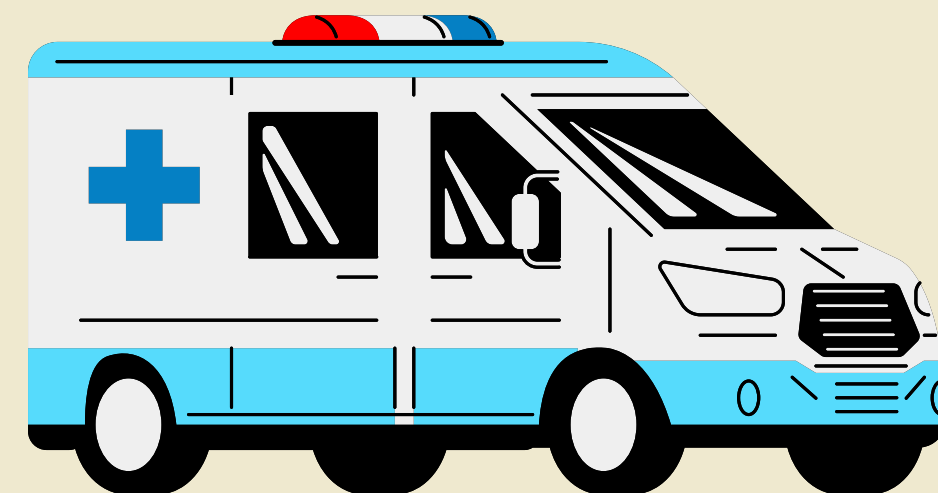# Submission Title,Team Name&Members

Title:- Patient monitoring device using 5g IoT integration

Team Name:- Ambu Trackers

Members:- 1. Tanisha Basu
2.Shreya Ojha
**3.Jyotika Jayani**
4.Shiven Sisodia

problem attempting to solve

In the transition of patients from high acuity environments such as operating rooms (OR) or intensive care units (ICU) to lower acuity wards, significant physiological changes may occur due to the altered environmental conditions. Among these patients, individuals experiencing frequent seizure attacks present a particularly critical scenario, often necessitating immediate medical attention. However, the timely arrival of ambulance services may pose challenges, potentially exacerbating the patient's condition.

To address this challenge, our solution entails the utilization of wearable monitoring devices capable of real-time data collection and analysis. By leveraging advanced hardware and software components, we establish a comprehensive monitoring system integrated with Internet of Things (IoT) cloud infrastructure, specifically utilizing the Blynk platform.

This system enables continuous monitoring of the patient's physiological parameters, including vital signs and seizure activity, during the transition period from high to low acuity environments and beyond. By aggregating and analyzing this real-time data, healthcare providers can remotely assess the patient's condition and make informed decisions regarding the necessity of hospital admission or discharge.
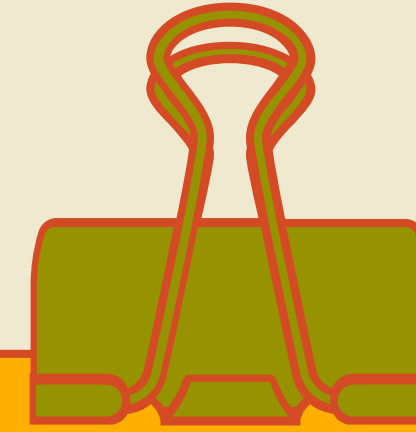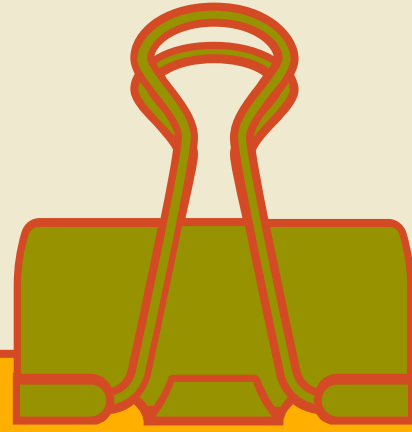
The implementation of this solution offers several key benifits including:-

- Timely intervention: Immediate detection of seizure activity allows for prompt medical response, even in the absence of onsite healthcare professionals.
- Cost savings: By avoiding unnecessary hospital admissions for patients whose condition is stable, significant cost savings can be achieved within the healthcare system.
- Enhanced patient outcomes: Continuous monitoring facilitates early detection of signs of recovery, enabling timely discharge and improving overall patient outcomes.

