Original Article

Aes Based Blood Bank System Using Cloud Techniques

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Abstract

Blood donation is required for saving human lives. Blood donor needs to check blood bank or donation camp for giving blood donation or blood booking. Blood donor may have doubt whether their personal data and medical histories are safely deposited and protected. For this purpose, proposed work uses cloud techniques to develop an online blood bank system and applying Advanced Encryption Standard (AES) algorithm for database security and encryption. Proposed system maintains central repository holding various blood deposits accessible along with related particulars accommodated on a cloud server. These particulars contain type of blood group, area of storage, date and location etc., This information support in maintaining and monitoring the deposits of blood. Proposed AES based blood bank system using cloud techniques is an online system that consents handlers to check whether the essential blood deposits of a particular group are available in the blood bank capably using a cloud server. Additionally, the system also has extra features such as patient details, blood booking and even the need for a certain blood group is posted on the website to find available donors for a blood emergency. Apart from this, system includes the concepts of database encryption using AES Algorithm to make sure that the security and confidentiality of users' information. This will help us keep their donation records protected from any threats from individuals with potentially malicious intentions, or any unforeseen hazards to the security of the data. Main aim of the proposed work is to reduce the time required to deliver obligatory blood to the needy in cases of emergency. AES Algorithm will help us keep their donation records protected from any threats from individuals with potentially malicious intentions, or any unforeseen hazards to the security of the data. This AES Based blood bank system using Cloud techniques is an online system that helps in handling several blood bank procedures successfully.

Keywords: Cloud techniques, Advanced Encryption Standard, Blood Bank, Data Encryption, Security.

1. INTRODUCTION

Due to blood unavailability throughout emergency, death rate is increasing during operations. This is because lack of awareness among people about blood donation, blood transfusion. Day by day the need of blood is increasing. Donation of blood is important for saving human lives. The collected blood bags from blood donation events are stored in one place is called as blood bank. The collected blood is stored, preserved and used whenever needed or demanded in a blood bank. Traditional blood banks include paperwork and unnecessary formalities. At the time of emergency situations traditional blood bank systems working is not that much efficient enough.

In many situations due to lack of appropriate communication between blood needy people and blood donors, emergency situation patients do not get blood in time and hence lose their lives. So, there is a terrible necessity of synchronization between donors, hospitals and blood banks. The proper management of blood bank reduces the wastage of the available blood inventory. All these difficulties can be dealt with by automating the present physical

blood bank system. A high-end, efficient, highly available and scalable system has to be developed to bridge the gap between the donors and the recipients and to reduce the efforts required to search for blood donors. The proposed system includes all the procedures automated and also providing security, therefore with a computer system it can be faster and accurate.

2. LITERATURE SURVEY

Online blood bank management system is a application software to keep day to day communications in a blood bank system. The application assistance to register all the blood donors, blood gathering particulars, blood supplied particulars etc. Blood bank Administration discovers a strategy to accumulate blood from several places and give it to the ones who are in need [1][2][3]. The online blood bank system takes an organized method of how to link the gap between blood donors, blood banks and blood recipients. It recovers the present system by providing a common ground to ease the process of blood reception and donation [4]. Blood donation and transfusion has been an ever-serious issue and the shortage of blood throughout the world has caused many people to lose their life. The lack of a centralized system for blood donation is majorly responsible for those losses [5]. If there is a crucial need for blood, it may not be possible for people to search in the internet for online blood bank systems that are already in existence. So, by adopting this proposed methodology the caller is immediately connected to the donor [11], [12].

Blood is a very exclusive and valuable source to save lives and blood donation is very important health care for blood donors [7]. The Motivation of the online blood bank systems is to streamline and automate the process of searching for blood in case of urgency and maintain the records of blood recipients, donors, blood donation camps and blood banks [8]. Always people doubt whether their personal data and medical information is secured or not. In this purpose the proposed work aims to develop an online blood bank system including the concepts of database security with encryption algorithm. The encryption techniques will ensure the database doesn't go to a random third gathering. It uses AES encryption technique to store data and GPS to track the donor's location [9]. AES uses symmetric key block cipher for encryption and decryption process and the five modes of operation in AES will be presented, coupled with three sizes for respective parameters [6], [13].

