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# IOT IV Bag Monitoring and Health Observation Alert System

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**ABSTRACT:** The IoT IV Bag Monitoring and Health Observation Alert System project is a comprehensive solution designed to monitor IV bags and track vital health parameters, ensuring timely intervention in critical situations. Leveraging Raspberry Pi as the core computing platform, the system integrates various sensors to monitor factors such as IV bag weight, temperature, and patient vital signs. Real-time alerts are generated and transmitted via MQTT protocol, enabling health care providers to respond promptly to any deviations from normal conditions. This research presents a portable physiological checking framework that can continuously monitor the patient's vital signs. suggested a continuous monitoring and control system to record patient data and assess patient status. An IoT-based remote health monitoring system.

Nowadays, every nation places a high priority on health care. The Internet of Things, or IoT, is the next technological revolution and a rapidly expanding field of study, particularly in the medical field. The use of smart phones and wearable sensors has increased, has accelerated the evolution of remote health care monitoring. Even if the doctor is far away, using IOT IV Bag Monitoring and Health Observation Alert System obtains an accurate diagnostic of the patient's condition.

**KEYWORDS:** ESP32 Microcontroller, DTH11 Temperature sensor, Pulse sensor, HX711 Load sensor, Blynk IOT Platform.

## I. INTRODUCTION

The administration of drugs and fluids to patients via an IV line is monitored and controlled using intravenous (IV) drip monitoring. IV drip monitoring devices are designed to guarantee patients receive fluids and drugs in a secure and efficient manner. Systems for monitoring IV drips can assist medical professionals in Observe the infusion rate. By measuring the rate at which fluids and medications are given to a patient, IV drip monitoring systems can assist make sure that the appropriate amount of fluids or medication is given at the appropriate time.

IOT IV Bag Monitoring and Health Observation Alert System using ESP32, is revolutionizing healthcare monitoring. This system collects data from IV bags and patient health evaluations in real time using an ESP32 microcontroller. The healthcare industry benefits from the integration of Internet of Things (IoT) as it increases overall efficiency and improves patient care.

Data on the patients will be supplied through the internet or IoT cloud to the hospital that is working together. The attending physician at the hospital will keep a close eye on the patient's overall health. It is particularly beneficial since it reduces the time it takes to obtain a patient's medical record and allows the doctor to view all of the patient's data before the patient even arrives at the hospital. Encouraging patients to send their health information to hospitals facilitates the preparation of necessary supplies for therapy.

## II. RELATED WORK

Ananda Mohan Ghosh et al. [1] has suggested using an E-health sensor shield kit interface kit to manage the hospital's health monitoring system, enabling family members and consulting physicians to remotely monitor the patient's condition online. However, it doesn't notify the relevant doctors and family members by email or SMS alert.

P Kumar et al. [2] has suggested a Raspberry Pi-based patient monitoring healthcare system that tracks the patient's bodily movement, heart rate, temperature, and respiration level. Data is gathered from sensors and shown on the screen using Putty software. Nevertheless, our suggested approach includes an alarm warning system to force doctors or family members to hand over the patient the needed medications.

By Lu et al. [3] Design and implementation of a smart intravenous infusion monitoring system. It can monitor the infusion process & detect any problems, such as occlusion, air bubbles, or disconnection of the IV line. This system uses an IoT platform and sends alerts to healthcare providers in real-time.

By Kim et al. [4] ZigBee technology is used in a wireless intravenous monitoring system (2015): This paper describes the planning and execution of a ZigBee-powered wireless intravenous monitoring device. When wanted, the system can send three notifications to healthcare providers to notify them of any irregularities in the infusion flow rate.

Jasmeet Chhabra. [5] proposes the plan and implementation for emergency medical services based on IoT health monitoring system. In this project, the patient health-related problems and healthcare cost are reduced.

By Ravi Kishore Kodali. [6] proposed the healthcare monitoring which is implemented to check the temperature of the patient. The Zig Bee mesh protocol is used where the patient 24-hour care records are being monitored. In-hospital records are maintained in the cloud.

N. GANESH. [7] proposed and published a Health Monitoring System using a Raspberry Pi and IOT in the Oriental Journal of Computer Science and Technology. The proposed method offers patients more effective and efficient medical care, and the information.

