



## SMART BLOOD DONATION PLATFORM USING AWS EC2 AND S3

<sup>1</sup>DR.G.Prasuna, <sup>2</sup>Sannamuro Lakshmi Tanuja, <sup>3</sup> Tavva Sravya Sri, <sup>4</sup>Tella Seshu Babu,  
<sup>5</sup>A. Pathan Waseem Khan

<sup>1</sup>HOD, Professor, Dept COMPUTER SCIENCE AND ENGINEERING, St. Ann's College Of Engineering and Technology, Nayunipalli (V), Vetapalem (M), Chirala, Bapatla Dist, Andhra Pradesh – 523187, India

<sup>2,3,4,5</sup> U. G Student, Dept COMPUTER SCIENCE AND ENGINEERING, St. Ann's College of Engineering and Technology, Nayunipalli (V), Vetapalem (M), Chirala, Bapatla Dist, Andhra Pradesh – 523187, India

### ABSTRACT

*The Smart Blood Donation Platform is a cloud-based system designed to address the challenges of inefficient blood donation management and delayed donor-recipient coordination. Traditional blood bank systems rely on manual processes that lead to data inaccuracy, delays, and poor emergency response. The objective of this project is to minimize these issues by automating donor registration, blood inventory tracking, and emergency notifications through a centralized platform. The system leverages cloud computing to ensure scalability, security, and real-time data access. Amazon EC2 is used for application hosting, while Amazon S3 provides secure storage for donor and medical data. AWS IAM ensures secure*

*authentication and role-based access control. The platform improves response time during emergencies and enhances donor engagement. Overall, the system offers an efficient, reliable, and modern solution for blood donation management.*

### KEYWORDS

Smart Blood Donation Platform, Cloud Computing, AWS EC2, Amazon S3, Blood Bank Management System, Donor–Recipient Matching, Secure Data Storage, Emergency Blood Notification.

### INTRODUCTION

Blood donation plays a critical role in saving lives, especially during medical emergencies, surgeries, and accident cases. However, traditional blood bank management systems often suffer from manual record keeping, delayed

communication, and lack of real-time donor information. These limitations result in inefficient donor–recipient coordination and delayed availability of required blood groups. To address this problem, the objective of this project is to develop a smart, cloud-based blood donation platform that automates donor registration, blood inventory management, and emergency notifications. The system utilizes cloud computing technologies to ensure scalability, availability, and data security. Amazon EC2 is used to host the web application, enabling reliable and continuous access. Amazon S3 is employed for secure storage of donor and medical records. AWS IAM is integrated to provide role-based access control and secure authentication. By leveraging these technologies, the proposed system minimizes manual intervention, reduces response time, and improves overall efficiency. The platform offers a centralized and reliable solution for modern blood bank management.

## **LITERATURE SURVEY**

Several researchers have proposed digital solutions to improve traditional blood donation and blood bank management systems by leveraging cloud and advanced computing technologies. Vasaikar et al. in “Online Blood Bank Using Cloud Computing” (2017) presented a cloud-

based system that connects donors, hospitals, and blood banks through a centralized web platform, improving access to donor information and reducing search time during emergencies. Abbas and Rizvi’s work on Online Blood Bank Management System emphasizes the role of online systems in tracking blood unit availability across centers, enhancing efficiency in crisis situations. More et al. developed “Blood Banking via Cloud Computing Using ML” (2023), which incorporated machine learning and real-time donor tracking to optimize donor detection and response time. Additionally, Raj et al. in “Cloud-Based Blood Banking with Real-Time Donor Tracking Using Machine Learning” (2025) combined cloud infrastructure with ML to streamline donor registration, predictive resource allocation, and emergency coordination. These studies collectively highlight the evolution from basic online blood bank systems to intelligent, cloud-integrated platforms that improve efficiency, responsiveness, and data accessibility in blood donation services.

## **RELATED WORK**

The Smart Blood Donation Platform builds on existing efforts to modernize blood bank systems by integrating cloud computing and automation to overcome manual limitations. Previous works have shown

that cloud-based architectures can centralize donor and blood inventory data, improving accessibility and collaboration among hospitals and blood banks. Technologies such as Amazon EC2 for scalable application hosting and Amazon S3 for secure storage have been widely adopted in similar projects to ensure continuous service and robust data management. Additionally, researchers have incorporated real-time notification systems to alert donors about urgent requirements, significantly reducing response times. By combining AWS cloud services with secure authentication mechanisms, this project enhances data integrity and user trust. Unlike traditional systems that rely on static databases and offline coordination, the proposed solution uses modern cloud infrastructure to streamline donor registration, blood unit tracking, and emergency communication. The abstract of related studies highlights the importance of real-time data updates, system scalability, and automated matching of donors to recipients using intelligent workflows. This related work confirms the feasibility and benefits of adopting cloud solutions to make blood donation systems more efficient and responsive to emergency needs.

