Covid-19 patient monitoring

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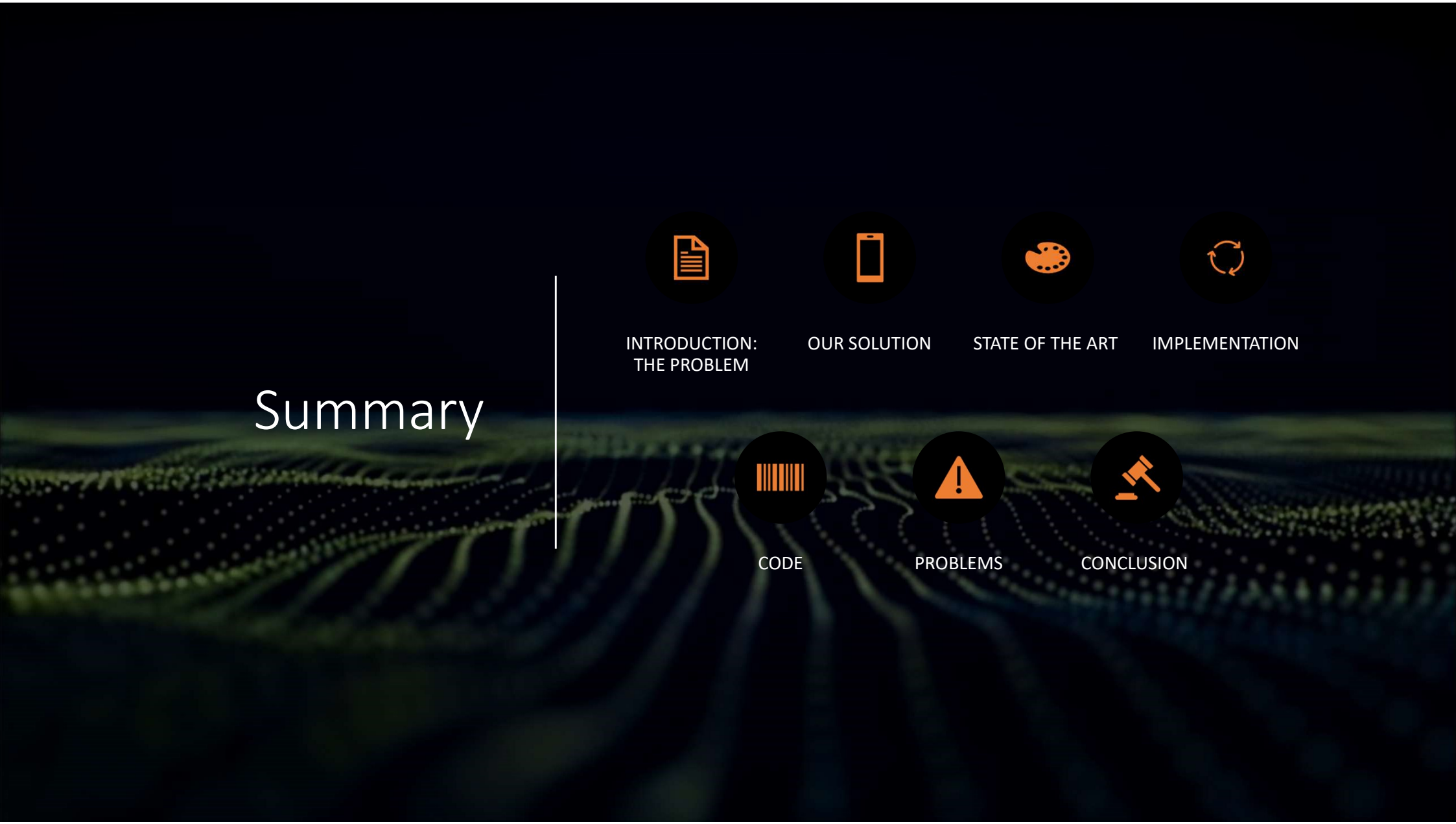
