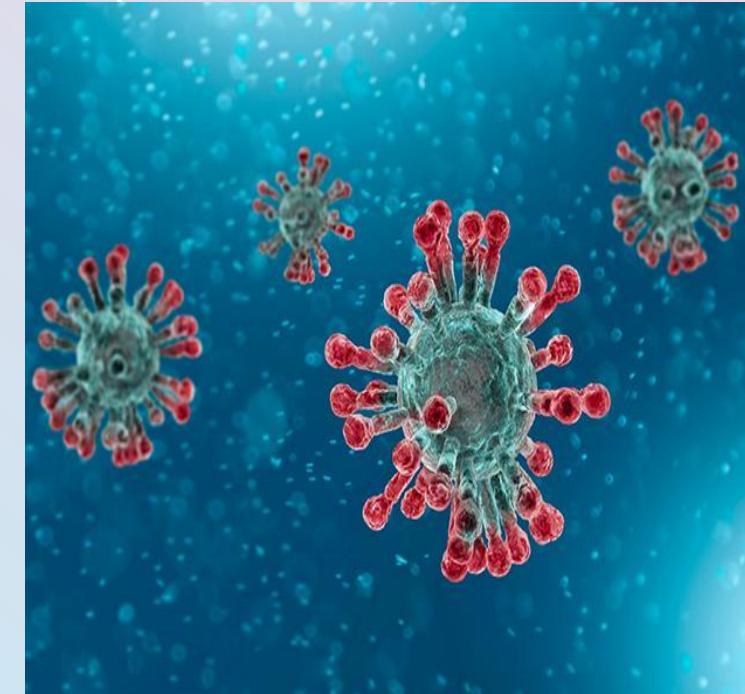


COV-PREV

Symptom Testing and Analysis Unit

By
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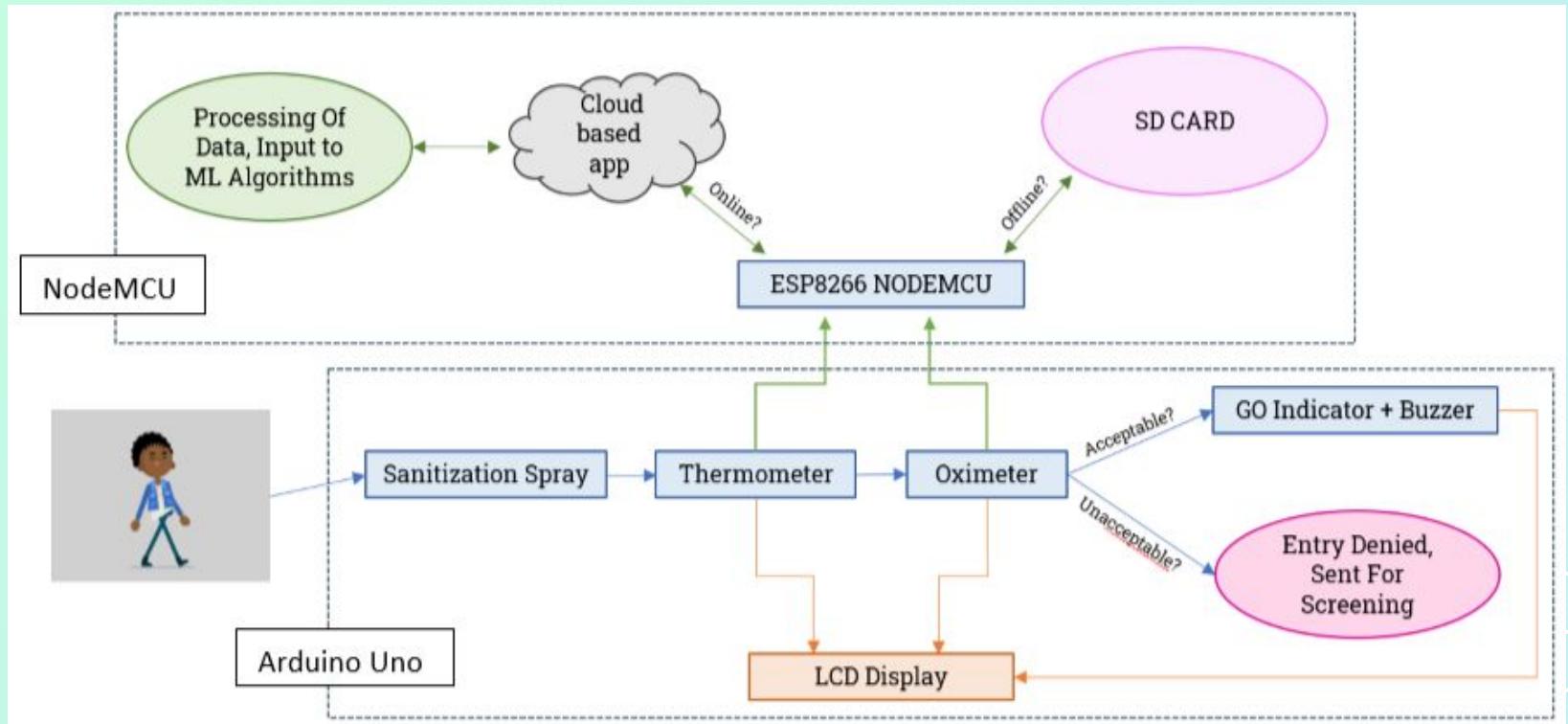
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LITERATURE REVIEW