Online blood bank system is web-based system, it supports the information of blood bags during its management in the blood bank. Website includes the availability of blood and quantity with the specified blood type along with the updated time. So that the blood needy people can go to website or web app service to whether blood is present there or not of the particular type [14]. If the required blood is there, he directly contacts the blood bank and in case of not present then requests are sent to the donors through messaging or calling the blood bank directly to registered donors or through app notification requesting them for donating blood urgently and receiver can get it from there as soon as donor donates it [10], [15]. Online blood bank systems provide security to medical reports and confidentiality. And also provide quick medical services like blood bag delivery.

In this literature survey the researchers educated the importance of web-based blood bank system in managing records for blood donors and blood donation activities to ensure accurate and readily available information for blood transfusion services. But overall facilities regarding blood availability on time not mentioning anywhere at the same time there is no security for donors as well as patients.

3. Proposed Online Blood Bank System Using Cloud Techniques

The main object of the proposed methodology provides security of donors and patients. Online blood bank system aims to achieve that any person who is willing to donate blood will have to register first through web app even if the user is new donor or the user can directly login if they have an account already. A form will have to be filled if any donor wants to donate blood. In the user account the user will be able to view all the details and records of all earlier donations as well as information about upcoming blood donation events. Apart from this proposed methodology using the concepts of database encryption to make sure that all the users medical records confidential and secure from any threats or any unforeseen hazards to the security of the data.

This paper is creating cloud-based blood bank system to make the blood available on time to the people even in emergency situations. And also, people can be able to view the useful information about hospitals, blood donor's details, location of blood banks etc. The security factor is maintained properly through their identify proof like

Aadhar number or licence and government document on which the blood group of the person is mentioned. Proposed system will consist of the android application which can be used in the smart phones and it will contain all the information of the donor and nearby hospitals. The web app will also maintain a GPS tracking system to find the location of the nearby hospitals. Registered people can get the notifications regarding blood donation camps, health centres etc. So that the person did not need to go out far for the search of the blood banks and hospitals. This application helps to save the time to a great extent and also helps in correct and quick decision making.

Proposed system covers the three basic operations of blood banks, namely: donor registration, monitoring of blood bags or product's inventories. The main idea behind this work is firstly the manual systems being used in blood bank systems are time consuming and are prone to errors. And also lack of information security. Another reason is in order to provide authorized features and authenticate to current systems where private and confidential data can only be viewed by authorized users. To propose a one web-based application where blood donors can register themselves to donate, therefore eliminating the drawbacks of the existing systems i.e., database insecurity. Proposed online blood bank system based on JavaScript with AWS cloud platform and supported with a database to store blood and user-specific details as shown in Fig. 1.

Fig. 1 Advantages of Cloud computing

This work maintains the website and enables the individuals who want to donate blood to help the needy people. It also permits hospitals to record and store the data for people who want to communicate with them, and also provides a centralized blood bank database in a secured way. The work will be using concepts of database encryption which is AES algorithm for data security to make sure that the users' information is kept secure and confidential. This will help us keep their donation records protected from any threats from individuals withpotentially malicious intentions, or any unforeseen hazards to the security of the data. Blood bank donor system is shown in Fig. 2, it monitors all the useful information and also ensures list of hospitals, availability of blood bags, information of blood donor and alerts for blood requirements etc.

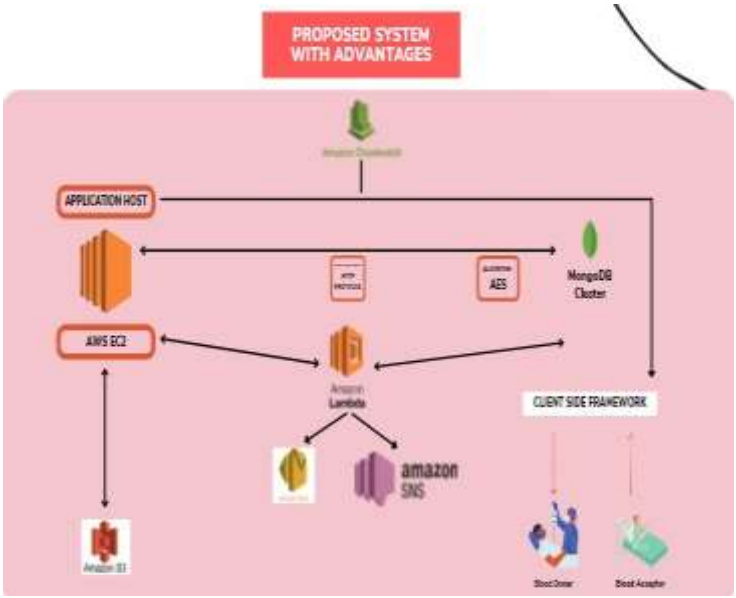

Fig. 2 Blood Bank donor System

3.1 Architecture of proposed system

Proposed work aims the user's data, personal information and medical records are safely stored and secured. Therefore, proposed work aims to develop an AES based online blood bank system using Cloud Techniques & applying the concepts of database security and encryption as shown in Fig. 3.