Summary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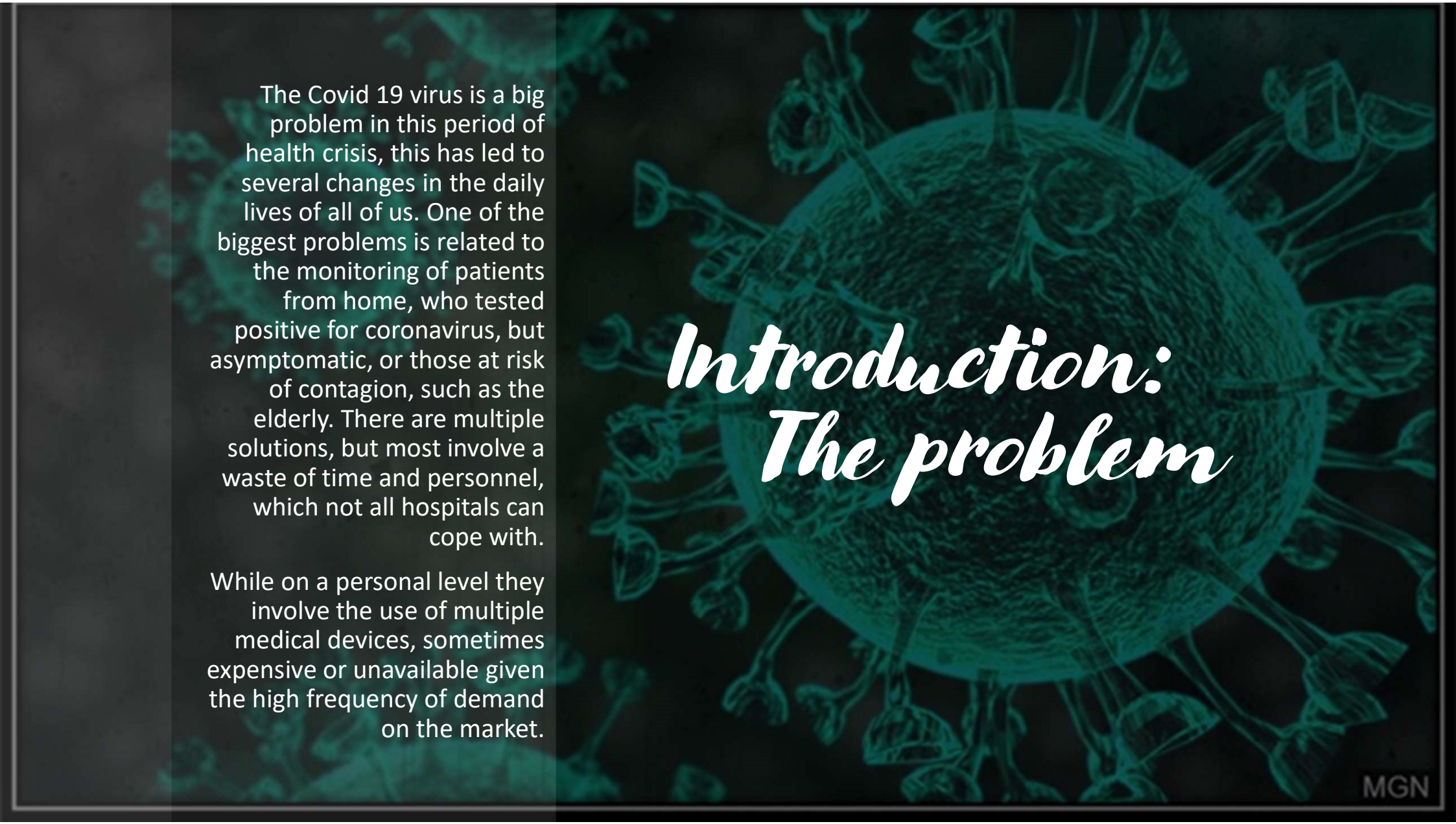
Introduction: The problem

