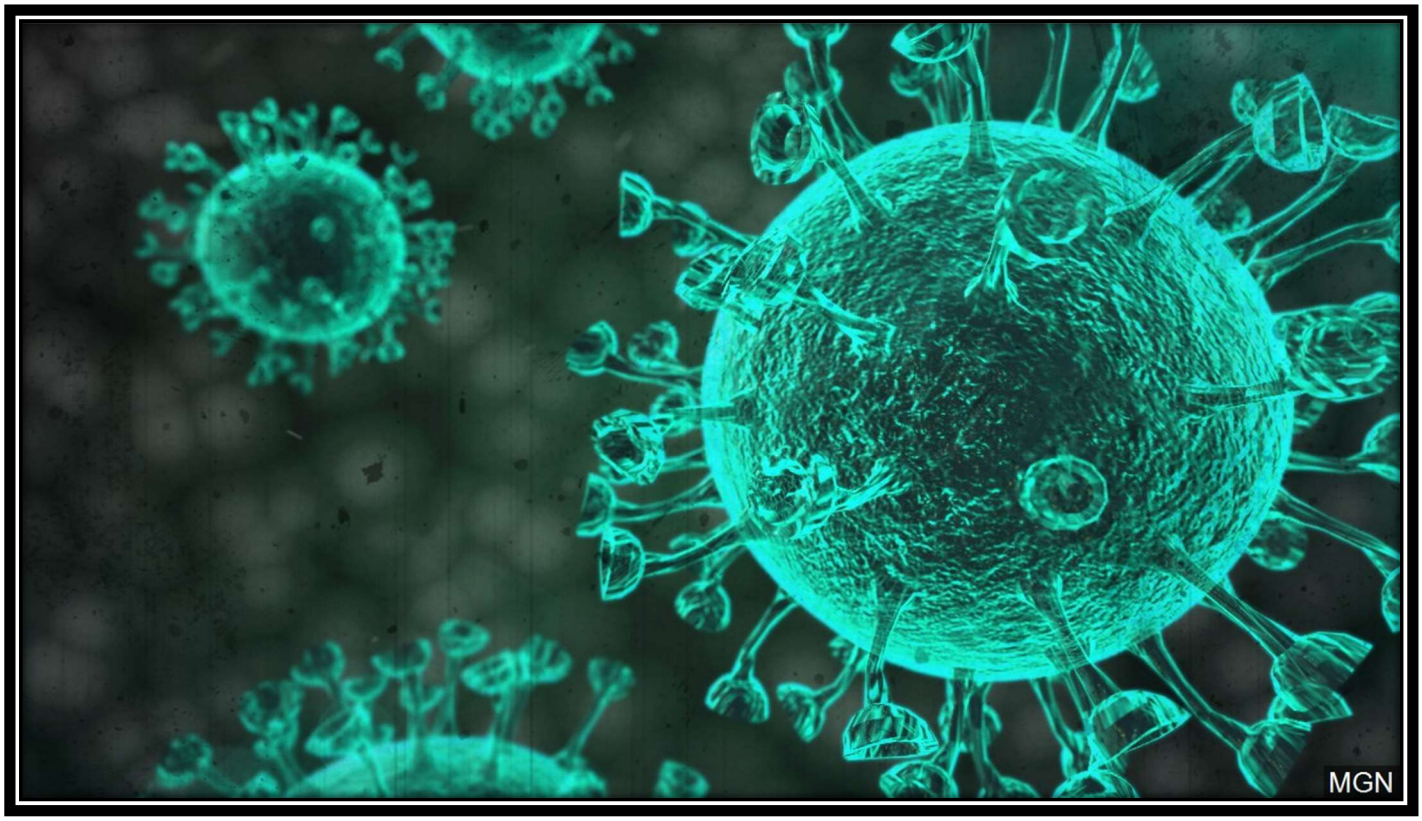
PROJECT IOT 2020/2021

Rapport 2

Covid 19 Patient Monitoring



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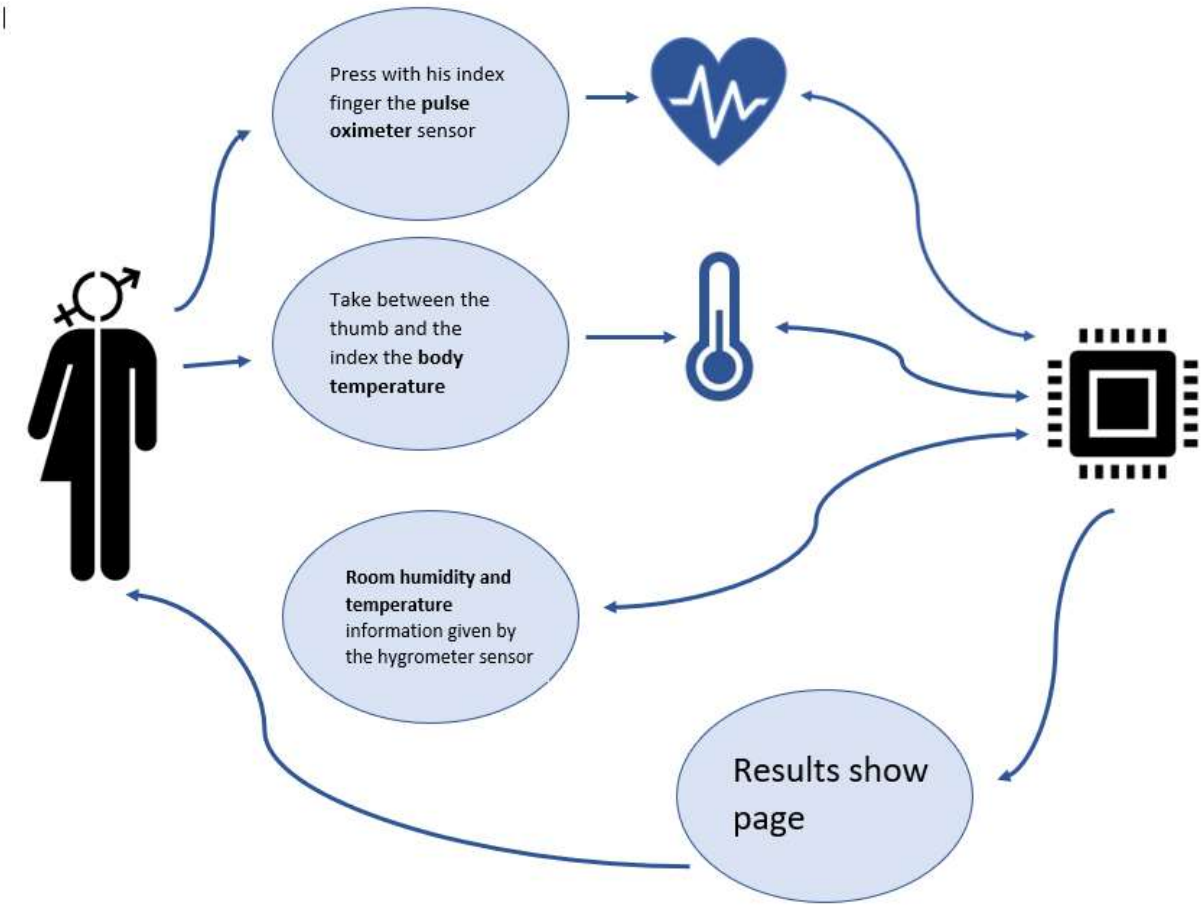
Summary

Description of the project:

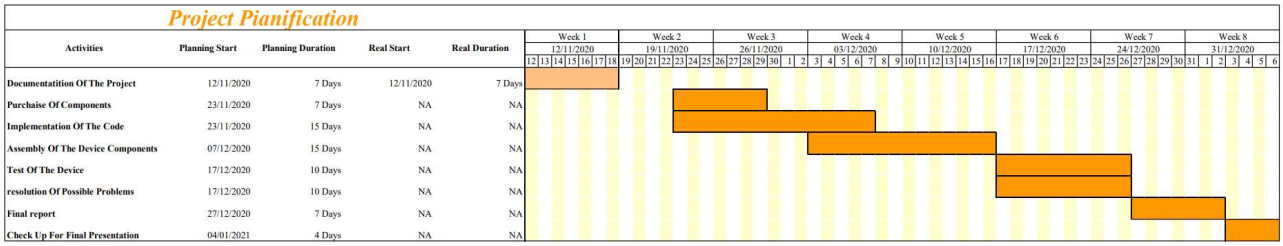
The device will keep track of the health status of Covid 19 patients at home, monitoring their heart rate, blood oxygen level and body temperature in the eventuality of an increase or decrease of these conditions.

To use the device the user has to press with his index finger the pulse oximeter sensor and, simultaneously, take between the thumb and the index the body temperature sensor. The device will receive the collected data as input, taking also the room humidity and temperature sensor information automatically. At the end the user has to insert the IP, given by the device, to connect to the results show page. [1][2][3]

PERT diagram



GANTT Diagram



Project Pianification

Activities	Planning Start	Planning Duration	Real Start	Real Duration
Documentatition Of The Project	12/11/2020	7 Days	12/11/2020	7 Days
Purchaise Of Components	23/11/2020	7 Days	NA	NA
Implementation Of The Code	23/11/2020	15 Days	NA	NA
Assembly Of The Device Components	07/12/2020	15 Days	NA	NA
Test Of The Device	17/12/2020	10 Days	NA	NA
resolution Of Possible Problems	17/12/2020	10 Days	NA	NA
Final report	27/12/2020	7 Days	NA	NA
Check Up For Final Presentation	04/01/2021	4 Days	NA	NA

	2. Not done yet
	4. Done

This diagram represents the least of tasks and estimated duration. It can be very useful for ourself organization. It will be updated during the progress of the project according to the evolution of the situation.