In summary, our solution combines cutting-edge hardware, software, and cloud-based infrastructure to address the critical need for continuous monitoring of patients transitioning between high and low acuity environments. By leveraging wearable technology and IoT connectivity, we empower healthcare providers to deliver timely and effective care, ultimately improving patient outcomes and reducing healthcare costs.

IDEA/SOLUTION

Explanation of Solution

Hobby Project:- Seizure monitoring device using 5g IoT integration

PROJECT OVERVIEW:-

This project aims to develop a simple system for monitoring key health parameters: pulse rate, temperature, blood pressure, and EEG signals. The collected data will be transmitted to the Blink IoT platform and subsequently displayed on a hospital dashboard for real-time monitoring

Is your idea unique or is an improvisation of an existing solution?

ABSOLUTELY YES

Requirements and Components:-
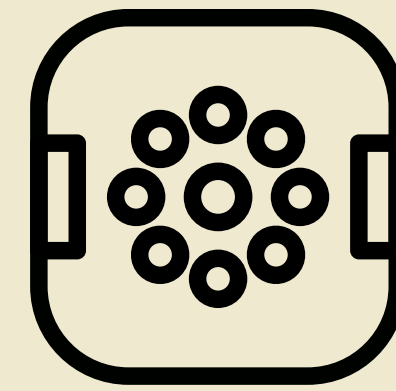
1. Sensors and Measurement Modules:

i. Pulse Sensor: To measure the pulse rate. A popular choice is the Pulse Sensor Amped, which is easy to interface with microcontrollers.

ii. Temperature Sensor: A digital temperature sensor like the DS18B20 or LM35 can provide accurate body temperature measurements.

iii. Blood Pressure Sensor: Modules like the MPX5050GP Pressure Sensor can be adapted for non-invasive blood pressure monitoring, though integrating such sensors may require additional signal processing expertise.
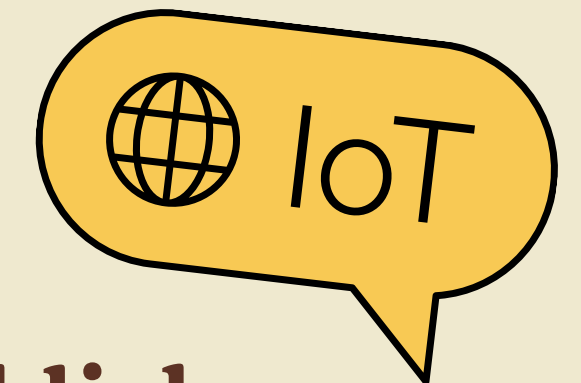
EEG Electrodes and Amplifier:- For EEG signal capture, the AD8232 ECG module can be repurposed, or specialized EEG modules like the OpenBCI board can be used for higher quality signals.

2. Micro controller/Development Board:-

i. A development board with Wi-Fi capabilities, such as the ESP32, is ideal for this project. The ESP32 offers sufficient computational power for processing sensor data, Wi-Fi connectivity for data transmission, and compatibility with a wide range of sensors and modules.

3. Connectivity and IoT Platform Integration:-

i. Blink IoT Platform: Utilize the Blink library for ESP32 to establish a connection between your device and the Blink IoT platform. You'll need to configure the Blink application to receive data from your device.