Wang et al. [8] IoT platform and has the ability to instantly notify healthcare practitioners of threats. "Internet of Things-Based Wireless Intravenous Drip Monitoring System" (2018): The design and execution of an Internet of Things-based wireless intravenous drip monitoring system are presented in this article. The infusion process may be tracked by the system, which can also identify issues and notify medical professionals.

Geo et al. [9] "Creation of an internet-of-things-based intravenous infusion safety and monitoring system" (2020): The creation of an IoT-based intravenous infusion safety and monitoring system is presented in the present article. The infusion process may be tracked by the system, which can also identify anomalies and notify medical professionals.

### III. KEY HIGHLIGHTS

1. **Sensor Integration:** The project demonstrates effective integration of multiple sensors, ensuring accurate data collection and reliable performance across various health parameters.
2. **Alerting Mechanism:** Real-time alerts are triggered based on predefined thresholds, providing healthcare providers with timely notifications to address critical situations promptly.
3. **ESP32 Microcontroller:** 1. The ESP32 microcontroller is a strong and adaptable gadget with excellent performance and low power consumption. Because it has Bluetooth and Wi-Fi built in, it is perfect for Internet of Things applications. An essential component of IV bags and health monitoring sensors' data collection and transmission processes is the ESP32 processor.
4. **Robustness and Reliability :** The system operates robustly in healthcare environments, with few instances of communication problems or malfunctioning sensor

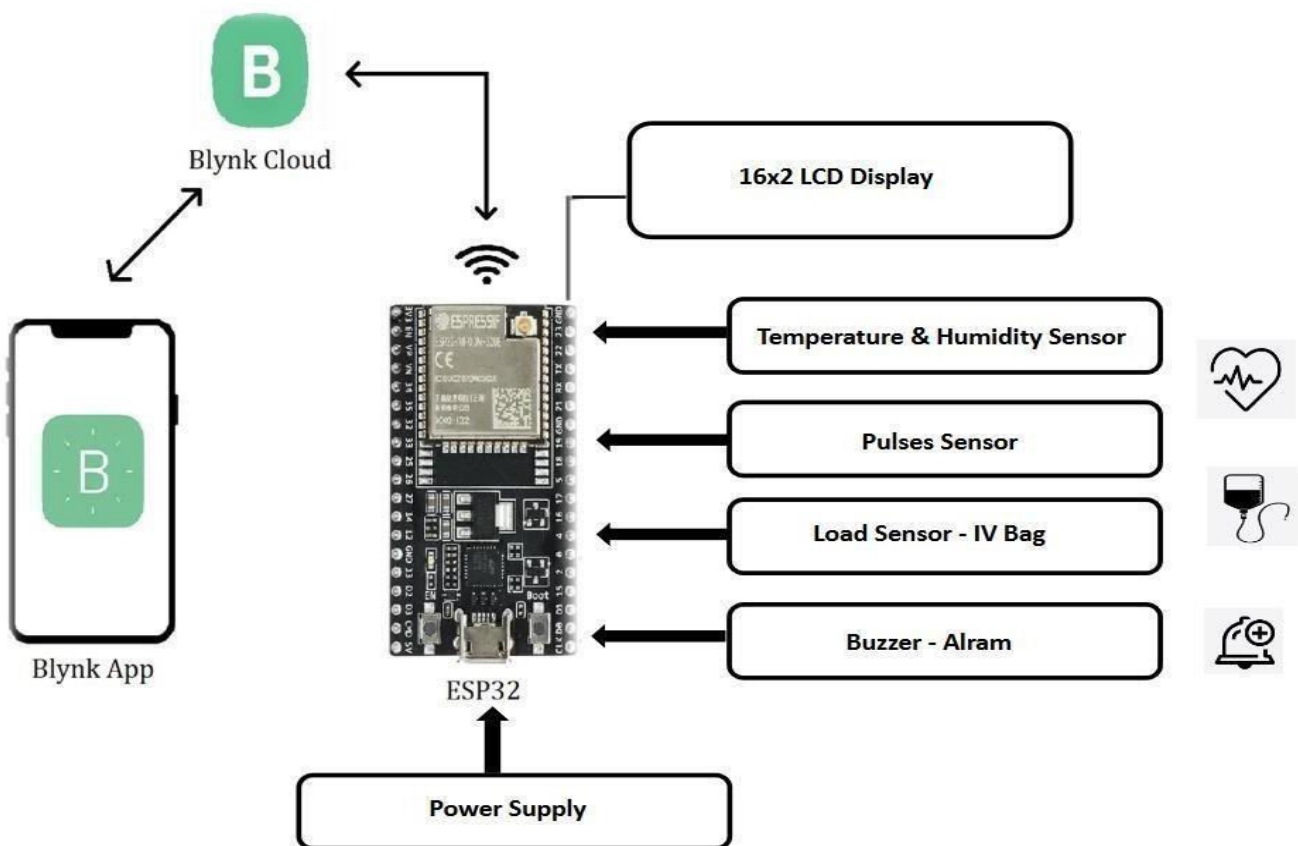
### IV. HARDWARE AND SOFTWARE COMPONENTS