- The increasing COVID-19 cases around the world have disrupted our daily lives and the economy. This has been a huge concern for the government thus far.
- Our team aims to gauge the physical conditions of the user in order to provide a better and a safer experience for everyone, so that we can flatten the curve faster.
- Although practises like temperature checking and sanitizations exist in status quo, we aim to make it entirely autonomous without any human intervention to reduce the risk of COVID-19.
- We also analyse the data to show trends in specific areas.

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BLOCK DIAGRAM AND OVERVIEW



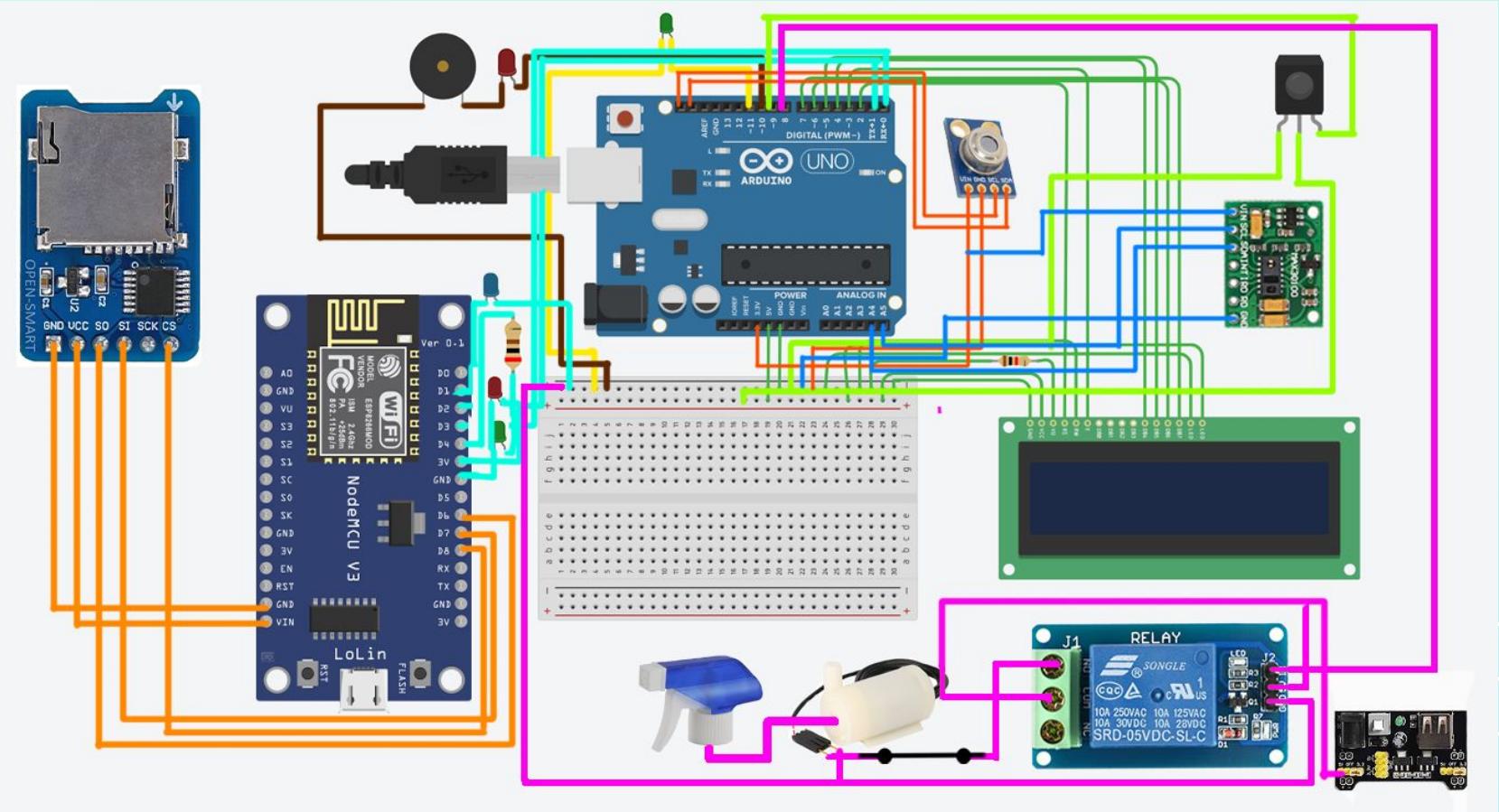
BLOCK DIAGRAM AND OVERVIEW

- + • The block diagram consists of two major components namely: Arduino Uno and ESP8266 NodeMCU.
- + • **Arduino Uno:**
 - Firstly, the user is sanitized in order to ensure their safety and the device's accuracy.
 - Then, readings are taken by the thermometer and oximeter using MLX90614 and MAX30100 sensors.
 - Both the readings are then displayed simultaneously on the screen.
 - If the readings are within a certain range, then the user is given a go indicator, indicating that their readings are normal and they can proceed. However, if the readings happen to be outside the given range, the user is denied entry to the place and is sent for screening.
