detail:**

- Total No. of Pages =
- Total No. of Preliminary pages =
- Total No. of pages accommodate bibliography/references =

**(Signature of Student)**

## FOR DEPARTMENT USE

We have checked the thesis/report as per norms and found **Similarity Index** at ..... (%). Therefore, we are forwarding the complete thesis/report for final plagiarism check. The plagiarism verification report may be handed over to the candidate.

**(Signature of Guide/Supervisor)** **Signature of HOD**

## FOR LRC USE

The above document was scanned for plagiarism check. The outcome of the same is reported below:

<table>
<tr><td>Copy Received on</td><td rowspan="4">• All Preliminary Pages<br>• Bibliography/Images/Quotes<br>• 14 Words String</td><td rowspan="2"></td><td>Word Counts</td><td></td></tr>
<tr><td>Report Generated on</td><td>Character Counts</td><td></td></tr>
<tr><td rowspan="2"></td><td>Submission ID</td><td>Total Pages Scanned</td><td></td></tr>
<tr><td></td><td>File Size</td><td></td></tr>
</table>

**Checked by**
**Name & Signature** **Librarian**

……

**Please send your complete thesis/report in (PDF) with Title Page, Abstract and Chapters in (Word File) through the supervisor at plagcheck.juit@gmail.com**

# major263

ORIGINALITY REPORT

| 11% | 9% | 3% | % |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | |
|---|---|---|
| 1 | bsssbhopal.edu.in<br>Internet Source | 3% |
| 2 | buchiefo.wordpress.com<br>Internet Source | 1% |
| 3 | www.slideshare.net<br>Internet Source | 1% |
| 4 | idoc.pub<br>Internet Source | 1% |
| 5 | www.jetir.org<br>Internet Source | <1% |
| 6 | www.ijnrd.org<br>Internet Source | <1% |
| 7 | www.researchgate.net<br>Internet Source | <1% |
| 8 | troindia.in<br>Internet Source | <1% |
| 9 | John Amose, Gokulkannan. R. M, Gokulanath. K. S, Nithin. G. "Blood Donation Management System: A Novel Approach to Streamlining | <1% |