Gaining Rapid Vital fluid philanthropist using IOT

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ABSTRACT

Lack of awareness about blood donation, misconceptions, inadequate infrastructure, and improper storage and transportation of available products, leading to waste. To eliminate this complexity, we offer efficient technology for blood management systems, the so-called Intelligent Blood Management System "IBMS". It aims to meet the blood needs of hospitals through a system using IOT (Internet of Things). This is the fastest way and uses the unique idea of contacting people directly without internet access and without any interactions in addition to live tracking the donor's location.

Keywords: Analytical processing, Artificial Intelligence, Automated system, Blood Donation, Centralized system, Conventional methods.

1. INTRODUCTION

Blood- Life Force of every creation that lives on this planet has its only source from the people who donate blood on voluntary basis Most donations are because of replacement donations, which are non-remunerated donations, provided by the relatives of patients who need blood either on urgent basis or for anticipated transfusion during planned surgeries. Professional donors are those who donate blood in exchange for money. There has always been blood shortage in most of the blood banks because the blood banks fail to organize voluntary blood donation camps on a regular basis and depend mainly on replacement donors. As a result, there is always pressure on patients to procure blood when needed.

1.1 Paper Overview

To overcome these troubles, we introduce the new method for a smart blood management system, called Intelligent Blood Management System (IBMS) that intends to provide an efficient and a real time coordination of blood management within a blood bank as well as to establish great communication among multiple blood banks. This system uses a unique idea to connect with people directly without using the internet and other inter-communication. It uses an internal management analytic that always takes care of the availability of blood and using predetermined logic that can prepopulate a blood bank based on the highest

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frequency of the need of a certain blood in an area. This system has an integration of user interaction also, where hospitals can make requests for blood through the Software. This Software helps the user to link with the donors in the fastest way and track the donor's location.

1.2 Blood Donors Index

Approximately 118.54 million blood donations were collected worldwide. 40% of this waste is collected in high-income countries, home to 16% of the world's population. Some 13,300 blood centers in 169 countries reported collecting a total of 106 million blood donations till 02-Jun-2023.About 13,300 blood centers in 169 countries reported collecting a total of 106 million blood donations. 90 blood banks are functioning in government hospitals in the state, out of 90 blood banks, 39 blood banks are functioning as blood component separation units. There are 3,840 approved blood banks (blood centers) in the country.

1.3 Rotaract Club Origin

Rotaract began as a youth program of Rotary International in 1968 at the Charlotte North Rotary Club in Charlotte, North Carolina, United States and has grown into a large organization of 10,680 clubs. (September 14, 2022) worldwide and beyond. 203,000 members in 189 countries. It is a service, leadership, professional, and community service organization (often misinterpreted as a social service club) for young men and women 18 years of age and older. Rotaract focuses on developing young people to become leaders in their communities and workplaces. Clubs around the world are also involved in international service projects, in a global effort to bring international peace and understanding to the world. "Rotaract" means "Rotary in Action", although the name originally comes from a combination of "Rotary" and "Interact", the high school program created by Rotary International in 1962. However, Austin Jordan himself could not conclude what a definitive definition of a Rotaract was.

Most Rotaract activities take place at the club level Rotaract clubs hold formal meetings in person or online, usually biweekly, featuring speakers, special outings, social activities, discussions or visits to other clubs. Club members meet on designated days for service projects, social events or professional development leadership workshops. The number of voluntary blood donors increased from 54.4% in 2006-2007 to 83.1% in 2011-2012, with the number of blood units decreasing from 4.4 million units in 2006-2007 to 9.3 million units in 2012-2013In 2016, the Ministry of Health and Family Welfare reported a donation of 10.9 million units against the requirement of 12 million units.

In 2018, the Ministry of Health and Family Welfare, with the support of various organizations, released a detailed report on blood needs in India.12.7 million devices were donated in 2020, lower than expected due to the COVID-19 pandemic. A study conducted in 2022 extrapolated the number of eligible donors in India to 402 million. The estimated supply is 33.8 donations compared to the demand of 36.3 donations, meaning a shortfall of one million units per year. Medical specialties have the highest demand for blood with 6.0 million units (41.2%), followed by surgery with 4.1 million (27.9%), obstetrics and gynecology with 3.3 million (22, 4%) and pediatrics 1.2 million (8.5%). Friday 14 June 2024 World Donation Day.