The Covid 19 virus is a big problem in this period of health crisis, this has led to several changes in the daily lives of all of us. One of the biggest problems is related to the monitoring of patients from home, who tested positive for coronavirus, but asymptomatic, or those at risk of contagion, such as the elderly. There are multiple solutions, but most involve a waste of time and personnel, which not all hospitals can cope with.

While on a personal level they involve the use of multiple medical devices, sometimes expensive or unavailable given the high frequency of demand on the market.



Our solution

There are numerous solutions to these problems. Our consists in the creation of a single device capable of monitoring some symptoms from home that may represent the onset of the virus in the patient considered. This is possible thanks to the measurement of three vital signs:

·**Heart rate** of the patient;
·**Blood oxygen level** of the patient;
·**Body temperature** of the patient.

The doctor treating the patient in question will therefore be able to access this information at any time and whenever these parameters change substantially, arrange for a visit to the patient in the manner deemed most appropriate. In fact, our device must allow those with the right information to be able to view the parameters considered with a simple internet connection at any time.

Our solution

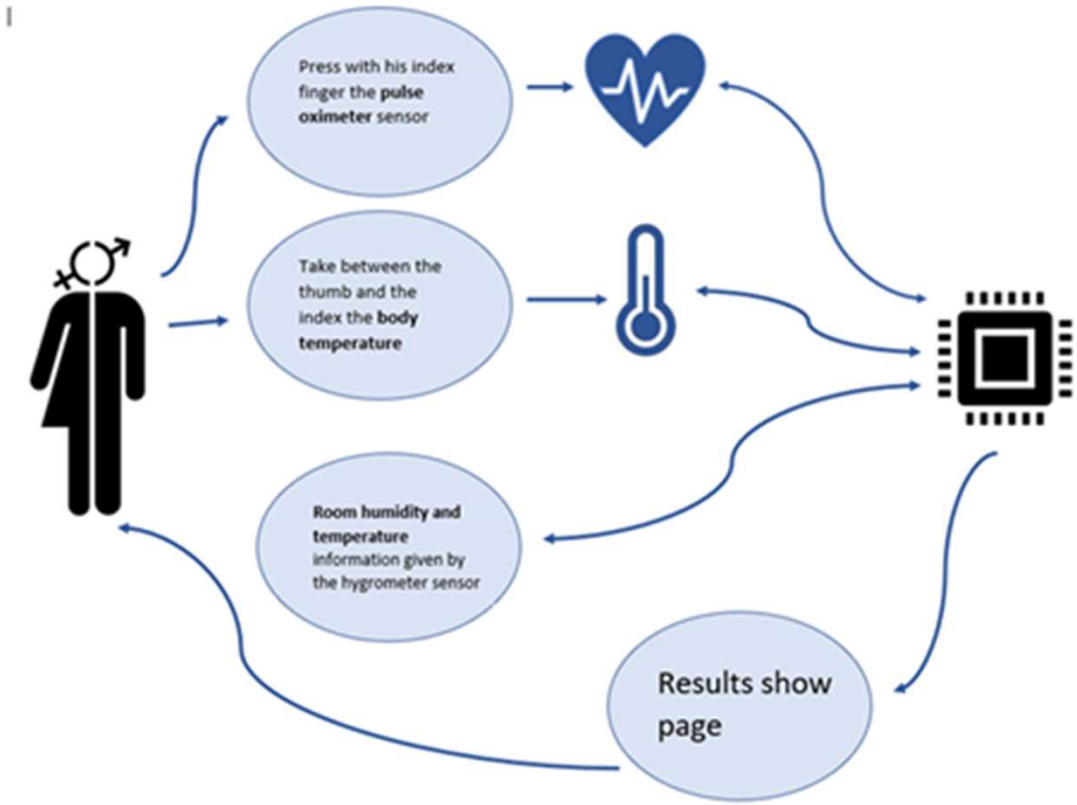
The divice must therefore be composed of three sensors, each with a different and specific task:

·**Pulse Oximeter Sensor**, used to monitor heart rate and oxygenation;

·**Temperature sensor**, is used to monitor the patient's body temperature;

·**Temperature and humidity sensor**, is used to monitor the temperature and humidity of the room where the patient is, as these conditions could bring significant changes in the parameters previously described.

