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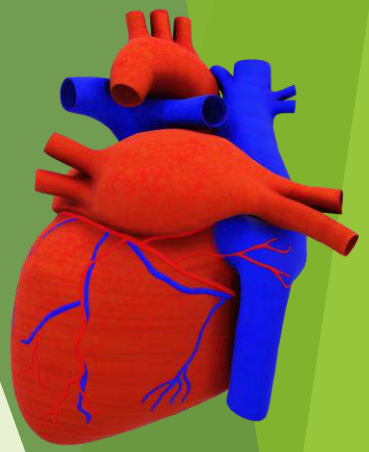

Final Project Viva-Voce

UBIDOT BASED ROBUST PRIMARY CARE MONITORING

PROJECT SUPERVISOR:
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FINAL YEAR ECE

INTRODUCTION:

- **Kevin Ashton** is the father of Internet of Things. It is a system where as many devices as possible are interconnected through internet and are able to transfer and collect data.
- Sensor is a device that produce on output signals for the purpose of sensing a physical phenomenon.
- **UBIDOTS** is an **IOT** platform that provides tools and services for building internet of things applications. While **UBIDOTS** is specifically focused on data visualization of data, storage and analysis for **IOT** application.
- Health care monitoring is a sophisticated technology and an alternative to the traditional management of their health.
- Our system is used to monitor the outpatient.

ABSTRACT:

- Health care monitoring system consist of wearable sensor that collect real time data from the patient and transmit it wirelessly to a central hub which then upload the data to the UBIDOTS cloud platform.
- Our system is more intelligent that can anticipate the critical condition before it even happens send the message to the patient family, doctors, nurses as well as hospital in charge person and launch an alarm to be assister by the nearest people in the place.
- Hospitals and medical clinics can utilize our system to monitor their outpatients who are in danger of unpredictable health conditions.
- Smart sensors are used to monitor the heart beat, oxygen level in blood, ECG and temperature .

SCHEMATIC DIAGRAM:

Out Patient

Observable parameters

- Temperature
- Blood oxygen level
- Heart rate
- ECG

Monitoring

UBIDOTS

LITERATURE SURVEY:

S.NO	YEAR	TITLE	CONTENT	DRAWBACKS
1	2023	IOT based ICU patient health monitoring system [Base paper]	ECG, pulse sensors are used	It is only implemented for ICU Inpatients.
2	2023	A Versatile Data Fabric for Advanced IoT-Based Remote Health Monitoring	Collection of data access	Related to Study paper.
3	2022	Development of an IoT Based Health Monitoring System for e-Health	Blood pressure, heart beat sensors	ICU recovery patients monitoring.
4	2021	Smart Health Care Monitoring System based on Internet of Things (IOT)	Blood pressure, heart rate sensors	Simulation only not implemented in hardware.
5	2021	IOT Based Remote Health Monitoring System	Temperature heart rate sensors	Simulation only not implemented in hardware.

EXISTING SYSTEM :

- Real-time Blood Oxygen Saturation Monitoring: Implement an SPO2 sensor to measure the blood oxygen saturation levels of the user in real-time. The acquired data will be processed and displayed on an LCD screen.
- Vital Sign Display: Utilize an LCD display to show vital signs such as blood oxygen saturation levels, heart rate, and other relevant health parameters. The display should be user-friendly, providing clear and concise information.
- Emergency Alert System: Integrate a buzzer into the system to generate an alert in case of abnormal health readings or critical situations. The alert system will be triggered based on predefined threshold values for vital signs.

Existing System Drawback

- **Accuracy and Reliability:**

  The accuracy and reliability of the health monitoring system heavily depend on the quality and calibration of the sensors used. Low-quality sensors may provide inaccurate readings, leading to false alarms or missed events.

- **Power Consumption:**

  Power consumption is a critical factor, especially for devices intended for continuous health monitoring. Arduino and GSM modules can consume significant power, which may require frequent recharging or the use of larger batteries.

Existing System Drawback…

- **Size and Portability:**

Integrating multiple sensors and communication modules into a portable and user-friendly device can be challenging. The size and weight of the monitoring device may affect user comfort and adherence

- **Cost:**

The cost of assembling a health monitoring system with various sensors and communication modules can add up quickly. This may limit accessibility for some users, particularly those in lower-income demographics.

PROPOSED SYSTEM :

- The proposed smart healthcare monitoring system integrates advanced technologies such as Arduino Uno, Max30100 (temperature, Heart rate, oxygen level), ECG sensor, Node MCU, LCD, and a buzzer to ensure comprehensive patient care.
- The Max30100 temperature sensor continuously monitor vital signs, including heart rate and body temperature.
- The ECG sensor provides real-time electrocardiogram data displayed on the serial plotter for quick analysis.

PROPOSED SYSTEM…

- The Node MCU facilitates seamless communication with the Cloud, where all collected data is securely stored.
- The LCD screen provides a user-friendly interface for real-time monitoring, and the buzzer serves as an immediate alert system for critical events.
- This integrated solution ensures efficient and timely healthcare monitoring, allowing for early intervention and improved patient outcomes.