1.4 Objective

The main goal of this application is to automate all blood bank operations. The search will also be very fast, so they can find the necessary details instantly. Develop an electronic information portal to create favorable conditions. Coordination between blood supply and demand. This system makes it easily available Blood and other blood components are of good quality and safe and can be provided in a healthy and ethical manner. It is acceptable, consistent with the long-term prosperity of the community. And makes mankind take the initiative to encourage voluntary blood donation and maintain a fully documented blood donation data. Raise awareness in the community about the benefits of blood donation. This will also serve as Interactive Software for best practices to reduce unnecessary blood use and help the state more efficient in

providing the blood. Our task is to link the donors with the required hospitals without any internet connections and navigate the donor's location which is between the hospital's nearby radius.

1.5 Introduction to IOT

The Internet of Things (IoT) is of particular importance in many different situations in our lives and industries thanks to its ability to connect and collect data from a variety of devices and sensors. Data collection and analysis, efficiency and automation, improved decision making, improved safety and security, environmental impact, healthcare, consumer convenience, governance Supply chain management, infrastructure management are some of the main reasons why IoT is important. The importance of IoT lies in its capabilities. to connect and leverage data from diverse sources, helping to improve efficiency, security, decision-making and convenience across many different sectors and aspects of our daily lives. It has the potential to generate significant economic and social benefits as it continues to develop and expand its applications.

1.6 Introduction to AI

Artificial intelligence (AI) is of immense importance in today's world and its importance continues to grow rapidly. All but the simplest human behaviors are attributed to intelligence, while even the most complex insect behaviors are not considered signs of intelligence. What is the difference? Consider the behavior of the burrowing wasp, Sphex ichneumonids. When the female wasp brings food back to her burrow, she first places it on the threshold, checks to see if there are any intruders in her burrow, and only then, if the way is clear, does she carry her food. it goes inside. The true nature of the wasp's instinctive behavior will be revealed if food is moved a few centimeters from the entrance to its burrow while it is inside. Once she emerges, she will repeat the entire process as often as the food is moved. Intelligence – which is clearly absent in the case of Sphex – must include the ability to adapt to new circumstances.

2. Literature Analysis

The current blood bank storage system is file controlled. This ensures that data and knowledge about blood type, donor's details and recipients are stored in documents and archives. Processing data and information then becomes difficult and time consuming. All blood donation tests, blood transfusions are also recorded on physical paperwork. This makes information powerless before blunders of people, thereby endangering human life. Another problem that lies within this framework is the lack of productivity. The tedious method of drawing blood, whether donor or recipient information, requires a lot of work.

Because finding information is a time-consuming process, it is very unlikely that a hospital can save lives at critical times. Information Protecting security and information is another additional point to consider as documents and records are easily stolen or lost. This makes it an unreliable framework. The goal of our project is to provide a platform where all blood donation related information, recorded blood donor, which can help ensure a rapid blood supply.

2.1 AI works with Blood bank management

Artificial intelligence (AI) can be a valuable tool in blood bank management by improving efficiency, accuracy and overall service quality. Here is some ways AI can be applied to blood bank management.

- *Inventory Management*
  AI algorithms can predict demand for blood products based on historical data, current inventory levels, and external factors like local events or accidents. This helps blood banks maintain optimal stock levels, reducing wastage and ensuring that critical blood types are always available.

- **Donor Recruitment**
  AI can analyze donor data to identify potential donors and tailor recruitment efforts. It can predict when donors are likely to donate again and send personalized reminders.

- **Patient Outcomes**
  AI can be used to analyze patient data and

outcomes, helping blood banks identify trends or issues related to the effectiveness of specific blood products or transfusion protocols.

▪ **Routing and Logistics**
AI-powered route optimization algorithms can track the donor's location and links to the hospitals. This reduces the time and ensures that blood products remain viable.