ii. Hospital Dashboard: Develop a web-based dashboard or use existing dashboard services that can integrate with Blink, displaying the received data in an easily interpretable format for healthcare providers.
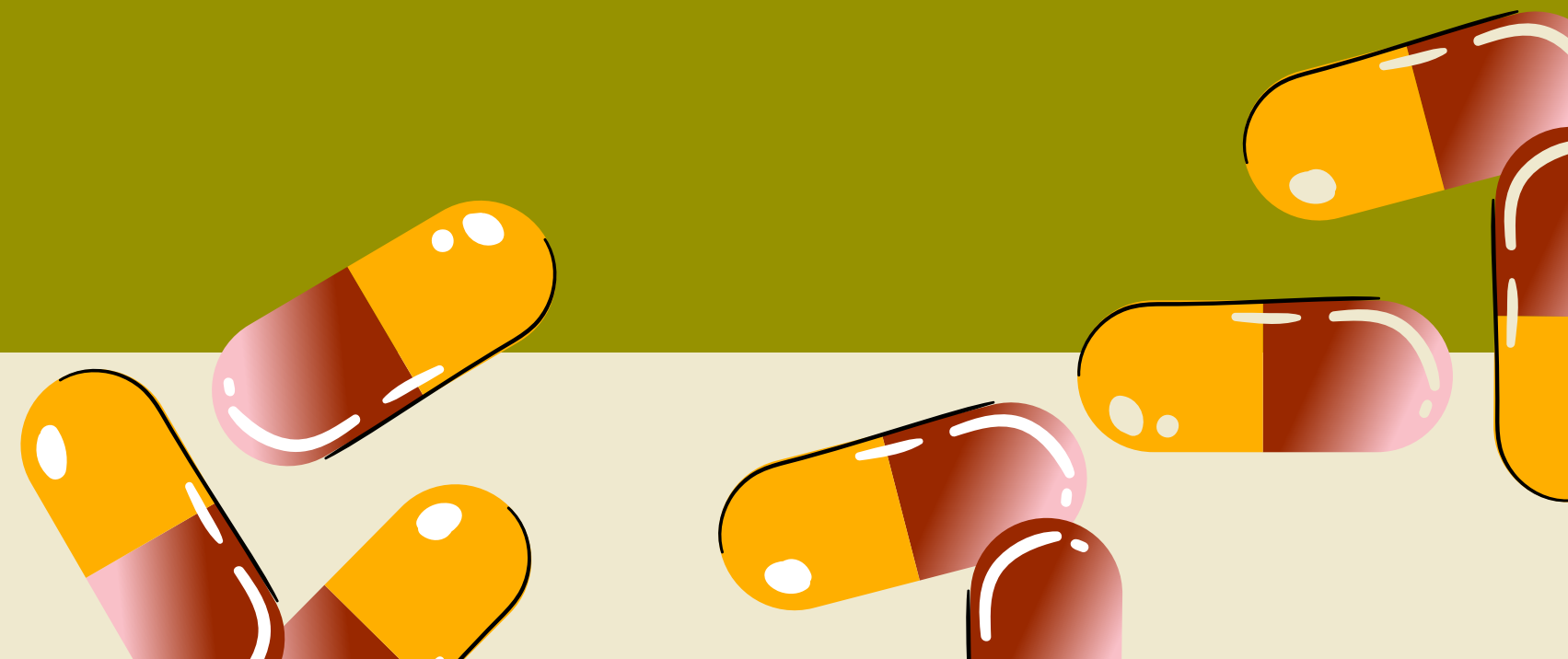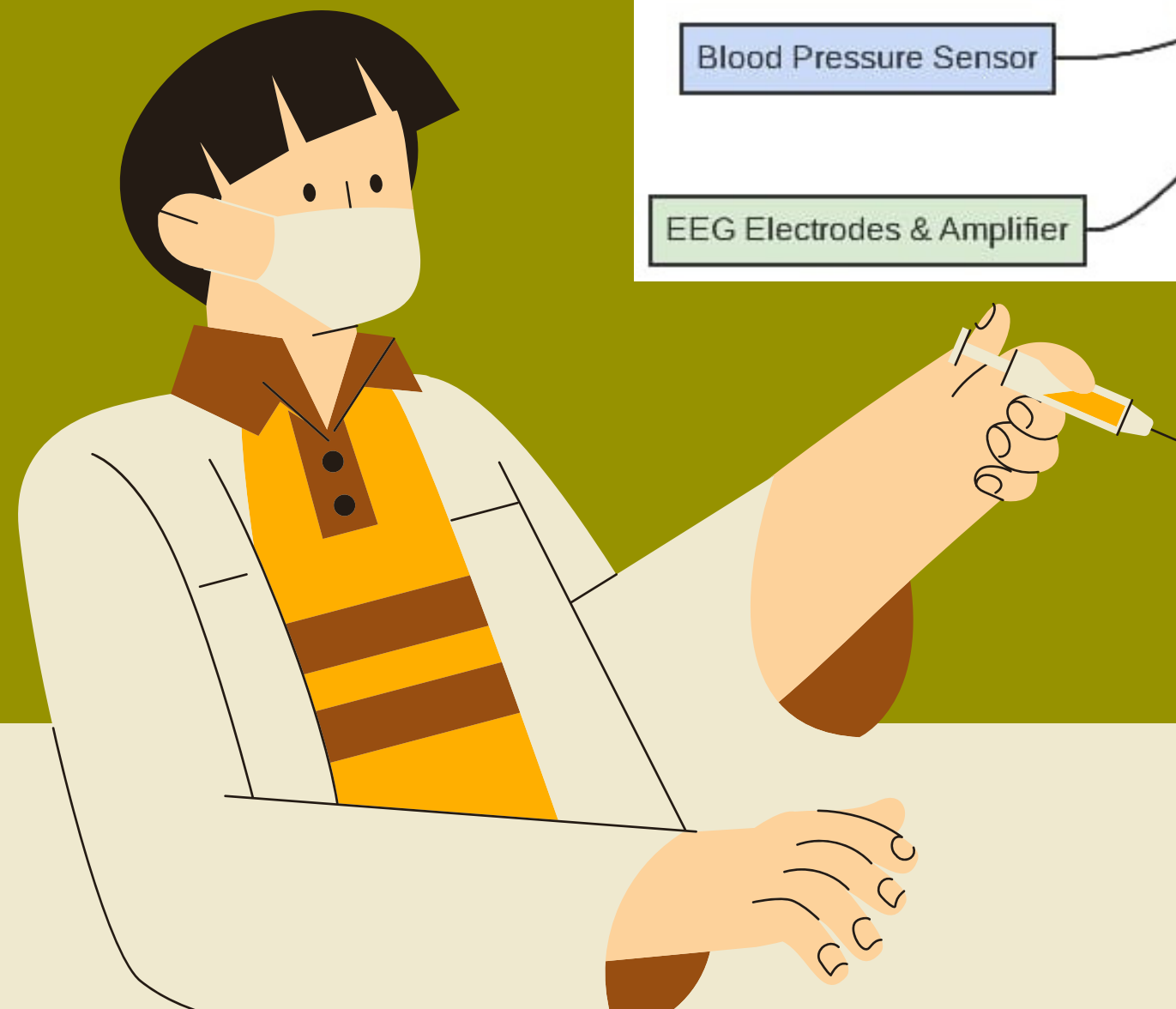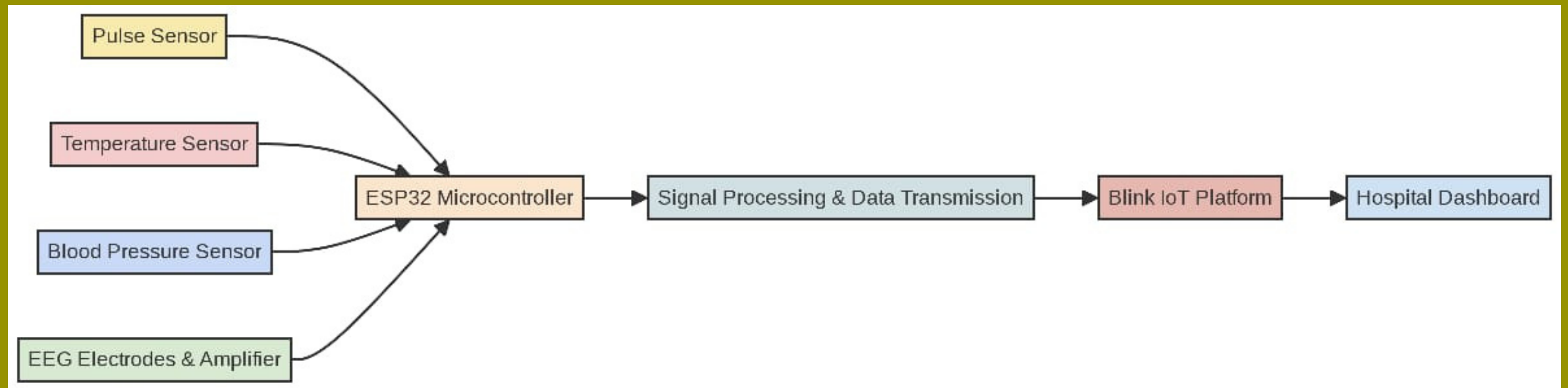
4.Power Supply