- **NodeMCU:**
 - The ESP8266 NodeMCU takes the reading from Arduino uno via serial communication. These readings are stored in either the SD card or online realtime database, depending on the availability of internet. The data is then stored, processed and displayed analytically on the app.

COMPONENTS USED

	Subsystem	Part	Quantity
Hardware	Microcontrollers	Arduino UNO	1
		ESP8266 NodeMCU	1
	Thermometer	Temperature Sensor (MLX90614)	1
	Oximeter	Pulse Oximeter Sensor (MAX30100)	1
	Sanitation Spray	Relay Module	1
		5V High Quality DC Mini Submersible Pump	
		Infrared Proximity Sensor Module	1
		Breadboard Power Supply	1
	Display	16x2 LCD Display Module	
	Data Management	HW-125 Micro SD Card Reader	1
	Physical Structure	Cardboard, Plastic Casing, Velcro Strips	1
	Other Components	Breadboards, LEDs, Buzzers, Jumper Wires, Resistors, Soldering Material, Power Adapters	-
Software	Arduino UNO and ESP8266 NodeMCU	Arduino IDE	-
	Cloud and App	Google Firebase Realtime Database, Quasar Framework for Cross Platform App	-

CIRCUIT DIAGRAM



THE SUBSYSTEMS

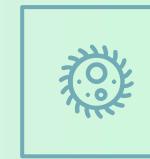
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Temperature &
Pulse Oximeter