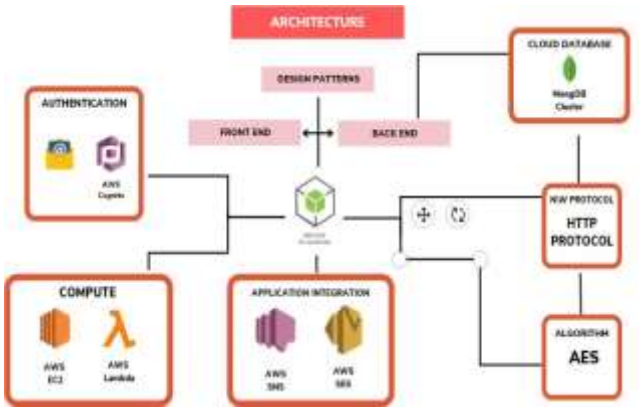

Fig. 3. Blood Bank System Architecture

4. Implementation of Advanced Encryption Standard Algorithm

AES algorithm considered secure and it is a symmetrical block cipher algorithm it is in the worldwide standard, that takes plain text in blocks of 128 bits and converts them to ciphertext using keys of 128, 192 and 256 bits. AES can encrypt and decrypt the information. The encryption part converts data into cipher text form and the decryption part converts cypher text into normal text form of data. Main advantage with this AES is implementation can be in both software and hardware to protect digital information in various forms of data, video and voice etc., from eavesdropping.

AES Sample Code:

```
var AES = function(key)
{
    if (! (This instance of AES))
{
    throw Error ('AES must be instantiated with `new`');
        }
        AES. prototype._prepare = function()
        {
        var rounds = number of Rounds [this. key.length];if (rounds == null)
        {
```

```
    throw new Error ('invalid key size (must be 16, 24 or 32 bytes)');
} // encryption round keys
```

AES algorithm takes input as user name, phone number, address etc., and one can get an output which displays the encrypted user data of the registered user. After running the code will get the following results snapshots as shown in below from Fig. 4 to Fig. 9.

