



# BLOOD BANK MONITORING AND BLOOD IDENTIFICATION USING IOT DEVICE

ANBUMANI.P1, DEIVA DHARSHINI.R2, DURKA.M3, INDHUMATHI.M4

1 ASSISTANT PROFESSOR, 2,3,4 UG STUDENT

COMPUTER SCIENCE AND ENGINEERING

V.S.B ENGINEERING COLLEGE, KARUR, TAMILNADU, INDIA

## ABSTRACT

To ensure that blood is safe for patient use, optimal temperature must be maintained at all times. Blood bank monitoring not only reduces waste but also provides rigorous support for inventory levels to ensure patients receive blood when they need it. Manual recording of temperatures in blood banks has the potential to suffer from human error as well. Customizable and with low learning curves, an automated environmental monitoring system not only documents temperature but also motion and humidity to ensure the safety of blood. Also, with the help of an IoT application, blood donors can be identified using an RF tag. This can help more people in many ways, even saving lives at a critical time. The continuous monitoring and automatic updating of temperature, humidity values, and IR sensors are used to count the number of people inside the blood bank. The inbuilt time monitoring to ensure the expiring date of the stored blood packs in the blood bank is done through the cloud with the help of an IoT module. Then, which type of blood is available in the blood bank that information was identified using the Cayenne app through the IoT.

**Keywords:** Blood donor, LCD display, IR sensors and Automated Blood Bank

## 1. INTRODUCTION

Automated Blood Bank is an associate work that brings voluntary blood benefactors and those in need of blood on to a common platform. The charge is to fulfill every blood request in the country with a promising android operation and motivated individualities who are willing to contribute blood. The proposed work aims to overcome this communication hedge by

furnishing a direct link between the patron and the philanthropist by using low cost and low power snap microcontroller tackle." Automated Blood Bank" is a design that brings voluntary blood benefactors and those in need of blood on to a common platform. This design aims at servicing the persons who seek benefactors who are willing to contribute blood and also give it in the time frame needed. The proposed work aims at servicing the persons who seek benefactors who are willing to contribute blood and also give it in the time frame needed. Every time the state needs regarding four Core units of blood, out of that solely a stingy forty Lakh units of blood square measure out there. Every two seconds notoriety desires blood. further than thirty-eight thousand blood donations area unit needed a day. A complete of thirty million blood corridor area units transfused annually. further than one million new individualities are unit diagnosed with cancer annually. Several of them can would need blood, generally daily, throughout their remedy treatment. One automotive accident victim will need as several as hundred units of blood. All the on top of wants is met by the planned work. Automated Blood Bank tries to help victim's cases those in need of blood. The proposed work explores to find blood benefactors by using IOT grounded Smart system.

## 2. LITERATURE SURVEY

Sumet Umchid, Pateemoh Samae et al "Design and Development of a Temperature Controlled Blood Bank Transport Cooler" – IEEE, 2019

Blood bank transport cooler used thermoelectric peltier cooler to produce coolness and a microcontroller with Commensurable-IntegralDerivative(PID) regulator is used to

control the temperature in the blood bank cooler within the range between 2 °C and 8 °C. The current temperature in the cooler is covered on the TV display and the announcement as light and sound will be actuated when the current temperature is out of the asked range. They've vindicated the performance of the advanced blood bank cooler, the temperature measured from the temperature detector of the advanced blood bank is compared with the temperature measured from the temperature calibrator.

### **Fauwzziyyah O. Umar et al “The Prospect and Significance of Lifeline: An E-blood bank System” – IEEE, 2019.**

Blood bank service which ensures cases get quick access to blood benefactors of any type whether levy benefactors, relief benefactors (family or musketeers), or compensated benefactors, in each case, collective interest is defended. This existing system is designed to thrive indeed in the outermost of areas and easy for both youthful and old because it adopts the use of unshaped Supplementary Service Data or USSD law, Short Communication Service (SMS) and free risk line which makes the system available for both online and offline database queries. They've redounded, if this system is completely enforced, effective blood transfusion services will be in quick enhancement in Nigeria and by extension Africa.

### **Sadiq Abdelall et al “The Use of Discrete Event Simulation for Optimal Performance of Blood Banks (A Case Study of Al-Shifa Central Blood Bank)” – IEEE, 2020.**

The being system is an exploration is inspired by the former factors, and aimed at the satisfaction of blood demand whilst easing the outdated miracle of blood units. This design has approached the separate event simulation to model the force system of Al-Shifa Central Blood Bank (CBB) in Gaza megacity as a case study. O packed RBC and whole blood are the most problematic and grueling blood factors among the other bones and thus, this study is limited to them.

