HEALTH MONITORING SYSTEM

Using Arduino Uno

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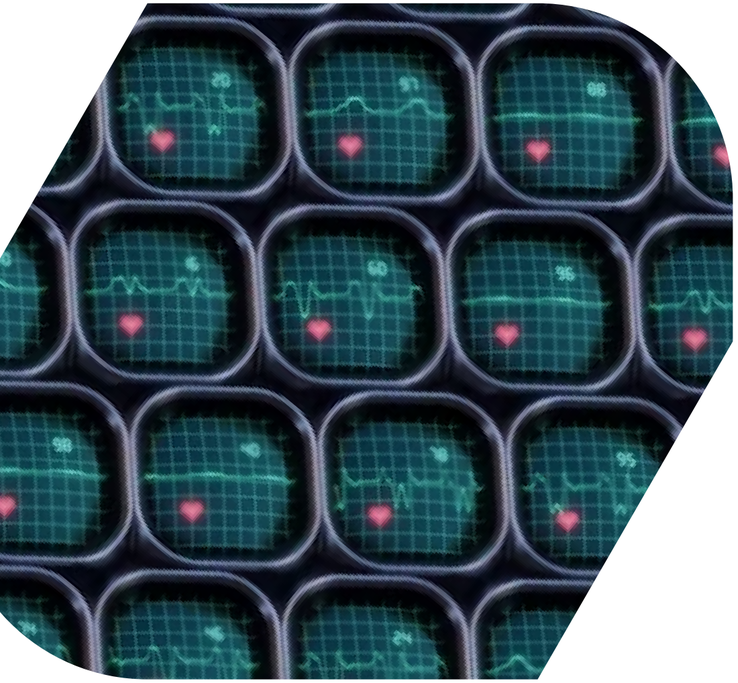
BACKGROUND

India is grappling with an alarming epidemic of diabetes and heart disease. Lifestyle changes, sedentary behaviour, unhealthy diets, and genetic predisposition contribute to the rising burden. Keeping a healthy lifestyle and regular health checks is therefore essential.
However, these checkups are not by any means affordable or accessible. Therefore, developing new health monitoring systems which can be accessed any time, anywhere is imperative.

AFFORDABLE HEALTH MONITORING SYSTEM

Briefly elaborate on what you want to discuss.



We are considering a three pronged approach to health monitoring.

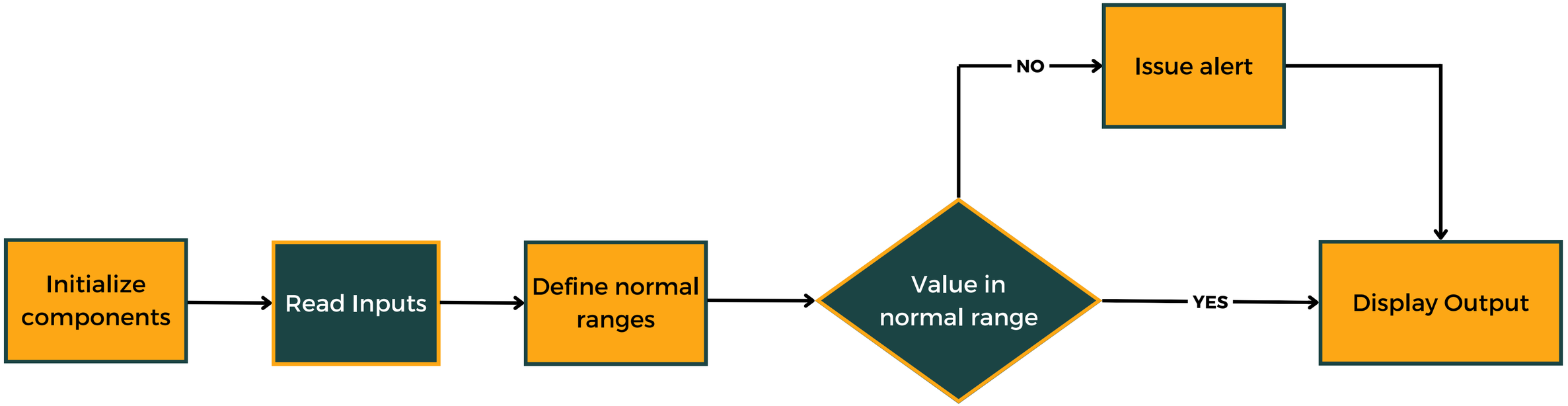
1. Heart rate monitoring - This is considered to detect irregularities, assess fitness levels, and identify potential cardiac conditions
2. Oxygen saturation - Abnormal SpO2 readings can indicate respiratory problems, circulatory issues, or low blood oxygen levels.
3. Temperature - Overall health and early indications of infection can be measured efficiently by using temperature as a metric.