5. RESULTS AND ANALYSIS

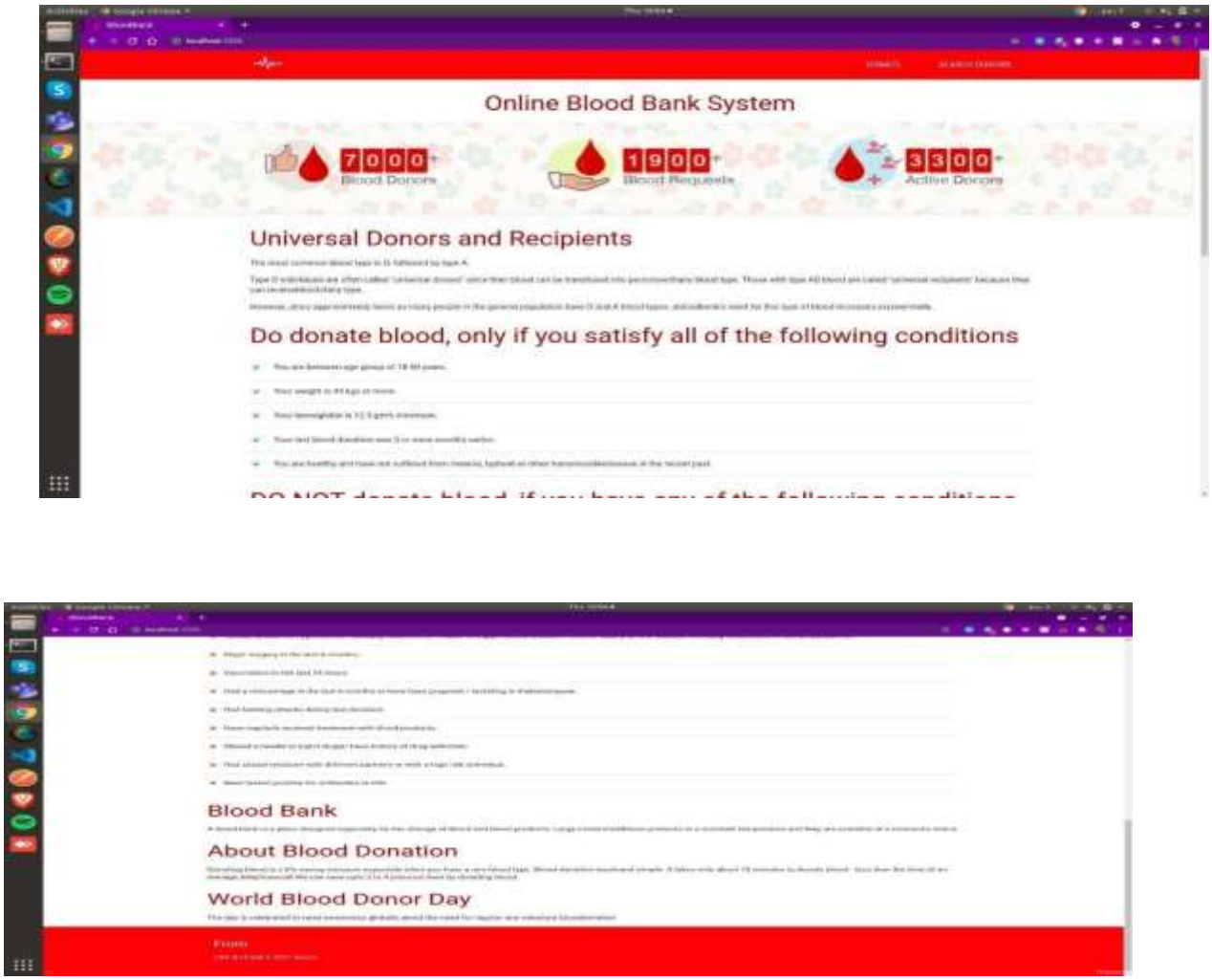

Figure 4. DESCRIPTION OF BLOOD BANK SYSTEM

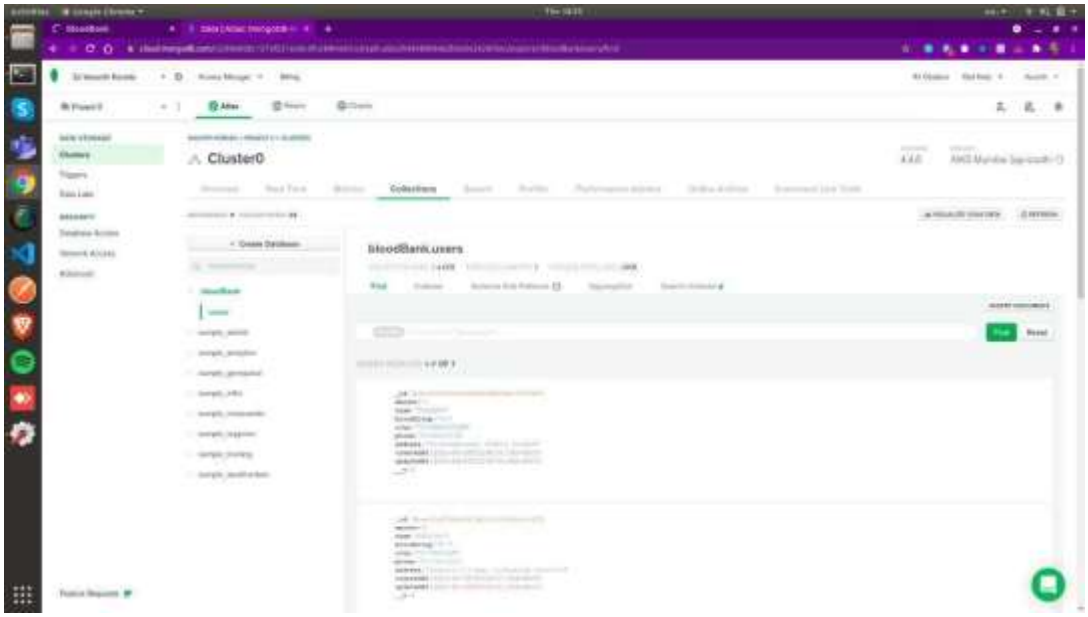

Figure 5. LIST OF DONORS SCREEN

Figure 6. DONATION REGISTRATION

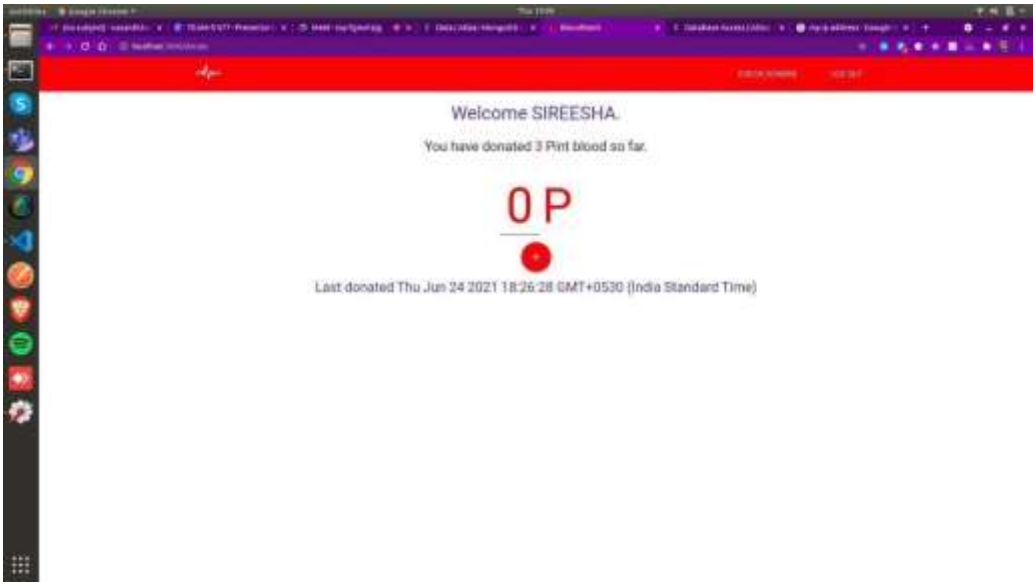

Figure 7. DONATION SCREEN

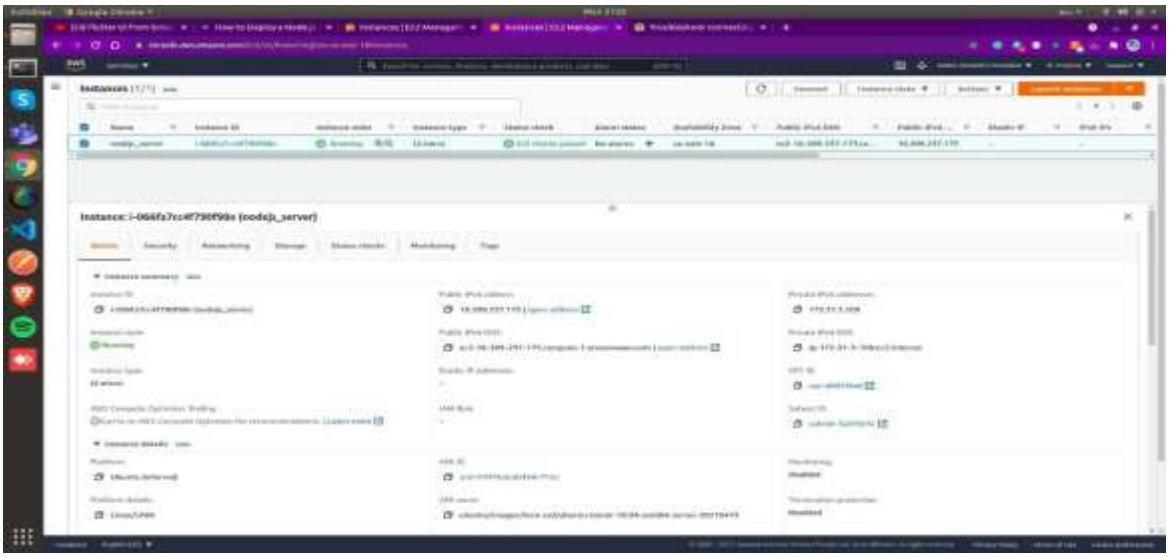

Figure 8. AWS EC2 instance

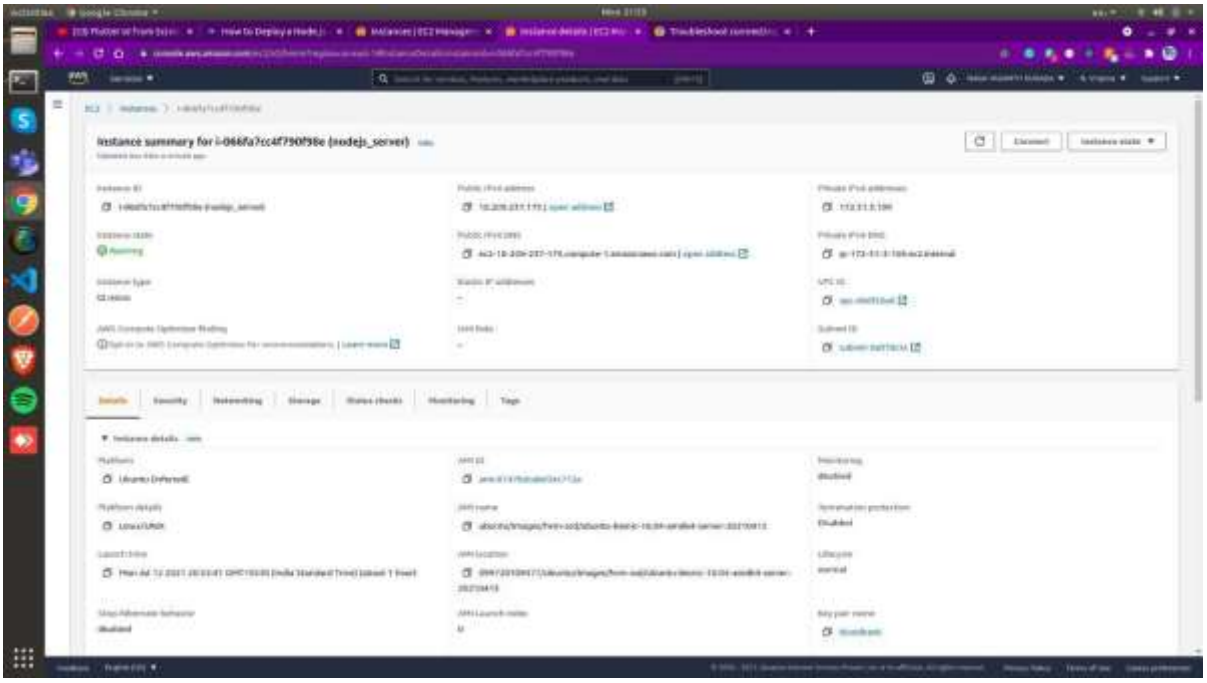

Figure 9. AWS EC2 instance Details

6. CONCLUSION

The main aim of this paper is creating cloud-based blood bank system to make the blood available on time to the people even in emergency situations, reduce the time required to deliver the blood to the needy in cases of emergency. And also, people can be able to view the useful information about nearby hospitals, blood donor's details, location of blood banks etc. Proposed online blood bank system aims to achieve that any person who is willing to donate blood will have to register first through web app even if the user is new donor or the user can

directly login if they have an account already. A form will have to be filled if any donor wants to donate blood. In the user account the user will be able to view all the details and records of all earlier donations as well as information about upcoming blood donation events. Apart from this proposed methodology using the concepts of database encryption to make sure that all the users medical records confidential and secure from any threats or any unforeseen hazards to the security of the data. The proposed AES Algorithm will help us keep users data records protected from any threats from individuals with potentially malicious intentions, or any unforeseen hazards to the security of the data. There are three beneficiaries which can get benefits from the management information system of blood bank which are donors (A person who wants to donate blood voluntarily at the blood donation camp. Information system also keeps the record of the donors who want to register online), Seekers (person who wants the blood from the blood bank due to various reasons likeaccidents, surgeries, delivery and many more) and Blood bank (staff people who are working in the blood bank which includes staffmember, operator, blood bank in charge, head of pathological department). Implementation of the algorithm and testing the user input data and displaying the available blood details finally delivers the results of the paper. Proposed work is a highly quality software to manage all these cumbersome jobs.

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