Since it's a hobby project, a simple USB power bank or a 5V adapter can power the ESP32 and low-power sensors. Ensure stable power for accurate sensor readings.

5. Data Processing and Transmission:-

i. Signal Processing: Implement basic signal processing algorithms in the ESP32 to filter and extract meaningful data from the sensors.
Data Transmission: Code the ESP32 to send the processed data to the o Blink platform using HTTP requests or MQTT protocol, depending on your setup with Blink.
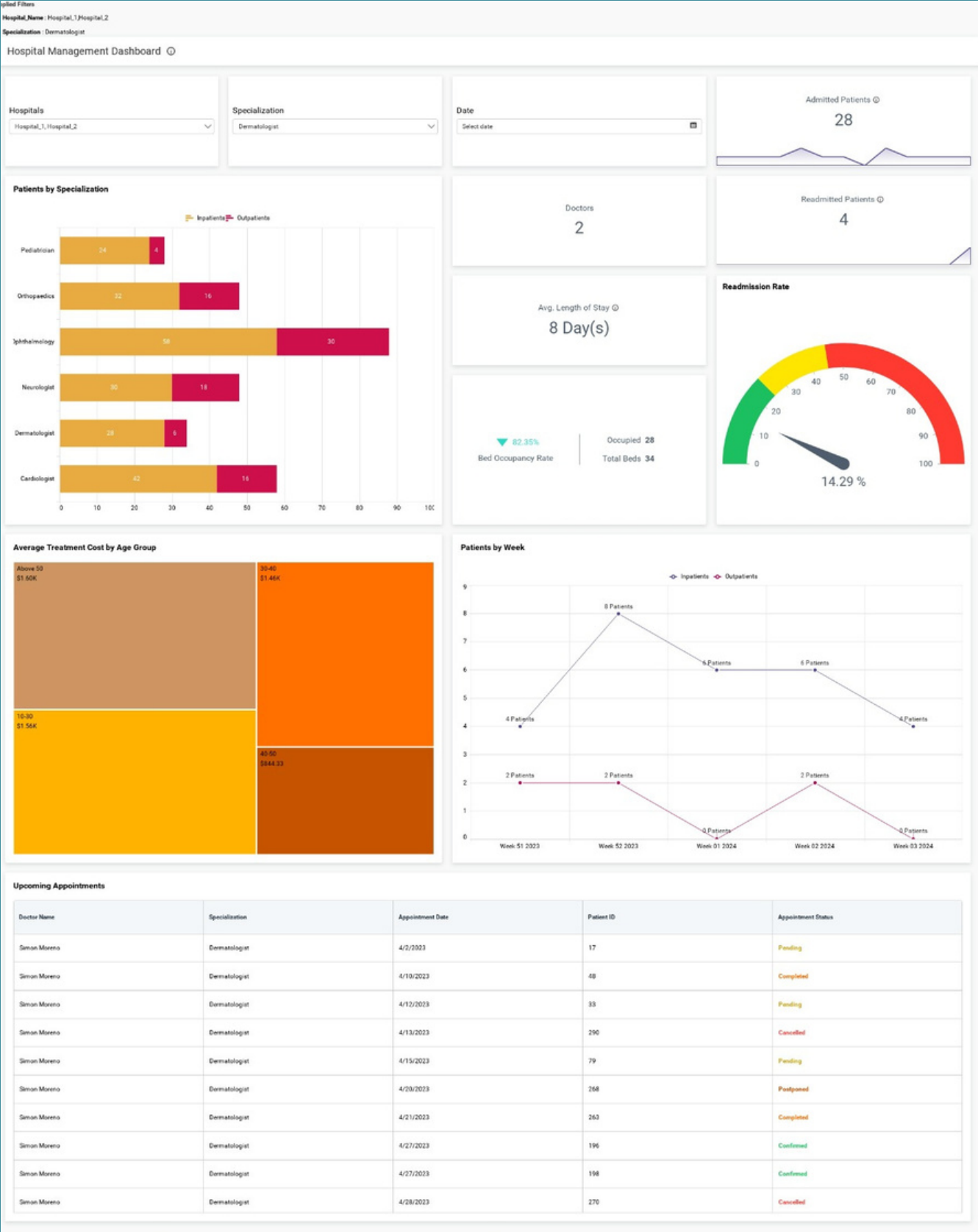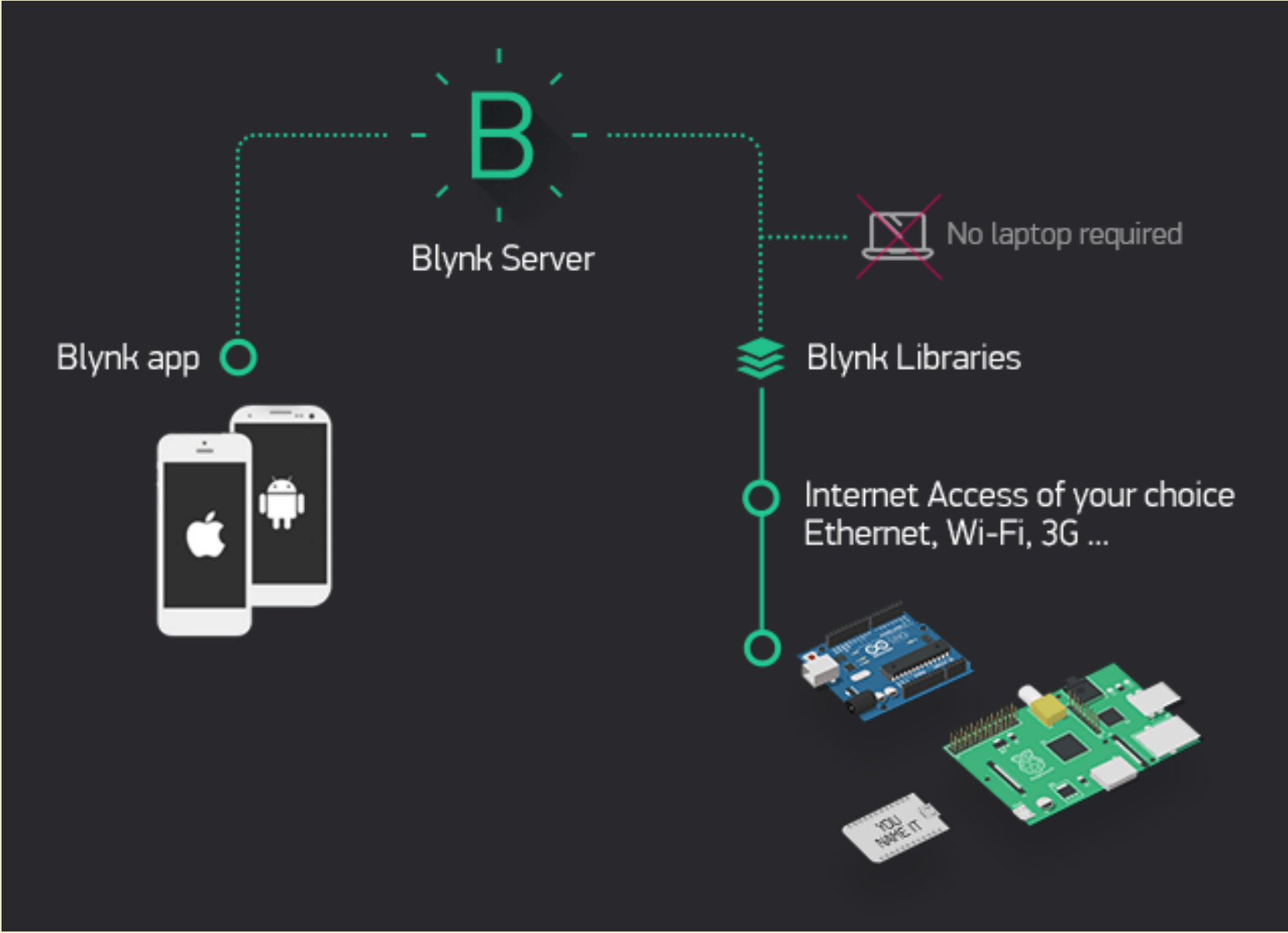
Overall flow of the data will look like this:-