Sanitization

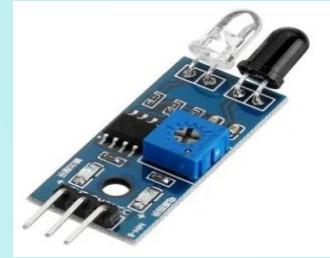


Data Storage
and Analysis

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SUBSYSTEM ONE: SANITIZATION SPRAY

- **IR Sensor for Detection:**
 - It emits light in order to sense the object in the surroundings.
 - If someone is standing in front of the IR sensor it'll detect and trigger the Relay.
- **Relay to Start the Pump:**
 - Works as a Switch, uses the principle of Electromagnetic Induction, when current is applied it attracts the contact arm and closes the circuit (Normally Open Relay)
- **Pump for Sanitization:**
 - When the relay closes the circuit, current flows in the DC-Pump, it pumps the sanitizer through the pipe which comes out through the nozzle attached to it.

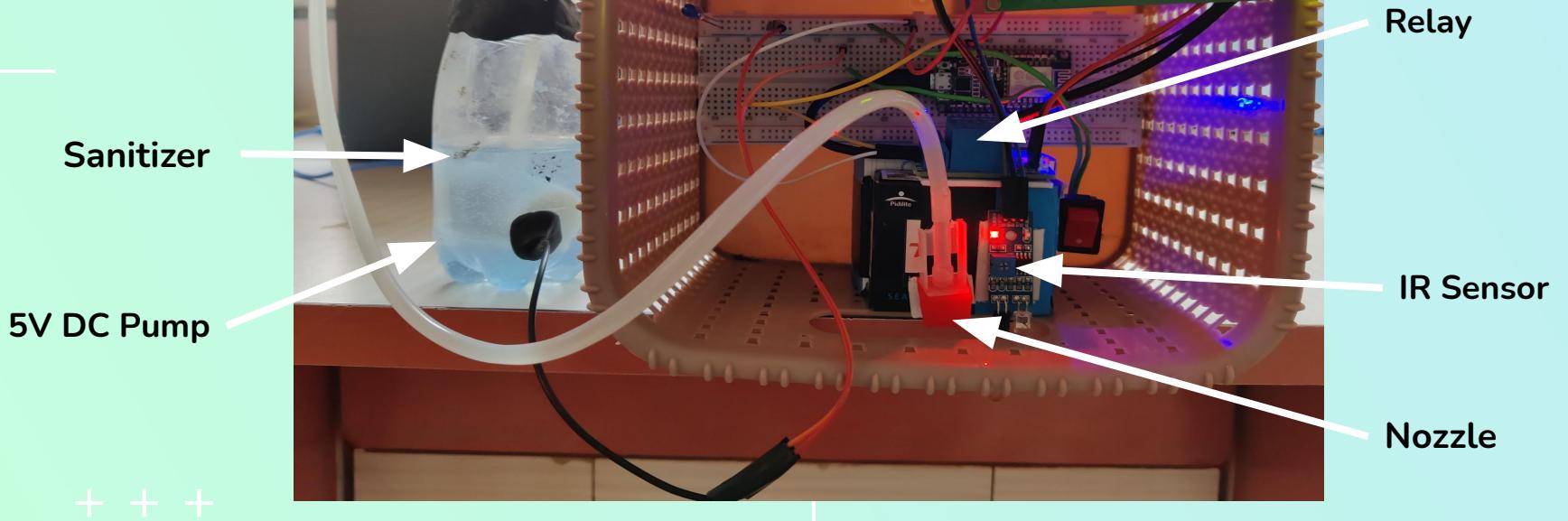


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SUBSYSTEM ONE: SANITIZATION SPRAY

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SUBSYSTEM TWO: TEMPERATURE AND PULSE OXIMETER

Temperature Sensor (MLX90614):

- Cheaper than MLX90615, has arduino libraries, fairly accurate
- Uses InfraRed to calculate body as well as ambient temperatures and sends it to the Arduino



Pulse Oximeter Sensor (MAX30100):