- ESP32 (any model with internet connectivity)
- Weight sensor (e.g., load cell with HX711 ADC)
- Temperature and humidity sensor (e.g., DHT11 )
- LCD Display
- Buzzer for alerts

- Power supply for ESP32 and sensor
- C and C++ code to read sensor data and send alerts
- MQTT broker for communication
- Web server or dashboard for visualization
- Client application to receive alerts

## V. PROPOSED SYSTEM

### Block Diagram



Our system, which uses the ESP32 as its central processing platform, incorporates a number of sensors to keep an eye on things like IV bag weight, patient vital signs, and temperature. Healthcare providers can react quickly to any variation from normal conditions by using the MQTT protocol to generate and transmit real-time notifications. Devices installed in different systems can be connected over the internet thanks to the Internet of Things.

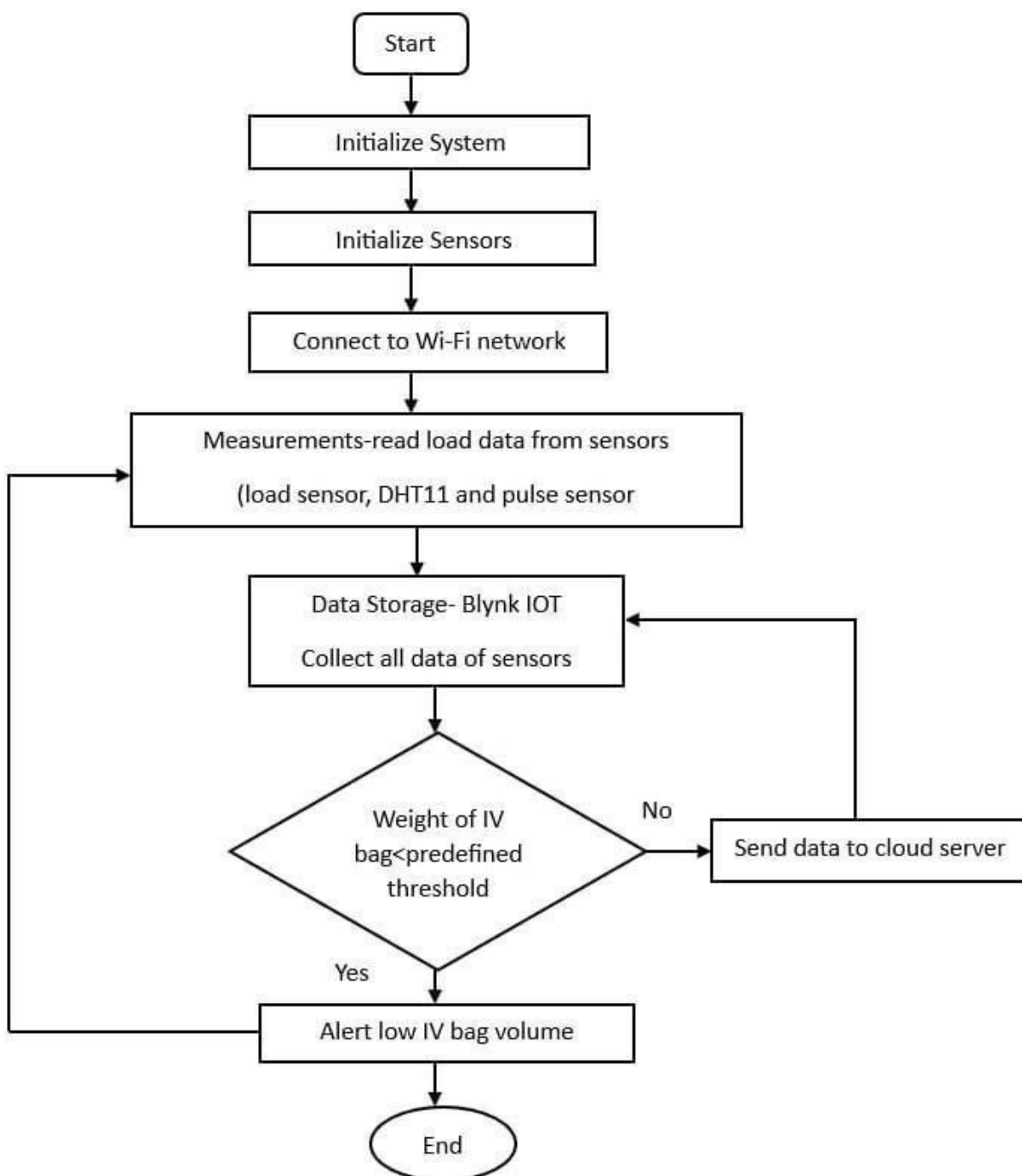
A tiny stand has the Weight Sensor fastened to it. To maintain equilibrium, the stand is constructed with a cross section at the bottom. The weight sensor hook on the stand can be suspended by the user using a small rod that extends from the top. Initially, the weight of the unfilled IV bag is measured using the weight sensor. Its weight is determined by this. The IV bag drips continuously until the fluid runs out while it is suspended on the sensor stand. The output voltage of the integrated circuit temperature sensors in the DTH11 series is linearly proportional to the temperature in centigrade.