The device will input all the above parameters and then bring them back to a single web page, by entering the IP address.



State of the art

The first non-invasive oximeters were the ear oximeters around 1935, but it had too many problems:

- Inability todifferentiate light absorbion due to arterial blood from the venous blood and tissues.
- High cost of instrumentation

Nowadays, there are small oximeters, based in laser oximetry, that measure the oxygen saturation on the extremities of human body, as finger.

The oximeter has jumped to the forefront of the news because it helps to discover a severe complication, such as pneumonia.

There exists some that also measure body temperature and, in exceptional cases, it can contains also room thermometer.

State of the art

There exists different kinds of thermometer.

The first one was 30 cm long and taking a patient's temperature could take up to half an hour.

These days thermometers have many important quality, as:

Compactness	Speed of measurement	Accurancy

The most used in these time are the infrared thermometer, which doesn't need to be touched and takes only few seconds to measure the temperature.

ThermoPro TP49 Mini Igrometro Termometro Digitale Termoigrometro da Interno per Casa Monitor di Temperatura e umidità per Ambient...

★★★★½ 3.522

9,99€

Pulsossimetro Saturimetro Palmare Display 2,8" LCD con Sensore Adutli a Clip, Sonda Temperatura e Batteria Ricaricabile

197,00 € (IVA escl.)
197,00 € (IVA incl.)
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CATEGORIA: PULSOSSIMETRI - SATURIMETRI RIFERIMENTO: DTNO
DISPONIBILE: 6 ARTICOLI

Saturimetro palmare con sensore adulti e sonda temperatura cutanea saturimetro professionale ospedaliero. Saturimetro con batteria ricaricabile e memoria interna da 90 ore.

AGGIUNGI AL CARRELLO

LISTA DEI DESIDERI CONFRONTARE

Sponsorizzato

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★★★★★ 183

39,99€ (39,99 €/unità)

Pulsossimetro, Monitore di Battito Cardiaco Portatile con LED Display, FED e CE Certificato per Misurazione di Pulsazione (PR) e Saturazione di...