Use cases

It could be useful to know how to build a device that allows you to monitor the health conditions of the forbearing via IoT, which is rapidly revolutionizing the healthcare industry. The device gives us the chance to track the patient health using Web server.

The aim of the Covid 19 patient monitoring is to check:

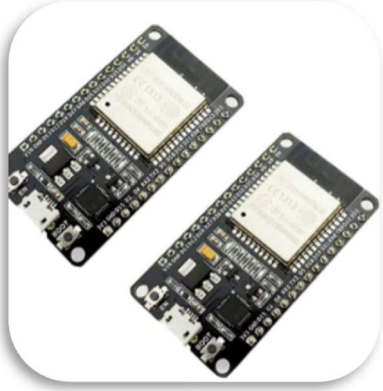
- Heart rate of the patient;
- Blood oxygen level of the patient;
- Body temperature of the patient;
- Temperature and humidity of the room in which is the patient. [4]

List of the components of the project:

- *ESP32 Board*
- *Pulse Oximeter Sensor MAX30100/MAX30102*
- *DS18B20 Sensor*
- *DHT11 Sensor*
- *Resistor*
- *Connecting Wires*
- *Breadboard*

Technical study:

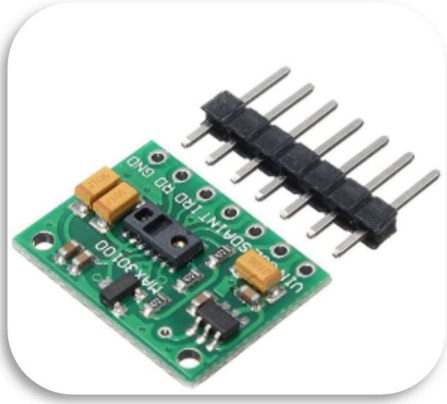
ESP32 Board



ESP32 is a series of low-cost, low-power system on a chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth. It is perfect for our project, because it is a union of more Arduino components that otherwise we had to take. [5]

Pulse Oximeter Sensor MAX30100/MAX30102

The MAX30100 is an integrated pulse oximetry and heartrate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analogical signal processing to detect pulse oximetry and heart-rate signals.



The device has two LEDs, one emitting red light, another emitting infrared light. For pulse rate, only the infrared light is needed. Both the red light and infrared light is used to measure oxygen levels in the blood. When the heart pumps blood, there is an increase in oxygenated blood as a result of having more blood. As the heart relaxes, the volume of oxygenated blood also decreases. By knowing the time between the increase and decrease of oxygenated blood, the pulse rate is determined.

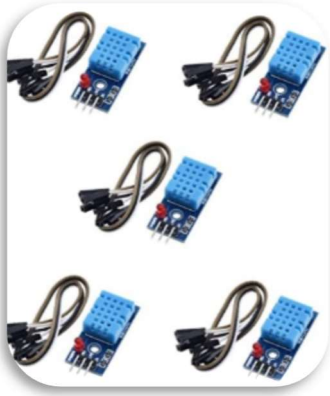
It turns out, oxygenated blood absorbs more infrared light and passes more red light while deoxygenated blood absorbs red light and passes more infrared light. This is the main function of the MAX30100: it reads the absorption levels for both light sources. [6]

DS18B20 Sensor

This is a pre-wired and waterproofed version of the DS18B20 sensor. Handy for when you need to measure something far away, or in wet conditions. The Sensor can measure the temperature between -55 to 125°C (-67°F to +257°F). The cable is jacketed in PVC.

Because it is digital, there is no signal degradation even over long distances. [7]

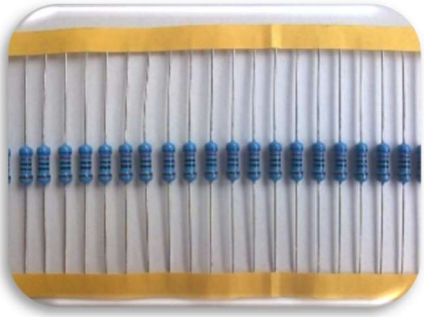
DHT11 Sensor



The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin.

It is fairly simple to use, but requires careful timing to grab data. The only real downside of this sensor is you can only get new data from it once every 2 seconds, so when using the library, sensor readings can be up to 2 seconds old. [8][9]

Resistor



A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. [10]

Connecting Wires

A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment. [11]

Breadboard

A breadboard is a construction base for prototyping of electronics.

The solderless breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design. For this reason, solderless breadboards are also popular with students and in technological education. [12]

References:

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