ELETROCAP PROJECT

André Ramos Loja Infante Barbosa - 103008

Artur Filipe de Menezes Crespo Ferreira - 102482

Guilherme João Ferreira Fustiga- 103291

Marco António Rocha Curto - 102989

Rodrigo Apolinário de Sousa Nunes Sereno - 102785

Tito Pereira - 103284

TÉCNICO LISBOA

ADVISORS AND MENTOR

Luis Caldas de Oliveira

Coordinator

Prof. Duarte Mesquita e Sousa

Scientific Advisor

Jorge Ferreira

Mentor

PROBLEM DEFINITION

Insecurity leaving your home for extended periods of time.

Lack of power to control your home remotely.

Complement security cameras systems with comfort and control tools.

BENEFICIARIES

OFFICES OR WAREHOUSES

HOMEOWNERS

OTHER BUSINESS

TECHNOLOGICAL SOLUTION

Central Unit

Raspberry Pi, that will process all the sensor's information.

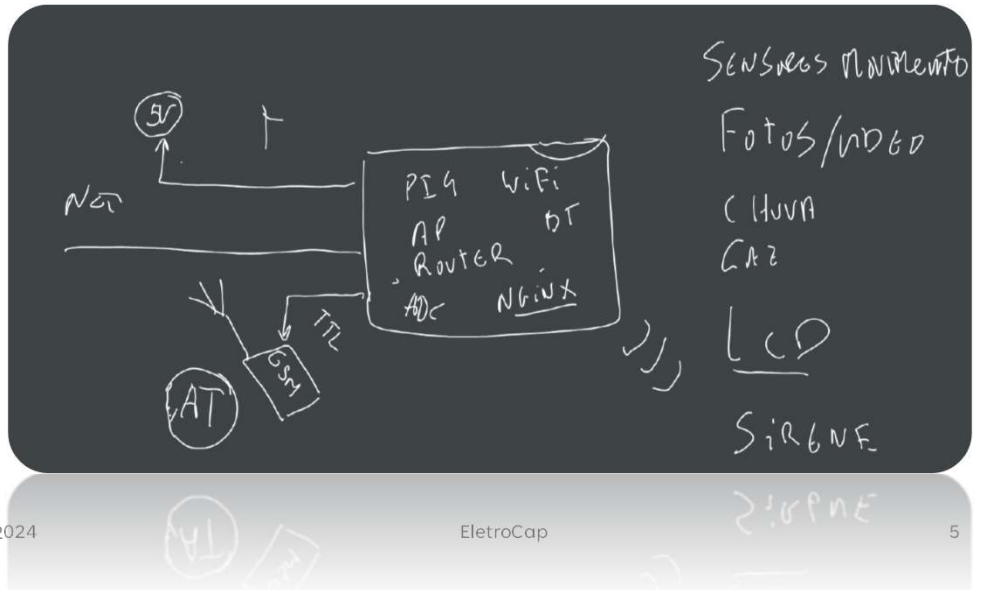
Protected with energy and communications backups.