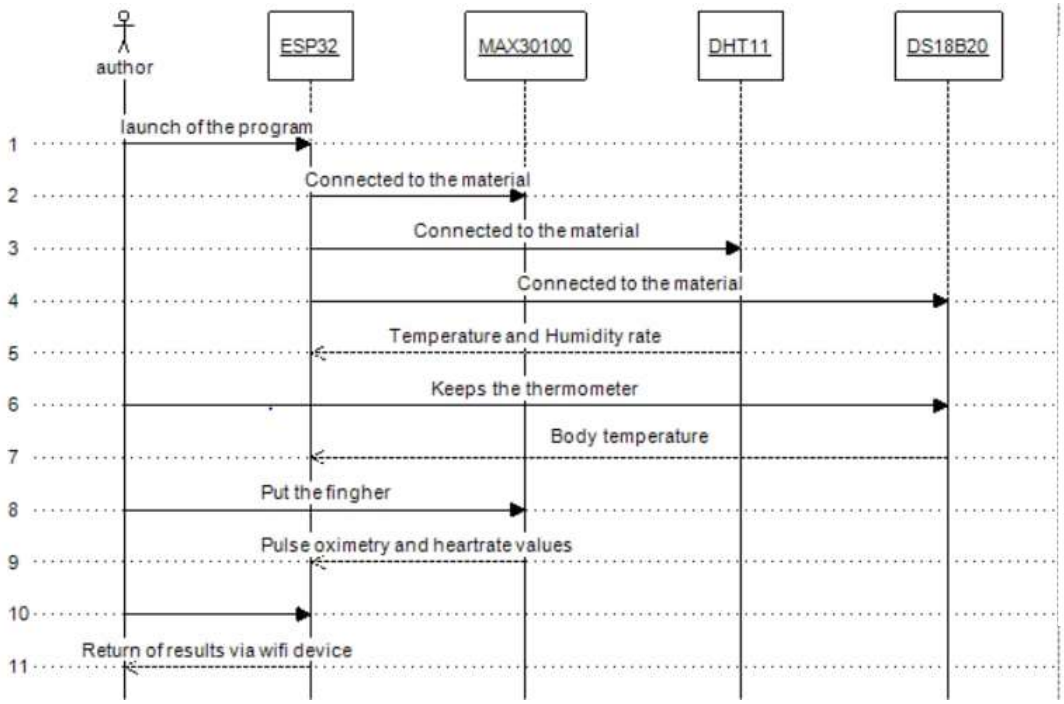
★★★½☆ 2

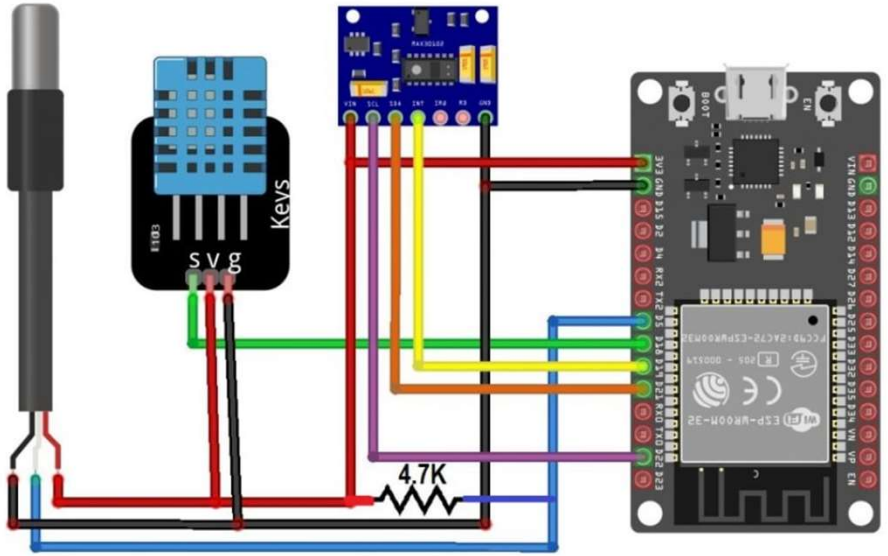
20,09€

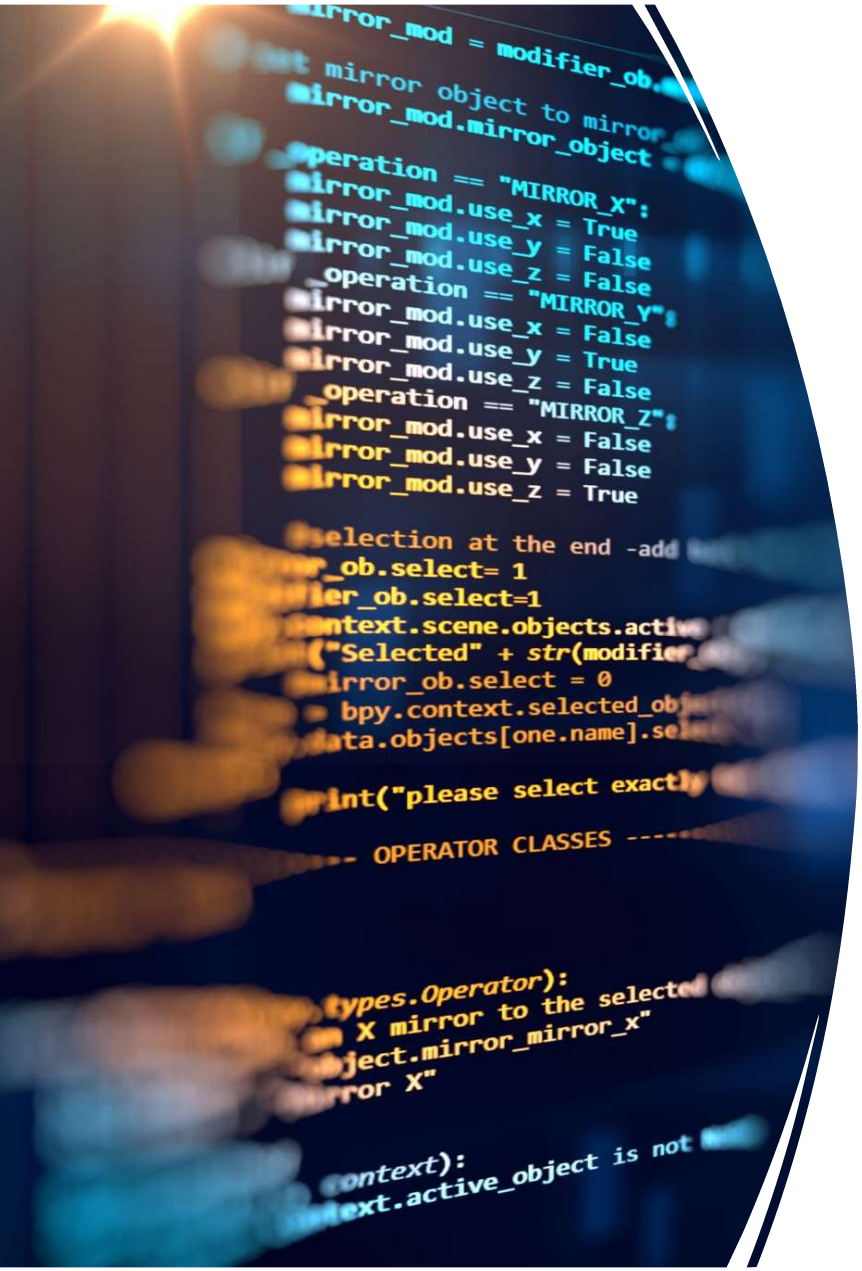
Market Study

	Min Price	Max Price
Pulse oximeter	20€	200€
Thermometer	3€	1000€
Hygrometer thermometer	2€	300€

Implementation







Code

Link of the project code: *https://how2electronics.com/iot-based-patient-health-monitoring-esp32-web-server/*

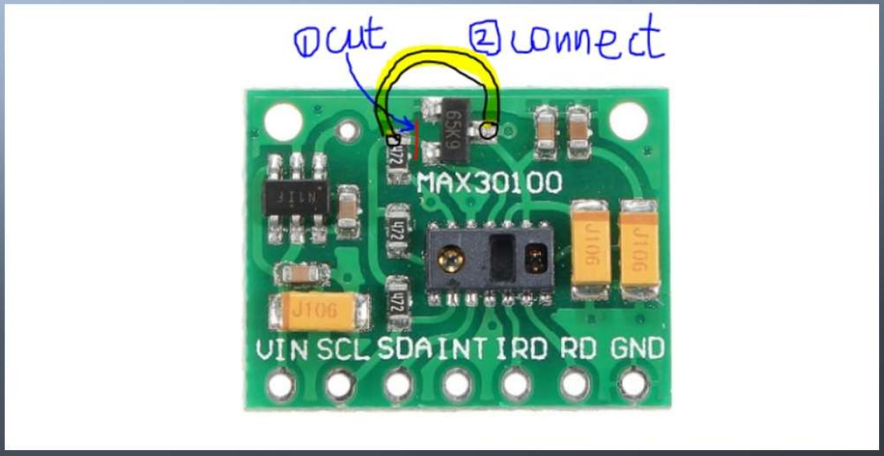
During the implementation we encountered problems with this code in the DTH11 component part.

```
const char* ssid = "The IoT Projects";  // Enter SSID here
const char* password = "11122235122@kap";  //Enter Password here

dht DHT;
PulseOximeter pox;
uint32_t tsLastReport = 0;
OneWire oneWire(DS18B20);
DallasTemperature sensors(&oneWire);


WebServer server(80);

void onBeatDetected()
```

```
'dht' does not name a type

exit status 1
'dht' does not name a type
```

Problem

Another problem encountered concerns the MAX30100: there is a design problem.
The SCL and SDA pins are pulled-up via the 4.7k ohm resistors to 1.8V!
This means it won't work well with microcontrollers with higher logic levels.
A possible solution can be to cut the path in the place of the red cross and make a jumper as shown by the yellow line.