### **D.Venkateswara Reddy et al “Designing an Automated System to Check the Availability of Particular Blood Group in The Blood Bank in Comparison with IR Sensor and Conventional Method” – IEEE, 2021.**

The being system is to design an automatic detector system to check and modernize the bloodstock in the blood bank. Accoutrements and Method The samples are collected grounded on two groups, IR detector ( $N = 27$ ) and

Conventional system ( $N = 27$ ) with nascence error- threshold 0.05, registration rate as 01, 95 confidence position, power 80. It involves both tackle and software program perpetration. The software and tackle spark the detector and check the blood vacuity and display on the web runner at the same time

### **Saurabh Pargaien et al “Urge To Implement IOT For Monitoring and Preventing Blood Bank System Crisis” – IEEE, 2022.**

They've developed a Centralized blood banks are a result for utmost of the issues faced in current blood bank operation system and IOT has played a major important part in this field. pall grounded CBBMS has strengthened whole blood force chain and patient safety. There are numerous operations and web- grounded platforms available that use pall technology and internet, and are easy to use and manage. some of the online CBBMS apps are reviewed that are available in India and operation of IOT in CBBMS at broader scale to ameliorate the functioning of current apps, exercising IOT to educate and produce mindfulness among community about blood donation.

### **3. EXISTING SYSTEM**

In this paper, we propose a private Ethereum blockchain- grounded result to automate blood donation operation in a manner that's decentralized, transparent, traceable, auditable, private, secure, and secure. The proposed result stores on-critical and large data off- chain using the decentralized storehouse of the Inter Planetary train System (IPFS). We present the system armature, sequence plates, reality- relationship illustration, and algorithms to briefly explain the working principles of our blood donation operation result. We estimate the performance of our result in terms of effectiveness and effectiveness through performing security analysis. We make our smart contract law intimately available on Github.

### **4. PROBLEM IDENTIFICATION**

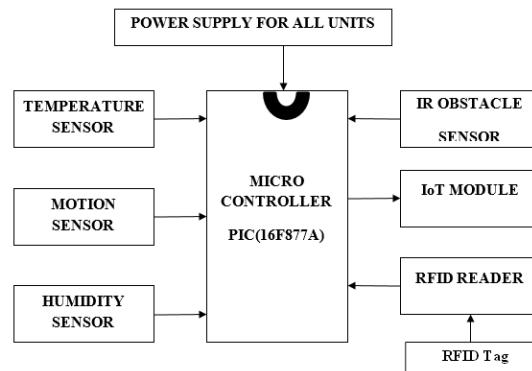
Our being blood bank monitoring system has major downsides due to homemade work. In our being system services of blood bank are also not good and perfect. People are also not satisfied with the current system because numerous times they've suffered from lack of blood at critical situation. The temperature of the blood storehouse room is manually recorded or alert is given only when after the temperature rises above limit. The record of the blood isn't automatically recorded.

Also Blood cold chain isn't covered duly. therefore, we're trying to represent the idea about robotization in blood bank monitoring and to see the vacuity of blood at any situation in any place through iot and reduce the mortal reliance in the system.

## 5. PROPOSED SYSTEM

Blood is a redeemer of all being lives in case of exigency requirements. In our proposed "Automated Blood Bank" is to collect the information from the benefactors, to cover the Blood group to shoot the needed Blood during the need of philanthropist in case of exigency. We want to make a network of people who can help each other during an exigency. By using low cost and low power IoT module. To assure blood is safe for patient use, it's necessary to constantly maintain optimal temperature. Blood bank monitoring not only reduces waste but provides rigorous support of force situations to insure cases admit blood when they need it. Homemade recording of temperatures in blood banks has the eventuality for suffering mortal error as well. Customizable and with low literacy angles, an automated environmental monitoring system not only documents temperature but also stir and moisture to insure the safety of blood. nonstop monitoring and automatic update of temperature and other factors. Identification of near blood banks and blood benefactors in case of exigency. This can help further people in numerous ways indeed can save live at a critical time. Blood bank monitoring not only reduces waste but provides rigorous support of force situations to insure cases admit blood when they need it. Homemade recording of temperatures in blood banks has the eventuality for suffering mortal error as well. The proposed system is an IoT system which will nearly cover the available status of the blood and temperature and moisture of the refrigerator which is present inside the blood bank. Blood bank has seeing unit installed to it which has two IR detector, moisture temperature detector, snap regulator as a gateway with Wi- Fi module using wireless protocol for wireless communication between blood bank and pall. Customizable and with low literacy angles, an automated environmental monitoring system not only documents temperature but also stir and moisture to insure the safety of blood. nonstop monitoring and automatic update of temperature and other factors. Inbuilt time covering to insure the expiring date of the stored blood packs and streamlined to the pall. RFID anthology is used to reads the RFID grounded smart blood pack and

modernize the available blood pack to the pall using cayenne garçon. The stoner/ consumer can view the blood group with stored date & time without any mortal intervention. IR Sensor is used the senses the mortal inside the blood bank storehouse area to insure the safest blood/ uninfected blood. Identification of near blood banks and blood quality with date and time in case of exigency using IoT module. This can help further people in numerous ways indeed can save lives at a critical time.