PROPOSED SYSTEM ADVANTAGES

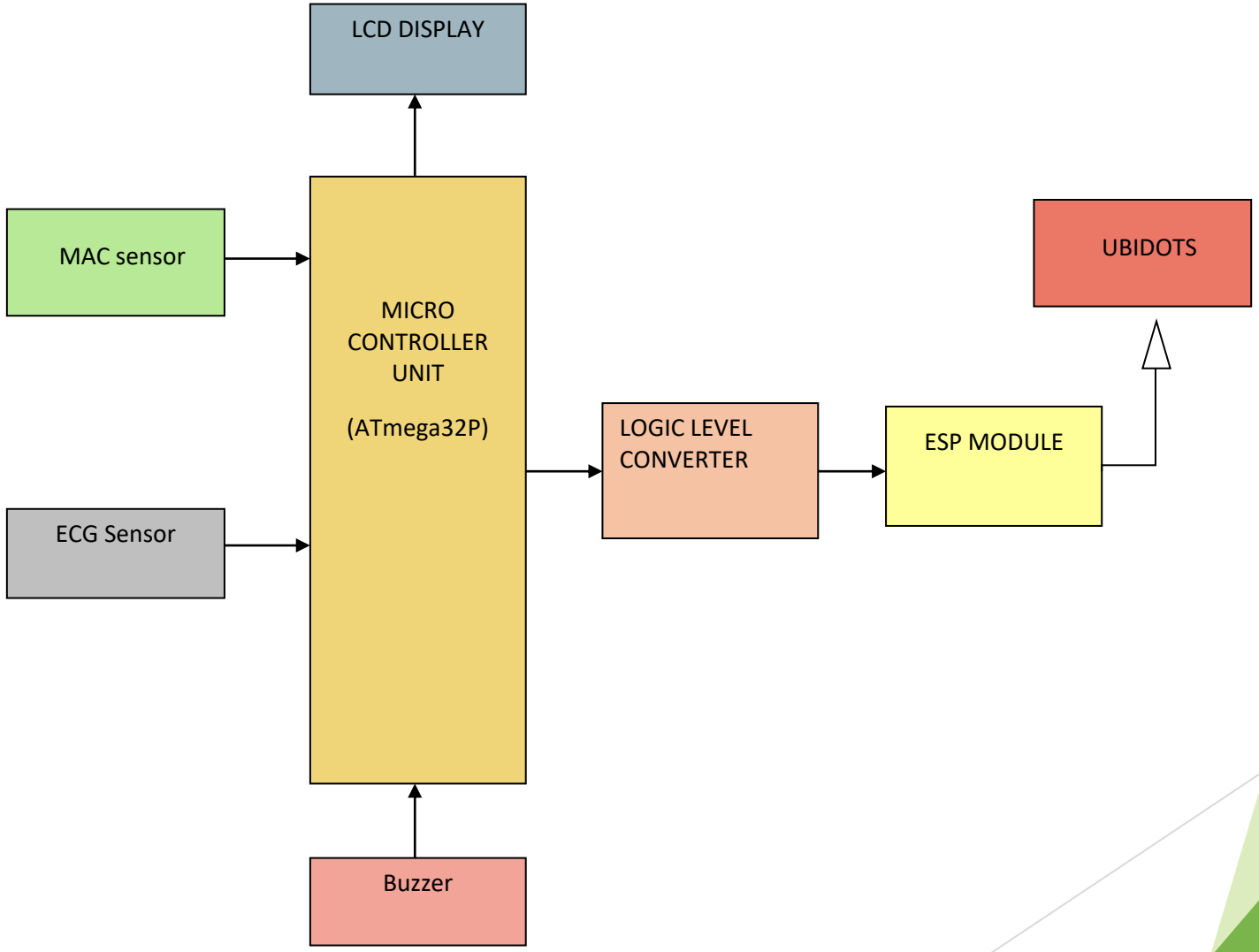
Real-time Monitoring:

- The system provides real-time monitoring of vital signs, such as heart rate, oxygen saturation, temperature.
- Continuous monitoring allows for immediate detection of any abnormalities or critical changes in the patient's health.

Cost-Effective:

- Arduino Uno is a cost-effective and versatile microcontroller platform, making the overall system affordable for healthcare applications.
- The use of off-the-shelf components like Max30100 and temperature sensors contributes to cost efficiency.