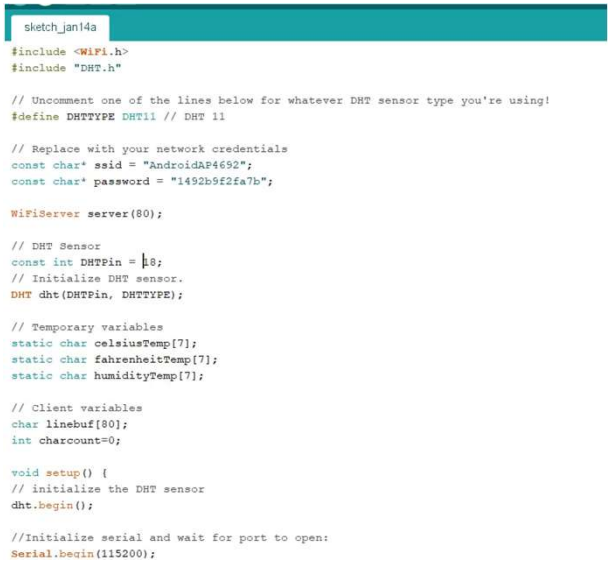


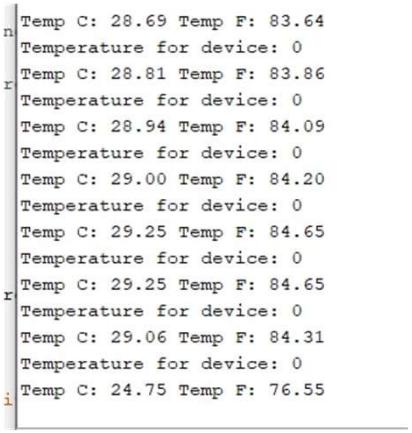
Conclusion

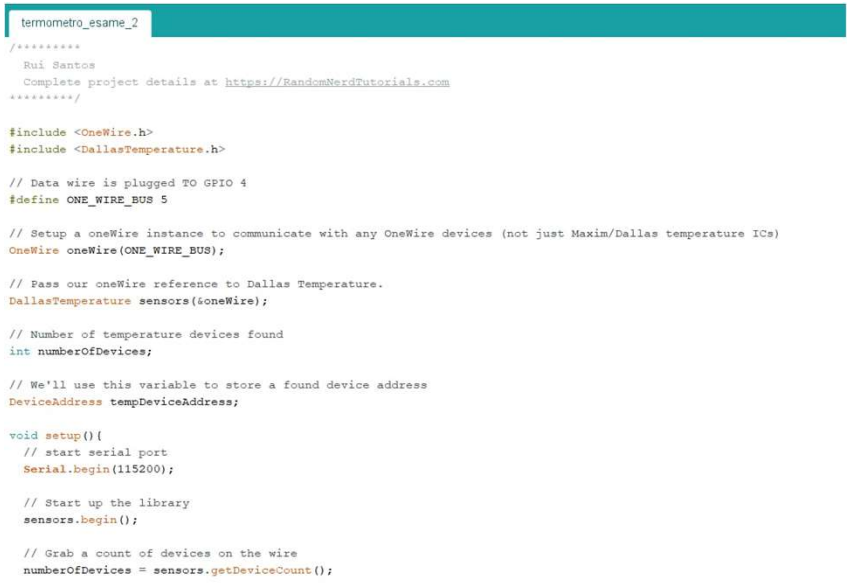
Following the problems encountered, we opted for the construction of multiple devices instead of just one.

Despite several attempts and the modification made, we have not yet been able to solve the problem with the MAX30100.

However, we are convinced that this project, if completed, can be of great help in various situations of health problems.








Merci à vous!
Grazie per
l'attenzione!