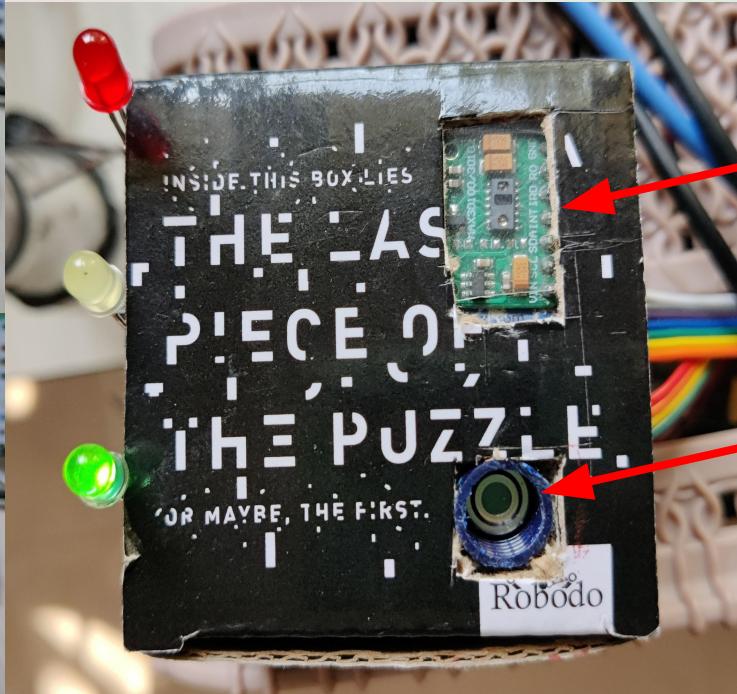
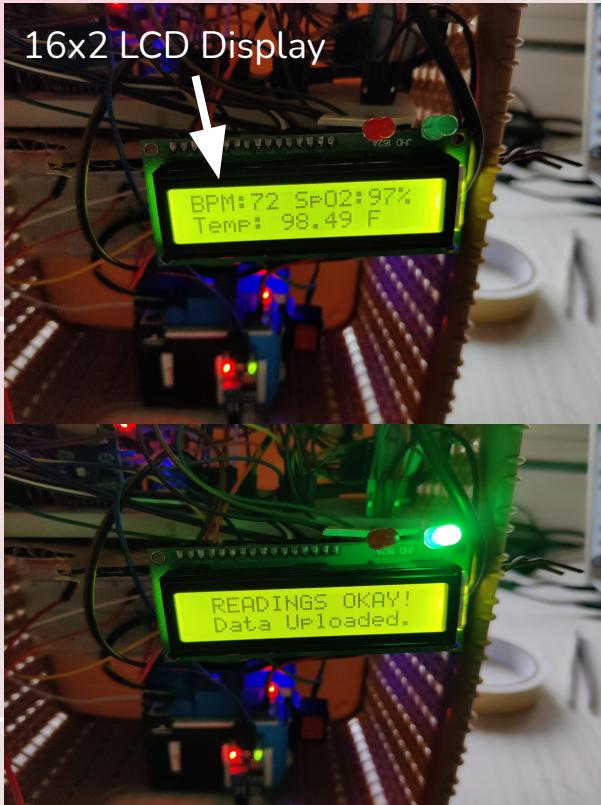
- Industry standard, used in pulse oximeter units and fitness monitors, has arduino libraries
- Uses Infrared to calculate Heart rate and Blood Oxygen levels and sends it to Arduino



Readings from both these sensors are displayed on a 16x2 LCD screen.

Thresholds for temperature, heart-rate and blood oxygen levels are set, that if crossed, cause a red LED to glow and a buzzer to beep.