PROPOSED BLOCK DIAGRAM :



REQUIREMENTS:

Hardware

- Arduino UNO
- Max30100
- Temperature Sensor
- Emergency Button
- GSM
- LCD
- Buzzer

Software

- Arduino IDE
- Embedded C

SOFTWARE DESCRIPTION :

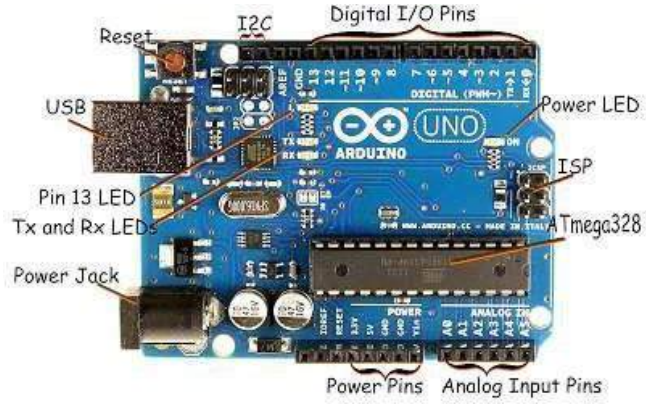
ARDUINO IDE:

- It is a flexible programmable Hardware platform.
- Core Language – Embedded C programming language.

HARDWARE DESCRIPTION :

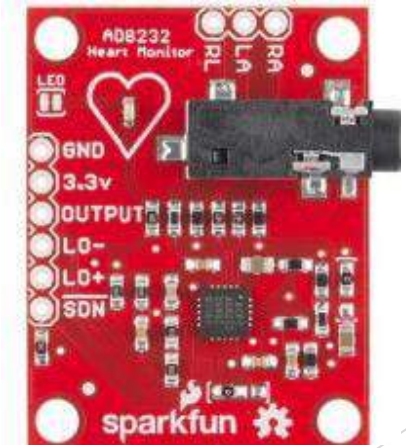
Arduino UNO:

- Arduino is an architecture that combines Atmel microcontroller family with standard hardware into a board with inbuilt bootloader for plug and play embedded programming.
- Arduino Software comes with an IDE that helps writing, debugging and burning program into Arduino.



ECG Module:

- AD8232 ECG Module integrated with AD8232 IC from Analog Devices, which is a single-chip designed to extract, amplify, and filter biopotential signals for biopotential measurement applications (like ECG and others).
- ECGs can be extremely noisy so that the AD8232 Single Lead Heart Rate Monitor acts as an op-amp to help obtain a clear signal from the PR and QT Intervals easily.

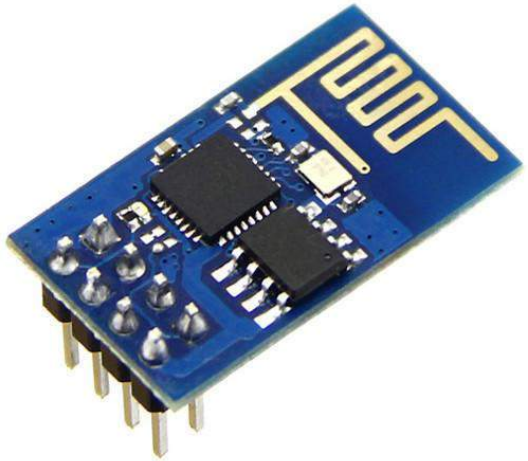


MAX30100 sensor:

- Optical Sensor: IR and Red LED Combined
- Measures absorbance of pulsing blood
- I2C Interface with INT Pin
- 3.3v operated completer pulse oximeter and heart rate sensor

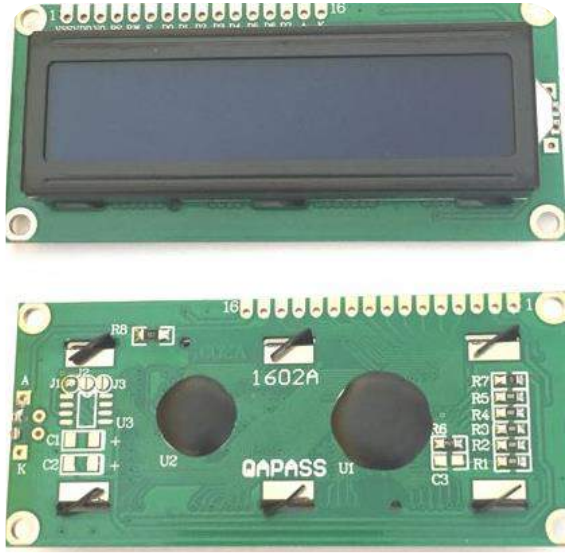
ESP8266:

- The ESP8266 WIFI Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WIFI network.
- The ESP8266 is capable of either hosting an application or offloading all WIFI networking functions from another application processor.