**FIG :1 BLOCK DIAGRAM**

### 6.1 HARDWARE REQUIREMENTS

- Power Supply & Transformer
- PIC microcontroller(16F877A)
- Motion sensor
- Temperature sensor
- IR sensor
- Humidity sensor
- RFID Reader
- RFID Tag
- LCD display
- IoT Module – ESP8266-12E (NODE MCU)

### 6.2 SOFTWARE REQUIREMENTS

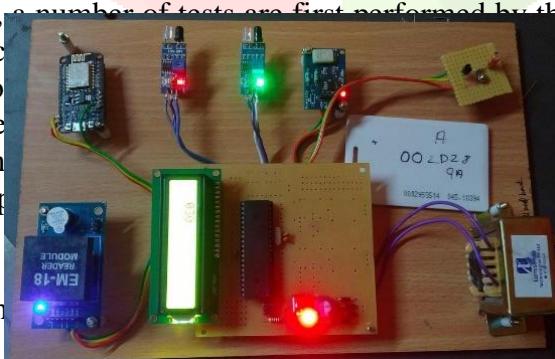
- MP LAB IDE Software
- ARDUINO IDE – ATMEGA 328P
- Module programming software

### 7. RESULTS AND DISCUSSION

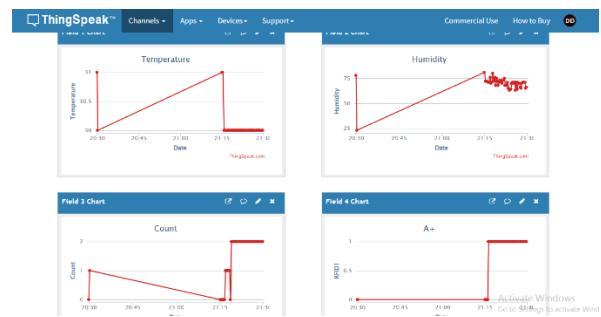
There are three different motifs related to the Internet of effects conception that has major unborn compass in terms of enhancement and exploration effectiveness, scalability and quality of service. The advanced system is prototype interpretation which provides the information about the available bloodstock. It consists of an array of IR detectors that covers the minimum area. To cover large blood packet, the IR detectors can be replaced by the cargo cell. It'll cover the

large blood packet and help efficiently to give information on bloodstock on a real-time base. Also, one alert system using RFID Label with smart temperature detector can be also added to the system for indicating the departed blood packet and its temperature. In the future, this work can be extended in the environment of total blood banks of a country.

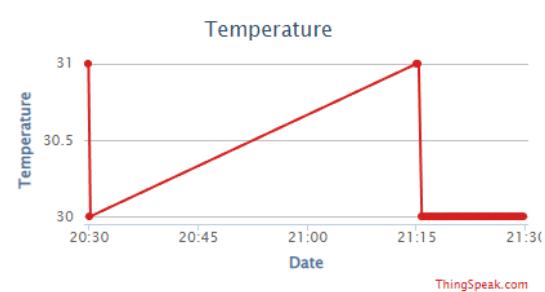
Big Data analysis can be done on the gathered data from Region. So that the specific sphere names can also be allocated to the blood bank app. Also on the website of blood bank, the login id and watchwords can be handed to the blood campaigners so that they can be made the online request for the blood units. The sanitarium blood bank is in charge of managing blood bags from the time they're entered from the blood patron to the time they're transferred to the blood donors for transfusion. Blood is veritably sensitive to temperature and should be stored in a temperature-stable terrain, similar as a refrigerator, to help deterioration during storehouse and transportation. To help circular deterioration of blood, the detector network using the IoT and the temperature detector installed in the blood bank refrigerator were used. This detector measures the temperature inside the refrigerator and transmits measures to the Gomorrah knot and the laptop, which is connected to the pall garçon through internet each over the world.