SUBSYSTEM TWO: TEMPERATURE AND PULSE OXIMETER



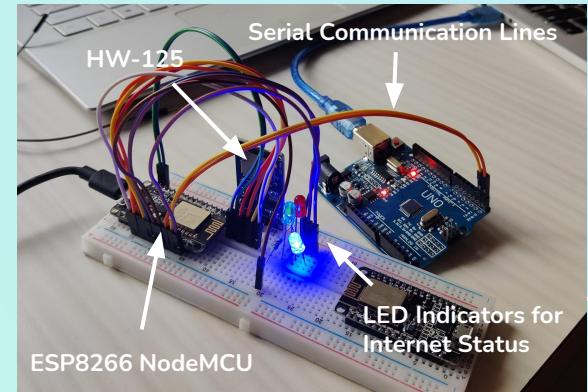
MAX30100
(Pulse Oximeter)

MLX90614
(IR Thermometer)

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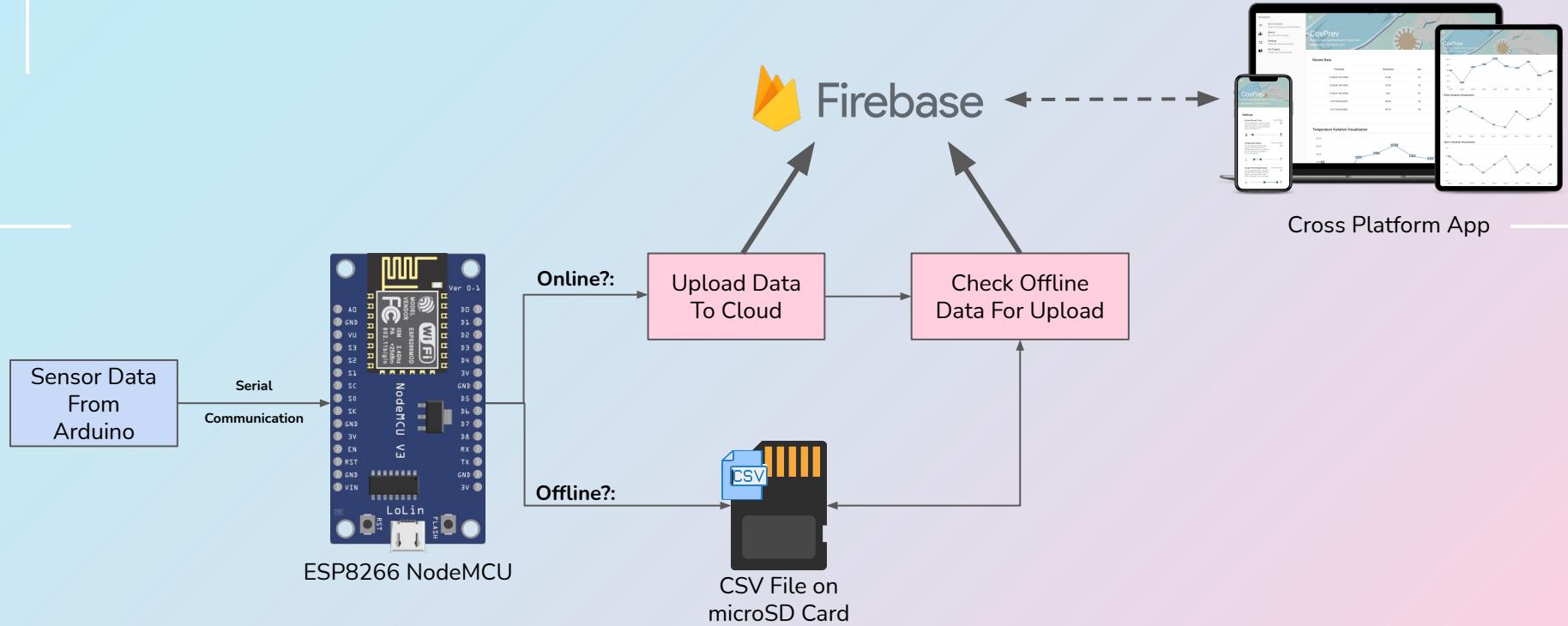
SUBSYSTEM THREE: DATA MANAGEMENT AND CROSS-PLATFORM APP

- The sensor data collected by the Arduino Uno is sent to the ESP8266 NodeMCU module via **serial communication**.
- If the system is online, the data is uploaded to the **Firebase Realtime Database**, which is directly reflected in the app.
- If the system is offline, the data is stored in a **microSD card**, and it is then uploaded to the cloud when the internet connection resumes.
- The **HW-125** microSD card reader module is used for the offline storage of data.
- The **online / offline status** of the device is visible on the device as red and green LEDs as well as in the app.