LCD Display:

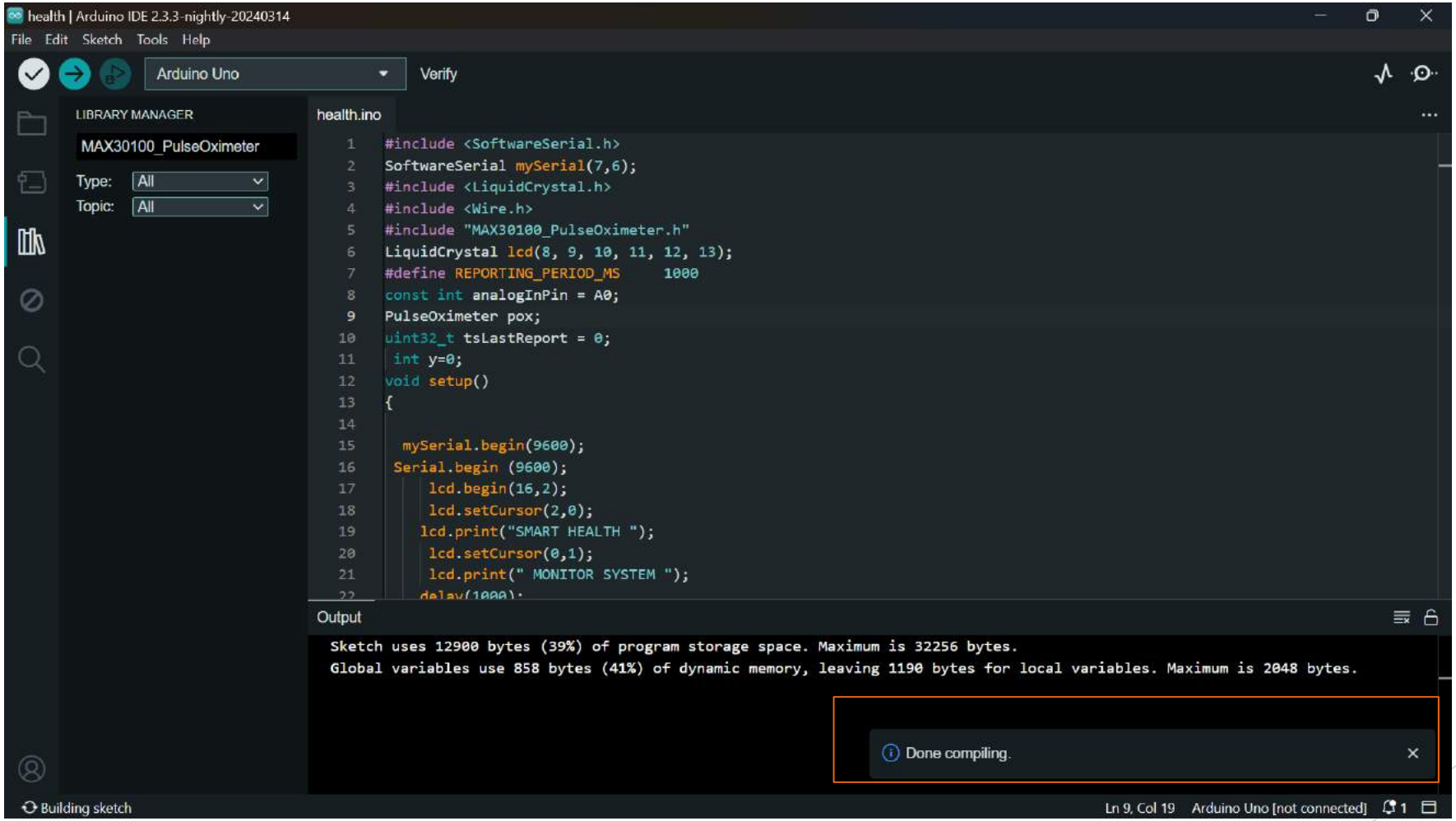
- Operating Voltage 4.7v to 5.3v
- 1mA Current Consumption with out backlight.
- Alphanumeric LCD Display
- Consists of two row and each row can print 16 characters.



Alarm:

- Operating Voltage: 3 – 24v
- Operating Current: 1mA
- Output Frequency: 100Hz
  Type: Piezoelectric

CODE COMPILING:

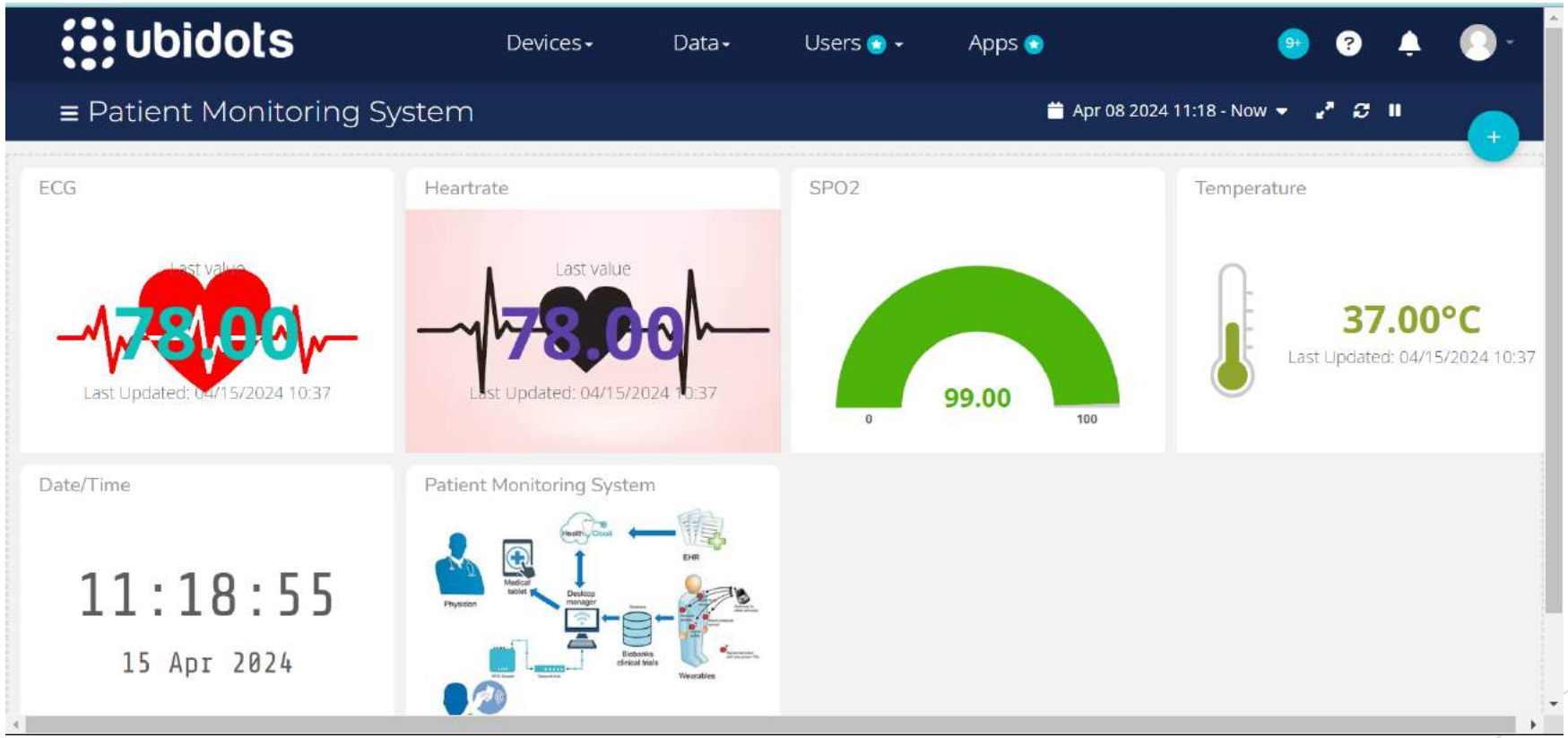


PROJECT KIT :