This is executed using affordable equipment to reduce production costs.

PROOF OF CONCEPT

- **Hardware setup:** Connect a pulse rate sensor, temperature sensor, and LCD display to the Arduino Uno.
- **Pulse rate monitoring:** Read the analog input from the pulse rate sensor and display the heart rate on the LCD display.
- **Temperature monitoring:** Read the analog input from the temperature sensor and display the temperature on the LCD display.
- **Oxygen Saturation Monitoring:** Read the analog input from the temperature sensor and display the spO2 on the LCD display.
- **Threshold alerts:** Set predefined threshold values for heart rate and body temperature. If the readings exceed these thresholds, trigger an alert on the LCD display or an alarm.
- **Data logging:** Log the measured values of heart rate and temperature in a text file on an SD card connected to the Arduino Uno.
- **User interface:** Implement simple buttons to navigate through the LCD display and provide options to view historical data or reset the system.
- **Power supply:** Ensure the Arduino Uno is powered using a suitable power source or a battery.

FLOW DIAGRAM



COMPONENTS

Temperature Sensor: The sensor monitors temperature changes and outputs a signal that is in accordance with the measured value.

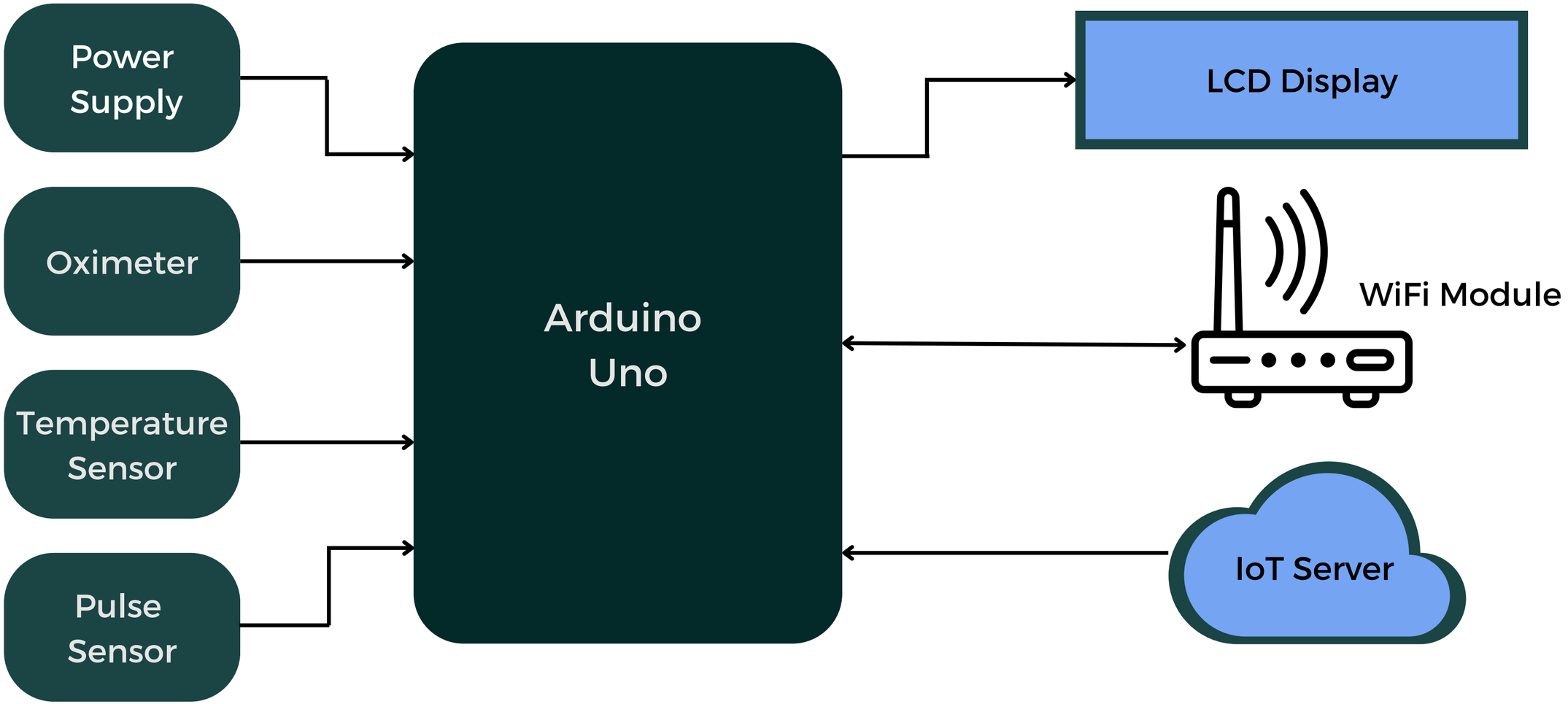
Oximeter: A probe is used for measurement, which is fastened to a finger, earlobe, or other body part. The SpO2 levels are determined by the probe's light emission into the tissue and a photodetector's measurement of the amount of light absorbed by oxygenated and deoxygenated blood.