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SUBSYSTEM THREE: DATA MANAGEMENT AND CROSS-PLATFORM APP



SUBSYSTEM THREE: DATA MANAGEMENT AND CROSS-PLATFORM APP⁺

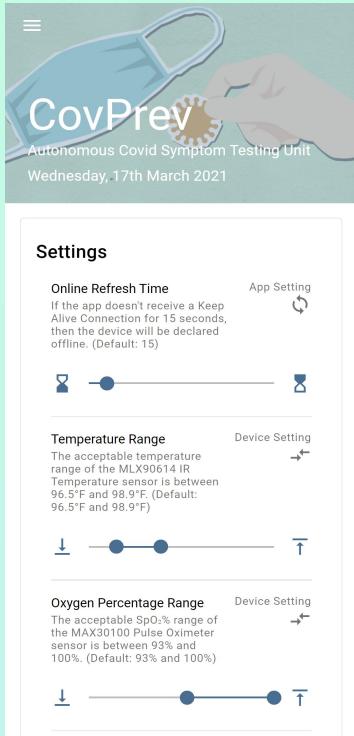


Tabular Representation

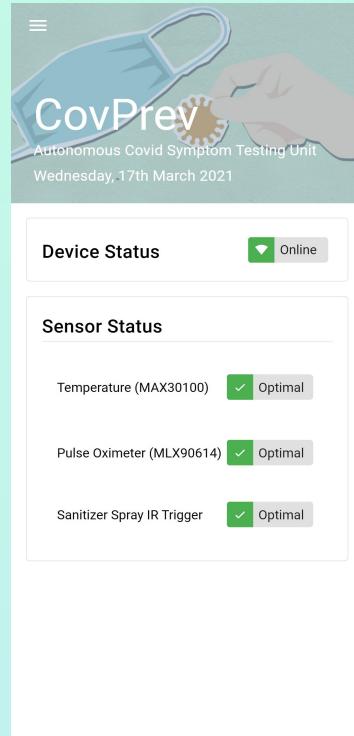


Graphical Analysis and Trend Observation

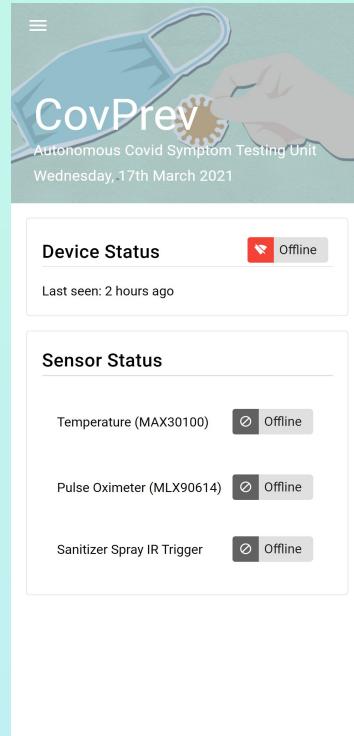
SUBSYSTEM THREE: DATA MANAGEMENT AND CROSS-PLATFORM APP



Change Device Settings



Device Online/Offline Status



VIDEO DEMONSTRATION



FUTURE IMPROVEMENTS AND SCALABILITY

- The app currently doesn't support device calibration remotely, which can be implemented in further versions.
- Biometric authentication and users can be used for attendance, entry-exit logs, etc.
- If multiple devices are installed in multiple locations, the statistics for different areas can also be studied,
- This device is a large scale device, thus it can be used in public spaces like malls, supermarkets, schools and other large institutions that have a large public gathering, we ensure the safety of the citizens and stop the spread of COVID-19.
- For expanding the impact of the device, a user interface can be added where the user is able to contact COVID-19 testing centers if they're symptomatic.





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- <https://github.com/mobitz/Firebase-ESP8266>



THANK YOU!