Therefore, a temperature sensor is better than a linear temperature sensor. When using sensors measured in Celsius, the user does not need to reduce the significant constant conductivity from the output in order to convert the scale to

centigrade. A temperature sensor is an item that monitors changes in body temperature. Health observation sensors measure vital signs like heart rate, and oxygen saturation. Continuous monitoring of these parameters provides valuable insights into patient health status.

healthcare professionals for timely intervention. which is able to continuously monitor all of the patient's parameters suggested a continuous monitoring and control device to record patient data in the Blynk IOT Platform and monitor the patient's status. It maybe considered to use IoT to create a remote health monitoring system where authorized personnel can access data stored on any IoT platform. The doctors may diagnose patients remotely based on the values obtained from this system.

### VI. FLOWCHART

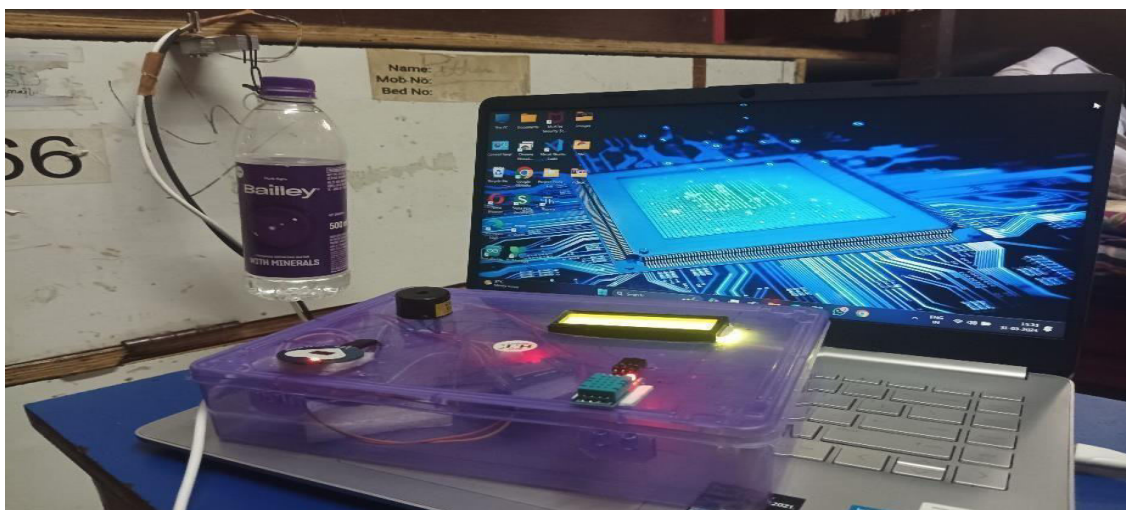