▪ **Overview of AI regarding Blood bank management (Fig.1).**
By leveraging AI in blood bank management, organizations can streamline operations, enhance patient safety, reduce costs, and better respond to emergencies. However, it's important to implement AI solutions carefully, ensuring that they are compliant with relevant regulations and that the safety and security of blood products and patient data are maintained all the time.
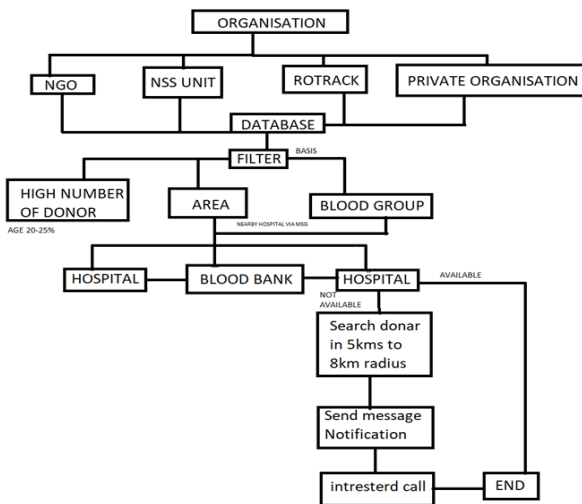

Figure 1. Flow chart of AI in Blood Bank Management

4.   Components of Blood Bank Management System

Blood Bank Management System (BBMS) is an important application in the medical industry that leverages technology to efficiently manage the storage, distribution, and tracking of blood and its components (Sibinga 2017,, Sinha *et al.*,2020, Kulshreshtha V, and Maheshwari DS. 2012, Priya *et al.*,2014, Kayode et al., 2019,Mohammad Nur,

2019). The system streamlines the process of maintaining an adequate blood supply for transfusions and ensures the safety and traceability of donated blood. The main components and technologies of modern BBMS are:

▪ **Database management system**
Store and manage donor information, blood stocks, and recipient details using a robust database system. This can be a relational database system such as MySQL, PostgreSQL, or a NoSQL database such as MongoDB.

▪ **User interface**
Develop easy-to-use web-based or desktop applications that are easy to access and enter data. The front end uses technologies such as HTML, CSS, and JavaScript. Frameworks like React, Angular, and Vue.js help you create responsive and interactive user interfaces.

▪ **User authentication and access control**
Implement secure user authentication and access control mechanisms to ensure only authorized personnel have access to sensitive information. You can use technologies such as OAuth, JWT, and SAML for authentication.

▪ **Donor management**
We collect donor information such as personal information, medical history, and blood type. Leverage technology such as barcode scanning to quickly and accurately identify donors.

▪ **Blood inventory management**
Track your blood and blood product inventory, including information such as blood type, quantity, expiration date, and storage conditions. Implement barcode or RFID technology for inventory tracking and management.

▪ **Blood collection**
Streamline the blood collection process by capturing donor information and collecting blood samples using a mobile app or handheld device. Mobile app development

can be done through platforms such as Android (Java/Kotlin) and iOS (Swift).

▪ **Stock alert**
Set automatic alerts when your blood supply is low or nearing expiry date to ensure you take timely action.

▪ **Distribution and tracking**
Track the distribution of blood supplies to hospitals and clinics and maintain records of recipient details for traceability.

▪ **Security and compliance**
We implement stringent security measures to protect patient and donor data and ensure compliance with healthcare regulations such as HIPAA.

▪ **Mobile app**
Develop a mobile app for donors to schedule appointments, view donation history, and receive notifications about upcoming fundraisers and urgent blood needs.

▪ **Integration with external systems**
Integrate with external systems such as electronic health records (EHRs) and hospital information systems (HIS) to seamlessly share data.

▪ **Backup and disaster recovery**
Implement a robust backup and disaster recovery plan to ensure data integrity and availability.

▪ **Training and support**
Provide training to staff and support to system users to effectively use the BBMS.

▪ **Continuous improvement**
We regularly update and improve our system based on user feedback and evolving technology trends.

5. Conclusion

Our smart blood management system is possible to benefit blood banks and hospitals by helping and automate the blood management process. This Software also provides real time analytics of the donations and requests of blood pouches. Our Software connects with the donors in the fastest way.swift critical fluid A philanthropist is a person or group that quickly and significantly contributes to charity, focusing on meeting pressing social needs. These donors place a high value on the effective use of funds in order to significantly improve the lives of those who are dealing with crises or life-threatening situations right away.Quickly critical fluid Agility and responsiveness are qualities that distinguish philanthropists. They act quickly to recognize urgent problems, gather support, and carry out plans that save lives and lessen suffering. They move quickly.

6. Future Scope

In future, if we get government sanction to access an individual's Aadhar card. So, from there our software will easily track the region, blood type etc. of each individual and all the details needed so we can provide services faster than today and help people. And we guarantee that this software will reduce blood shortage in less time worldwide.

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