## **EXISTING SYSTEM**

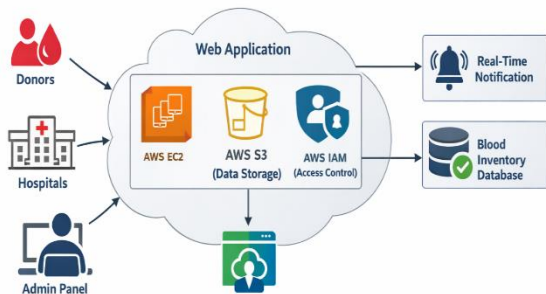
The existing blood donation systems discussed in the main related works from the literature

survey primarily rely on basic online or cloud-based platforms for donor registration and blood inventory management. Although these systems provide centralized data storage, they suffer from several limitations. Most existing methods depend on manual updates by administrators, which can lead to outdated or inaccurate blood availability information. Real-time donor–recipient matching is often not supported, causing delays during emergency situations. Additionally, many systems lack proper scalability and struggle to handle large volumes of data efficiently. Security mechanisms are limited, increasing the risk of unauthorized access to sensitive donor information. Notification systems, if present, are not automated or location aware. These drawbacks highlight the need for a more intelligent, secure, and real-time cloud-based solution.

## **PROPOSED SYSTEM**

The proposed Smart Blood Donation Platform improves upon the existing systems by integrating advanced cloud and automation technologies. Unlike traditional methods that rely on manual data updates, the proposed system automates donor registration, blood inventory tracking, and emergency notifications. Amazon EC2 is used to host the application, ensuring scalability and high availability. Amazon S3 provides secure and reliable storage for donor and medical records. AWS IAM is implemented for role-based access control and enhanced security.

## SYSTEM ARCHITECTURE



**Fig1: Block Diagram**

## METHODOLOGY DESCRIPTION

The proposed Smart Blood Donation Platform follows a cloud-based architecture designed to ensure efficiency, security, and real-time accessibility. Initially, donors and hospitals interact with the system through a web application interface to register, update profiles, and request or offer blood units. The web application is hosted on Amazon EC2, which provides scalable computing resources and ensures continuous availability of the platform. User authentication and authorization are managed using AWS IAM, enabling role-based access for donors, hospitals, and administrators to protect sensitive data. All donor details, medical records, and blood inventory information are securely stored in Amazon S3, ensuring high durability and reliability. The admin panel monitors and

manages donor approvals, blood stock updates, and system activities. When a blood request is raised, the system processes the request by checking the blood inventory database and identifying suitable donors. Real-time notification services are triggered to alert eligible donors instantly. This automated workflow reduces response time during emergencies and ensures accurate coordination. Overall, the methodology integrates cloud services, secure access control, and automated communication to deliver an efficient blood donation management solution.

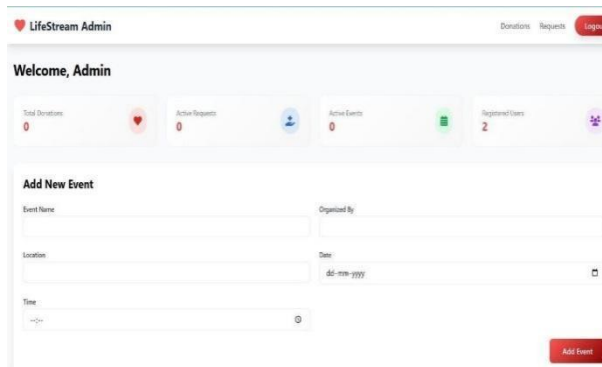
## RESULTS AND DISCUSSION

The results of the Smart Blood Donation Platform are presented through step-by-step system outputs, demonstrating the functionality and effectiveness of the proposed solution. This screenshot shows the donor and hospital registration interface where users enter personal details, blood group, and contact information. The successful submission confirms secure data entry and storage in the cloud.

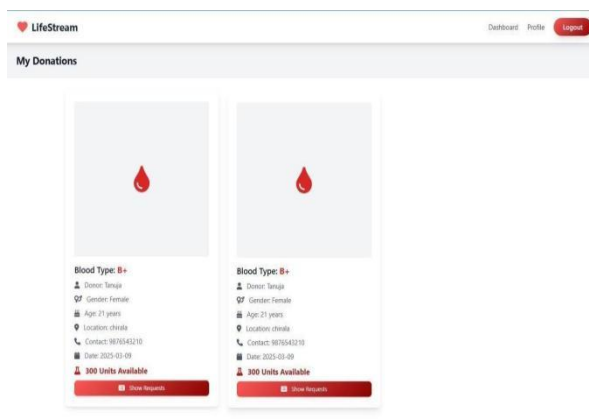


**Fig2: Home Page**

After opening the website, the admin can register and will then be taken to the dashboard page.



**Fig3: Admin Dashboard**



**Fig4: Donation Page**

## CONCLUSION

The Smart Blood Donation Platform successfully implements a cloud-based solution to automate donor management, blood inventory tracking, and emergency communication. By leveraging AWS EC2, S3, and IAM, the system ensures scalability, security, and real-time accessibility. The platform reduces manual intervention and improves coordination between donors, hospitals, and administrators. The result analysis shows faster donor–recipient matching and accurate blood availability updates. Overall

system performance demonstrates improved response time during emergencies.

## FUTURE ENHANCEMENTS

Future enhancements can include integrating machine learning algorithms to predict blood demand and donor availability. The platform can be upgraded with mobile applications and GPS-based donor tracking for faster location-based matching. Additionally, advanced cloud services such as AWS Lambda and blockchain technology can be adopted to improve automation, scalability, and data security.

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