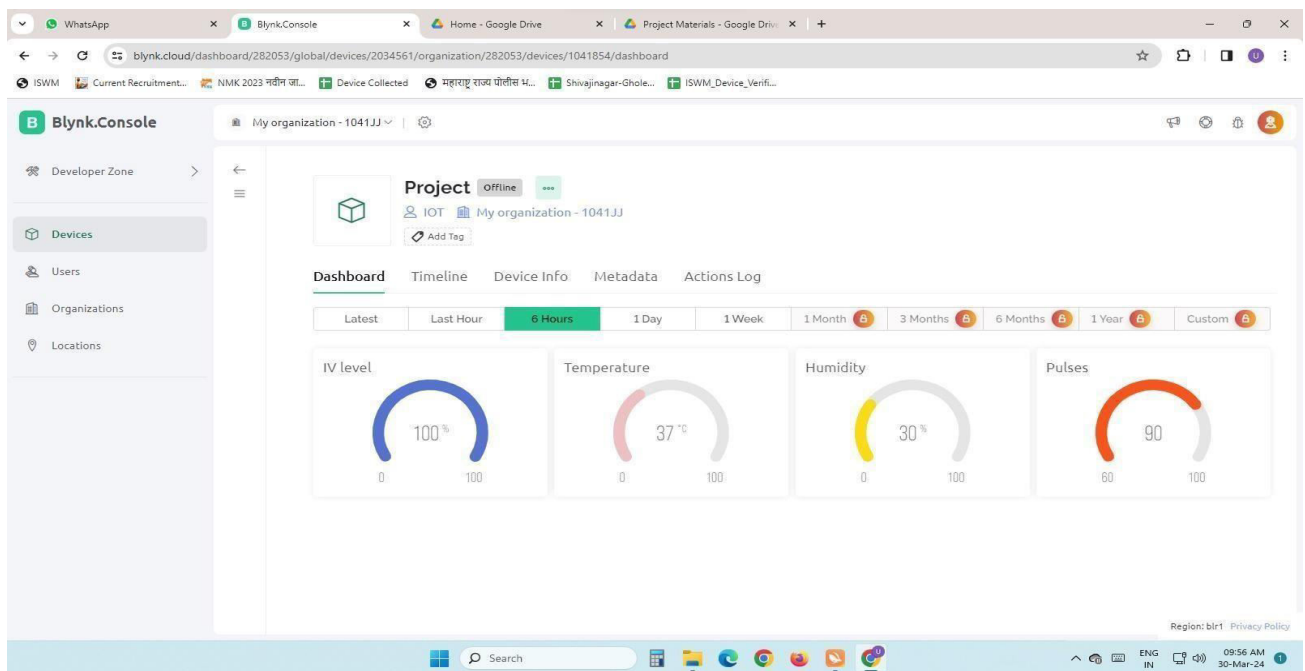


## VII. RESULTS

Results that are created in real-time are those that are made available instantly or very quickly. Within the framework of the system under discussion, "real-time results" would pertain to the instantaneous data and information that the system collects and presents while it is in operation.

The using IOT Platform allows for the real-time monitoring and analysis of multiple factors, including body temperature, heart rate, and fluid level, and others, in the results. Users of the system can ensure the safe and efficient administering of medication to patients by taking necessary action and making educated judgments based on the real-time findings presented by the system.

Healthcare providers may make sure that patients receive the right care and that any discrepancies from normal values are quickly identified and taken care of by keeping an eye on these metrics in real-time. We also check all data in mobile platform using of blynkapp of IOT.