Heartbeat Sensor: This also uses light to measure heart rate. It monitors fluctuations in blood volume

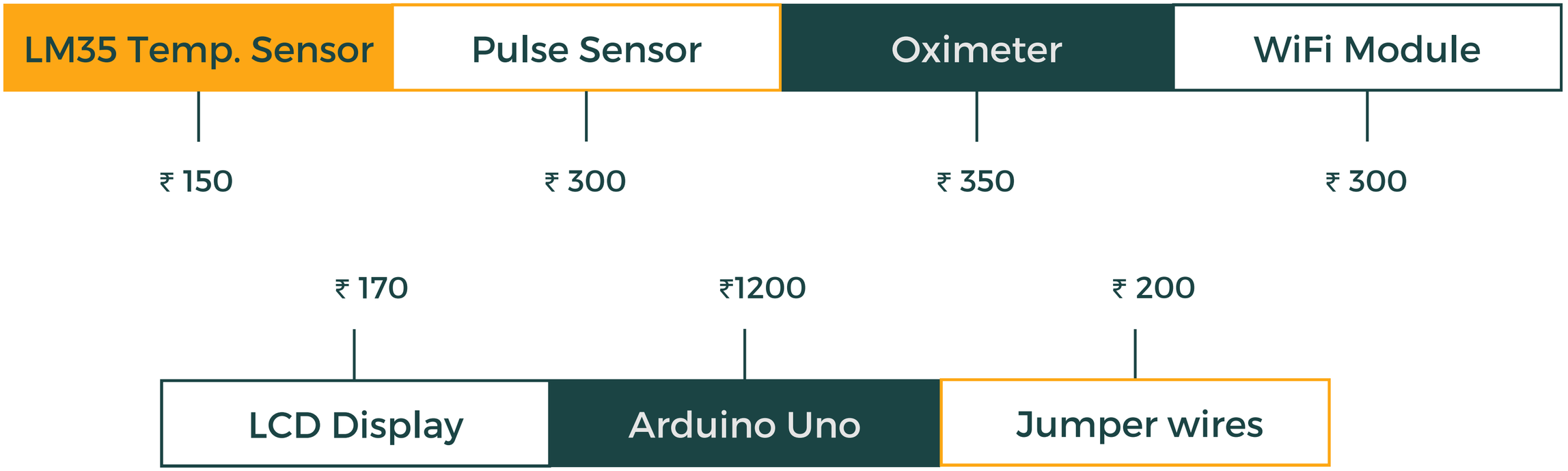
Wifi Module: A WiFi module enables wireless communication between devices using WiFi technology. It allows the Arduino Uno or any microcontroller to connect to a wireless network, facilitating data transmission to other devices or cloud services.

Arduino Uno: Data collection, processing, and control are all made possible by the Arduino Uno's ability to communicate with different sensors and modules. It can be powered by an external power source or a USB connection, and it is programmed using the Arduino IDE.

BLOCK DIAGRAM:



COMPONENT-WISE BUDGET ESTIMATE



Net Budget: ₹ 2700

ANALYSIS

Improvements to pre-existing models:

Wireless Connectivity: wireless communication capabilities such as Bluetooth or Wi-Fi to transmit health data to a mobile device or a central server. This allows for remote monitoring and real-time analysis of the data.Choose a wireless module compatible with Arduino Uno, such as an ESP8266.

Energy Efficiency: Optimize power consumption to extend the battery life of the monitoring device. This can be achieved by using low-power sensors,, sleep modes, and efficient coding techniques. We will be optimizing the code and utilizing arduino sleep modes.

Expand Sensor Capabilities: Incorporate additional sensors to monitor more health parameters. For example, we will integrate a pulse oximeter to measure blood oxygen levels

Machine Learning and Data Analytics: Utilizes machine learning algorithms and data analytics techniques to detect patterns, trends, or anomalies in the collected health data. This can help in identifying potential health risks or predicting certain medical conditions.

THANK YOU