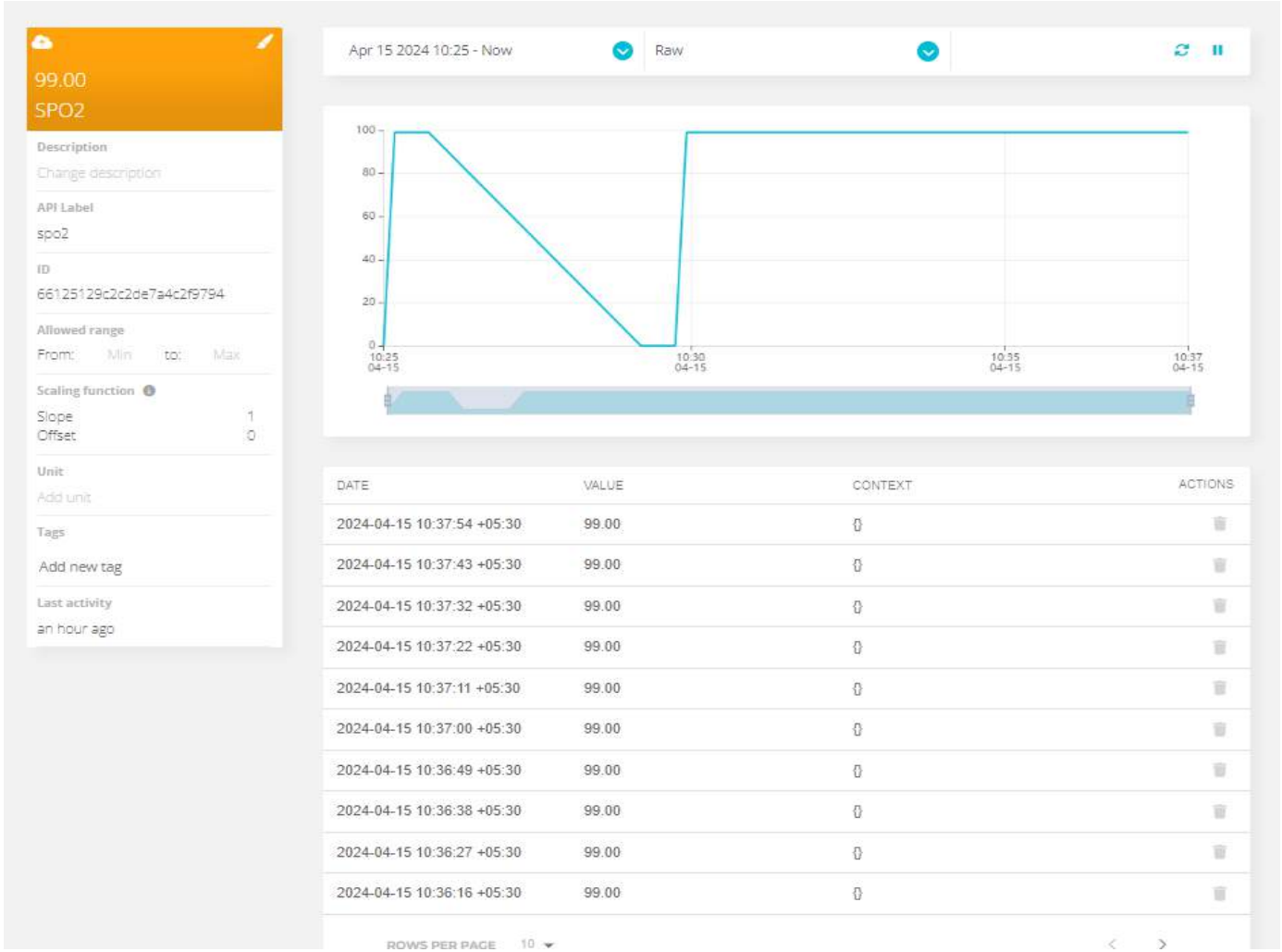
HARDWARE KIT

PATIENT MONITORING

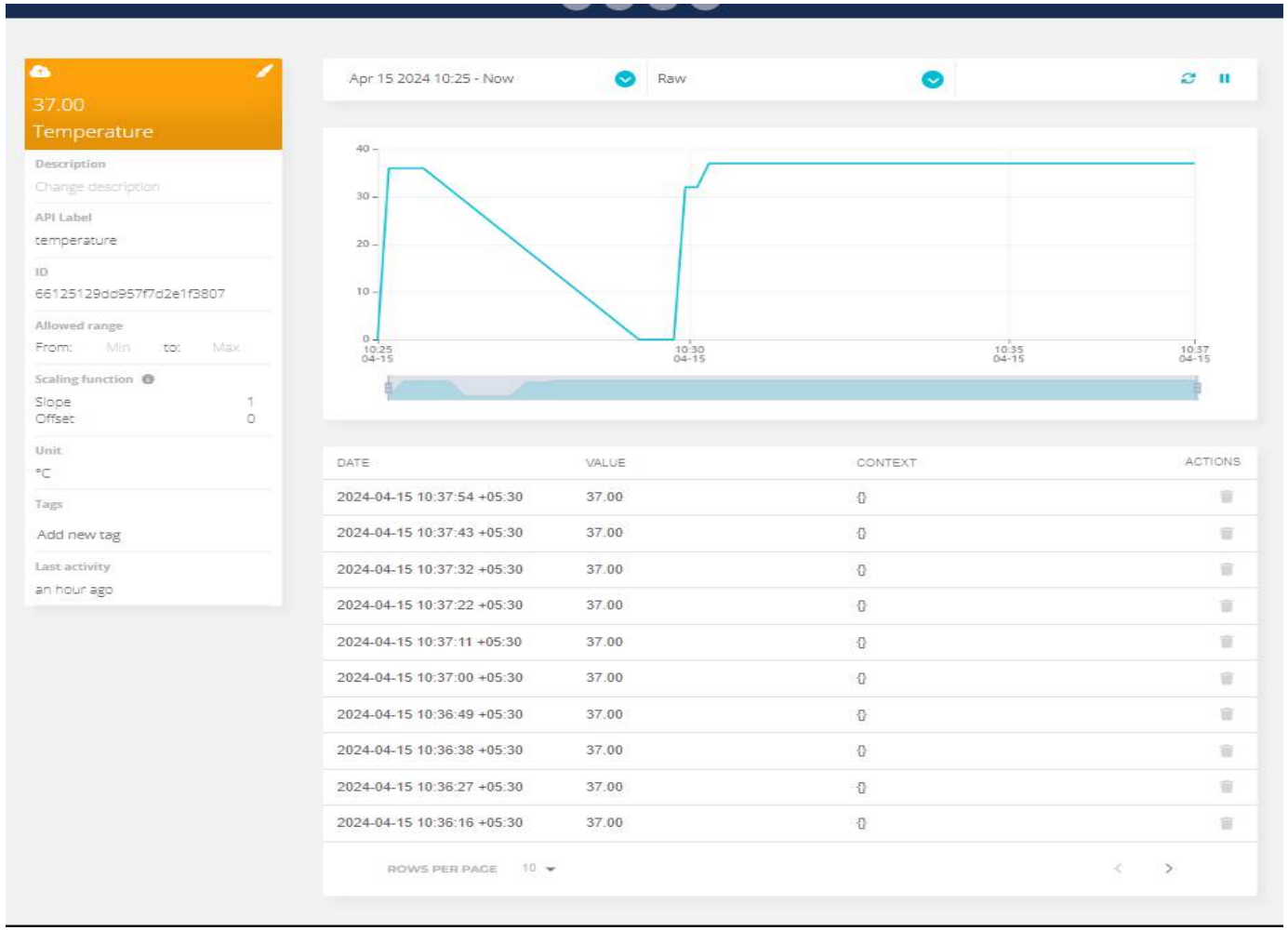
UBIDOTS Output:



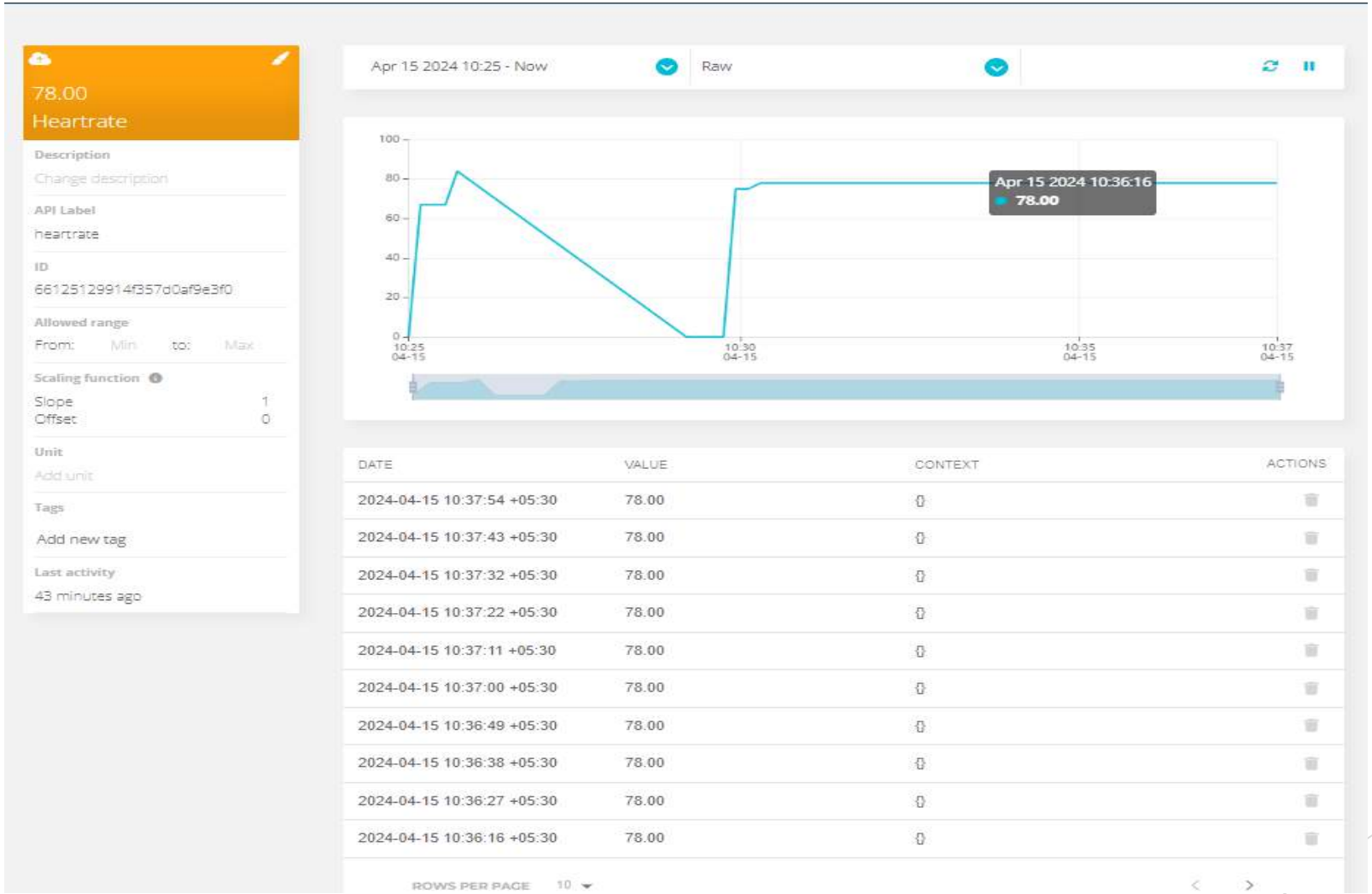
SPO2 Data Output:



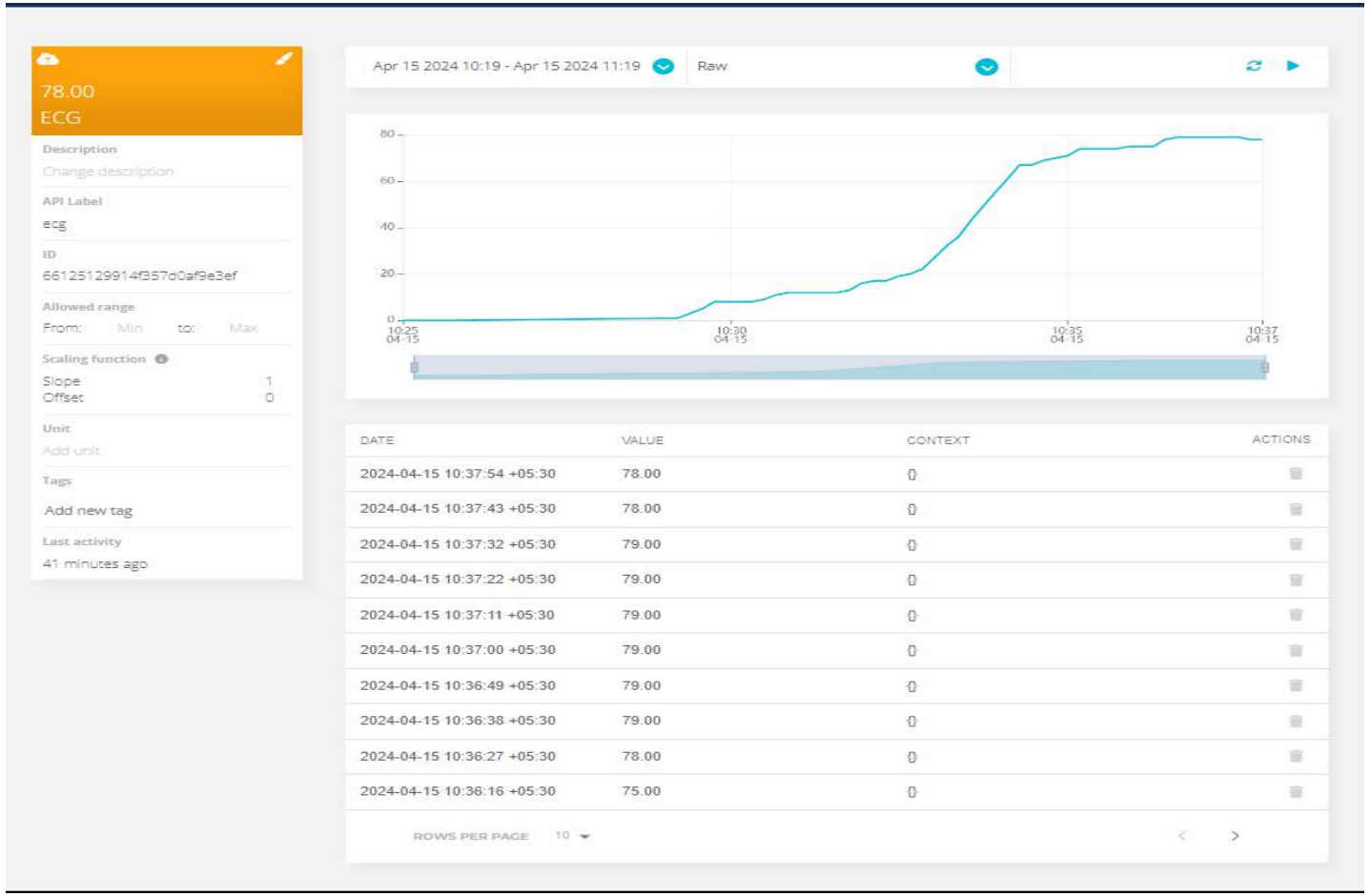
Temperature Data Output:



Heartrate Data Output:



ECG Data Output:



KIT LCD DISPLAY OUTPUT :

Displays body temperature, ECG, SPO2 level and heart rate

RESULT AND DISCUSTION:

- It provide an overview of the system's functionality testing outcomes, including the successful operation of sensors, data transmission, cloud integration, and user interface functionality. Discuss any observed issues or limitations encountered during testing and their resolutions.
- Present the results of data security testing, assessing the effectiveness of encryption protocols, access controls, and data encryption mechanisms in safeguarding patient health information. Discuss any vulnerabilities identified and recommendations for enhancing data security measures.

CONCLUSIONS:

- Continuous monitoring help our patient and doctors treats appropriately by keeping records of body temperature, heart rate,spo2 and ECG.
- Keeping records to aid doctors to know about the real condition of patients and help them to take action smartly.
- Power consumption will be less.
- Whenever the patient monitoring system monitors the abnormal reading it will produce the buzzer sound to alert nearby peoples.
- The patient system readings will be monitor anywhere by the doctors and relatives.
- The patient activity will be secured it will be monitored only by doctors and patient relatives. UBIDOTS platform will allot user id and password to monitor readings.

FUTURE SCOPE:

- The proposed system will be integrated with additional sensors and wearables to capture a broader range of health parameters, such as blood pressure and glucose level.
- Explore emerging sensor technologies to enhance measurement accuracy and reliability.
- Develop a mobile application for caregivers and patients to access real time health data, receive alerts, and communicate with health providers.

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Thank you