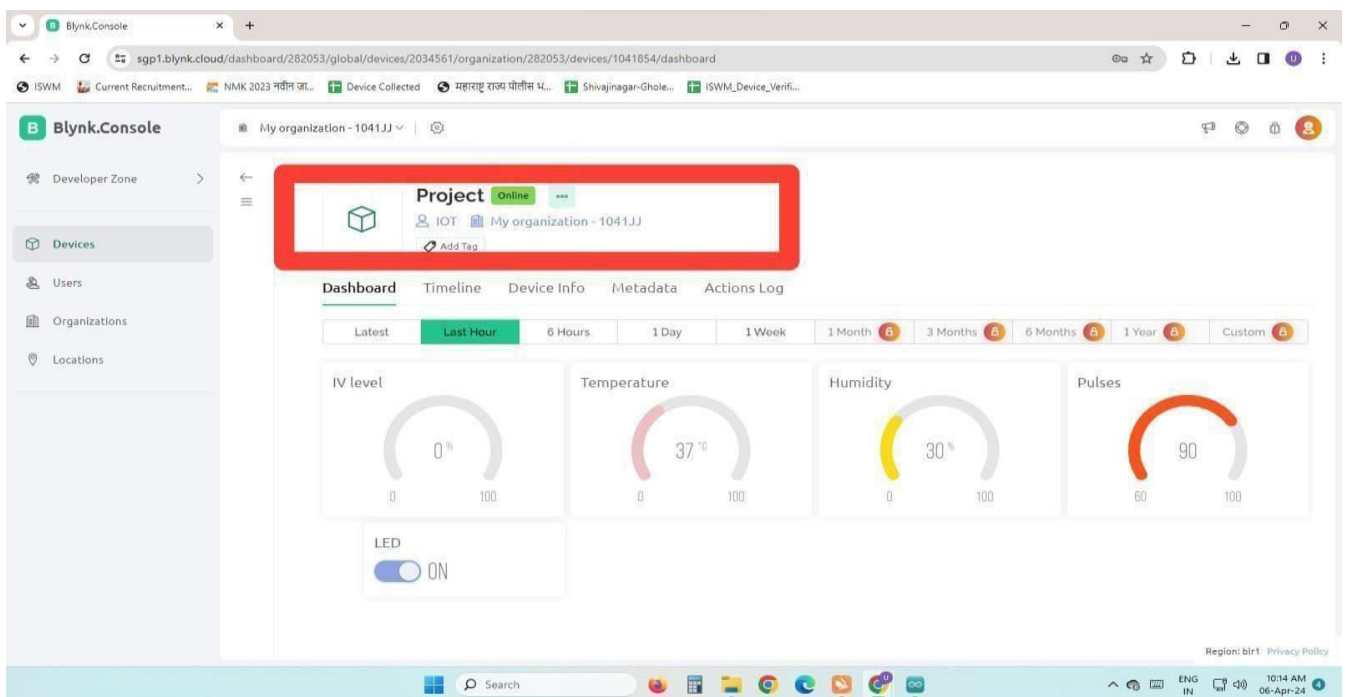


All things considered, this outcome shows how the system can track and evaluate patient data in real time, giving important information about the patient's health and facilitating efficient medical decision-making.

The suggested solution was put into practice, and patients' real-time data is accessible via the Blynk IOT cloud channel. The doctor from the affiliated hospital can simultaneously diagnose and monitor the patient when contemporary sensors are affixed to the patient's body.

The database contains the patient's past information, which aids the doctor in providing the patient with accurate care. At a specific interval, the system transmits the real-time data to the cloud channel. The graphical display of data makes it easier to interpret the information and calculate the outcomes.

The Blynk IOT Platform is user-friendly, intelligible, and simple to use. Using an ESP32 microprocessor, the Blynk IOT Platform may be linked to a WIFI network. During the connection process, the connection's online and offline state can be viewed through an LED on the OFF button and in the user interface at the green button.



## VIII. CONCLUSION

An important development in healthcare technology is the IoT IV Bag Monitoring and Health Observation Alert System, which provides unmatched chances for proactive patient monitoring and care delivery. We can realize the full potential of this system to revolutionize healthcare delivery and enhance patient outcomes by implementing the above-mentioned guidelines and iteratively enhancing the system in response to user feedback and technical improvements.

It represents a transformative approach to healthcare monitoring. The system's integration of IOT technology, ESP32 microcontroller, and real-time data analytics offers unprecedented insights into patient health. By leveraging innovation and technology, healthcare providers can enhance patient care, improve clinical outcomes, and advance towards a more connected and proactive healthcare ecosystem.

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