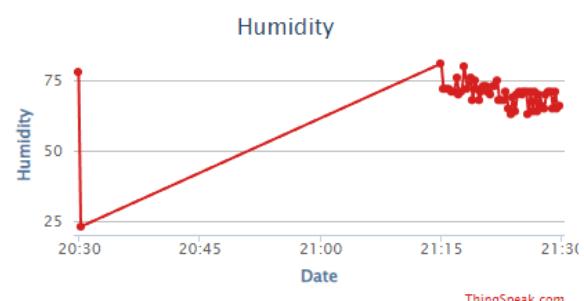
## **FIG:2. DESIGN SETUP**



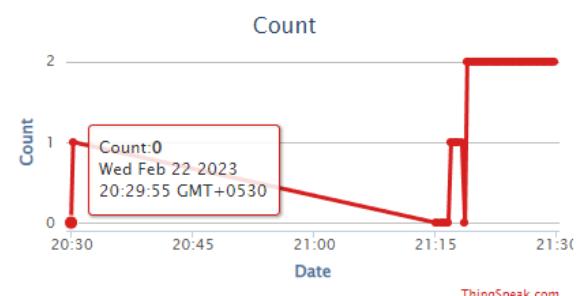
### **FIG 3. THINKSPEAK APPLICATION PAGE**



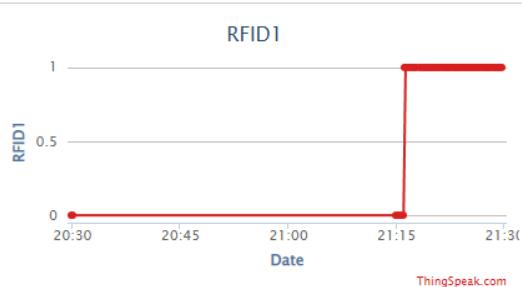
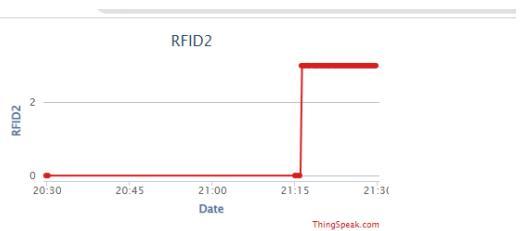
#### **FIG 4. TEMPERATURE GRAPH**



### **FIG 5. HUMIDITY GRAPH**



**FIG 6. IR SENSOR GRAPH**

**FIG 7. RFID TAG 1 GRAPH****FIG 8. RFID 2 TAG GRAPH**

## 8. CONCLUSION

The perpetration of an IoT-grounded blood bank monitoring and blood identification system can greatly enhance the effectiveness and delicacy of blood operation in healthcare installations. This system utilizes IoT bias, similar as detectors and RFID markers, to continuously cover the conditions of blood samples and insure their proper identification and storehouse. This can help prevent crimes in blood transfusion procedures and ameliorate patient safety. likewise, this system can also give real-time data on blood force situations, expiration dates, and operation patterns, allowing healthcare installations to more manage their blood force and reduce waste. By using the power of IoT technology, blood banks can optimize their operations and give better care for cases. Overall, the perpetration of an IoT-grounded blood bank monitoring and blood identification system has the implicit to revise blood operation in healthcare installations, perfecting patient issues and enhancing overall effectiveness.

## 9. REFERENCES

- [1] Why Blood Donation Are So Important. Accessed: Jan. 20, 2021. [Online].
- [2] FeelGood: A Blood Donation System Based on Smart Contracts. Accessed: Mar. 20, 2021. [Online]. Available: <https://www.northeastern.edu/rise/presentations/feelgood-a-blood-donation-system-based-onsmart-contracts/>
- [3] Dubai Health Authority. Accessed: Apr. 20, 2021. Available: <https://www.dha.gov.ae/en/SpecialtyCentres/DubaiBloodDonationCenter/Pages/FAQ.aspx>

[4] Sensire. Blood Cold Chain—The Challenges of Saving Lives. Accessed: Apr. 24, 2021. [Online]. Available: <https://www.sensire.com/blog/blood-cold-chain-the-challenges-of-saving-lives>

[5] S. Kim, J. Kim, and D. Kim, "Implementation of a blood cold chain system using blockchain technology," *Appl. Sci.*, vol. 10, no. 9, p. 3330, May 2020

[6] T. Hannon, "Waste not, want not," *Amer. J. Clin. Pathol.*, vol. 143, no. 3, pp. 318–319, Mar. 2015, doi: 10.1309/ajcpmp8facvc0rprg.

[7] Design Guidelines Centres—Who. Accessed: Mar. 18, 2021. [Online].

[8] How Are Blood Component Expiration Dates Determined? Accessed: May 16, 2021. [Online]. Available:

[9] What Happens to Donated Blood. Accessed: May 23, 2021. Available:

[10] MED Alliance Group. (Aug. 4, 2020). The Blood Supply Chain—Learning About the Points of Failure. Accessed: Feb. 12, 2021. [Online]. Available.