Pulse Sensor → ESP32 Microcontroller
Temperature Sensor → ESP32 Microcontroller
Blood Pressure Sensor → ESP32 Microcontroller
EEG Electrodes & Amplifier → ESP32 Microcontroller

ESP32 Microcontroller → Signal Processing & Data Transmission → Blink IoT Platform → Hospital Dashboard

BLYNK SOFTWARE FLOW DIAGRAM

HOSPITAL DASHBOARD

1. Enclosure and Wearability:

Design a compact, wearable enclosure for the sensors and microcontroller, considering patient comfort and sensor placement accuracy. 3D printing could be an accessible option for creating custom enclosures.

2. Software and Programming:

Arduino IDE: Use the Arduino IDE to program the ESP32, leveraging existing libraries for sensor interfacing, Wi-Fi connectivity, and Blink integration.

Dashboard Development: For the hospital dashboard, web development skills in HTML, CSS, JavaScript, and potentially backend development (e.g., Node.js, Python) will be needed if you opt for a custom solution.

Next Steps:-

- 1. Assemble and test each sensor with the ESP32 individually.
- 2. Integrate all sensors with the ESP32, ensuring stable simultaneous operation.
- 3. Implement signal processing algorithms to extract clean data from the sensors.
- 4. Establish connectivity with the Blink IoT platform and ensure reliable data transmission.
- 5. Develop or set up the hospital dashboard to receive and display patient data.
- Test the entire system for accuracy, reliability, and user experience
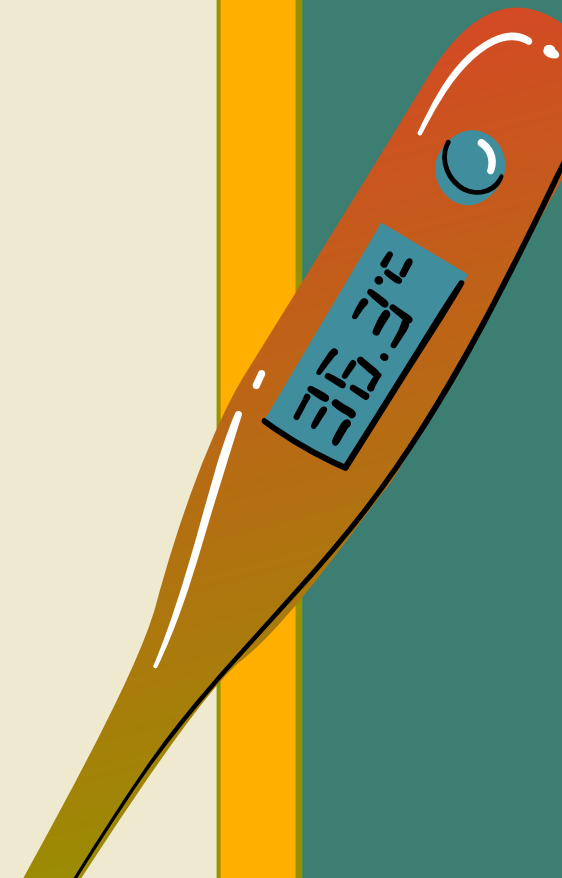
Safety and Considerations:-

- · Prioritize patient safety and comfort in sensor design and placement.
- · Ensure data privacy and security in data transmission and dashboard access.
- · Be mindful of regulatory and ethical considerations, even for hobby projects involving health data.
- This project outline provides a comprehensive guide to creating a simple patient health monitoring system with IoT integration, suitable for a hobbyist looking to explore medical technology and IoT applications.