Sensor Integration

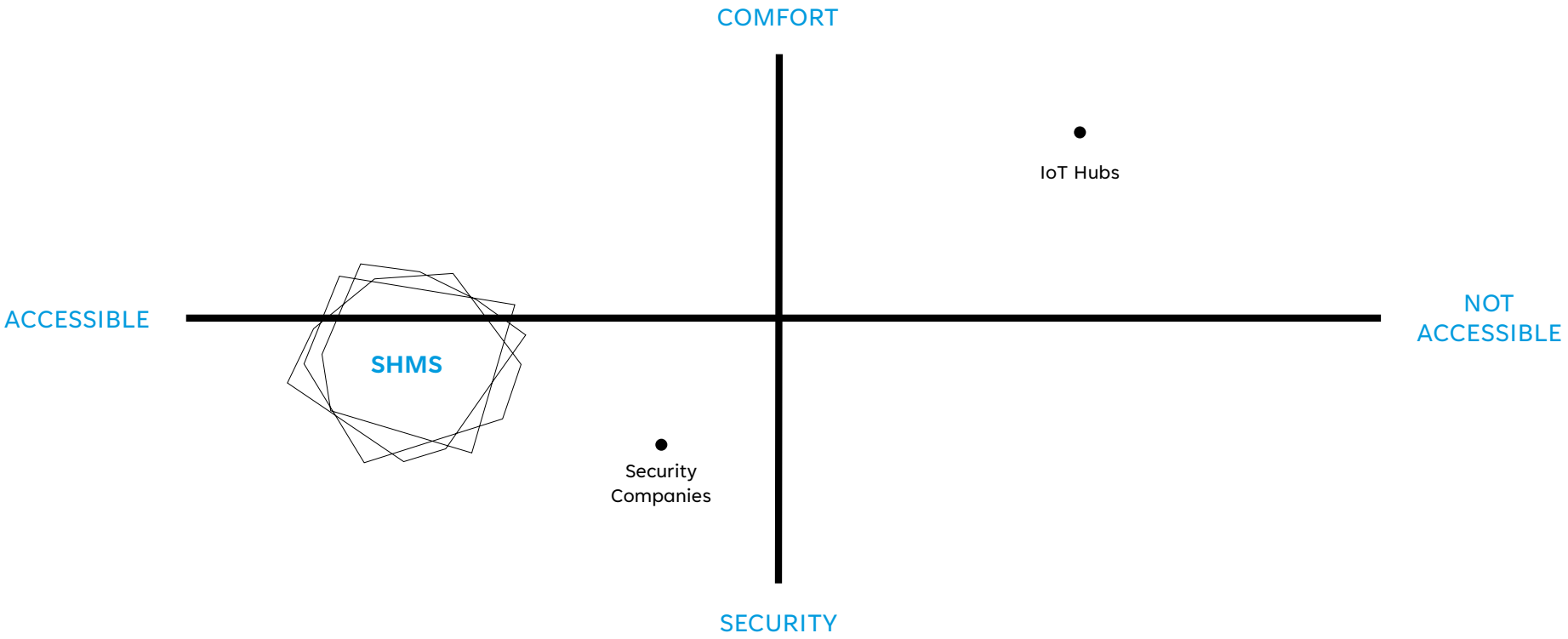
Prototype with a discrete collection of sensors, e.g. movement, rain or light.

Software

WebApp to display the data to the user with connection to the central unit.
Computer Vision Algorithm to recognize unexpected movements and to differentiate humans from animals.



OUR COMPETITION



CENTRAL UNIT

Raspberry PI

Backup Battery and Communication

Display LCD

WEBSERVER
WEBAPP

Web Development

Data Base

CAMERAS AND
SENSORS

Computer Vision

Sensor Communication

ACTUATORS

Alarms

Door Lock

Requirements

TECHNICAL CHALLENGES

COMMUNICATION PROTOCOLS

COMPUTER VISION ALGORITHMS

ELECTRONIC MODULES

DATA MANAGEMENT

WEB DEVELOPMENT

CYBERSECURITY

PARTNER

TESTING AND VALIDATION METRICS

Good Function of Features

How the developed software and integrated sensors and features respond to real situations

Ease of Use and Installation

How easy it is to the user to get the system installed and to get the sensors that he needs and how easy it is to the team to develop the prototype and add future features

Cost Efficiency

Prototype price compared to the expected value

Reliability

What is the system response to an attempt to breach the system or the home

ANDRÉ BARBOSA

SOFTWARE

Full Stack WebSite
Full Stack WebApp
Computer Vision
Data Management

ARTUR FERREIRA

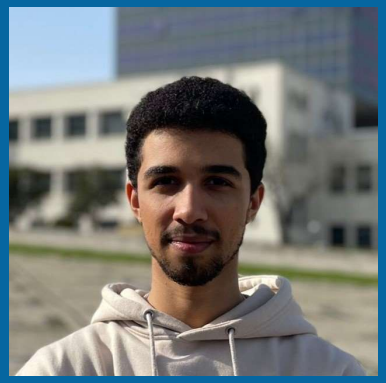
CENTRAL UNIT

Information Processing
Computer Vision
Backups
Sensors and Actuation

GUILHERME FUSTIGA

COMMUNICATION PROTOCOL

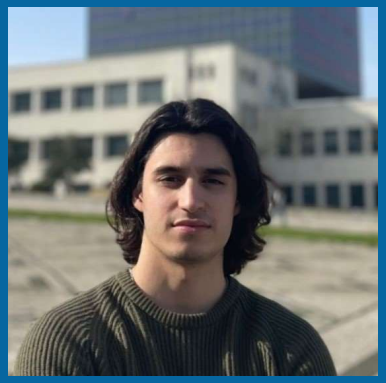
Sensors and Actuation
Design
Computer Vision
Web Dev



MARCO CURTO

WEB DEVELOPMENT

Full Stack WebSite
Full Stack WebApp
Design
Cyber Security



RODRIGO SERENO

CENTRAL UNIT

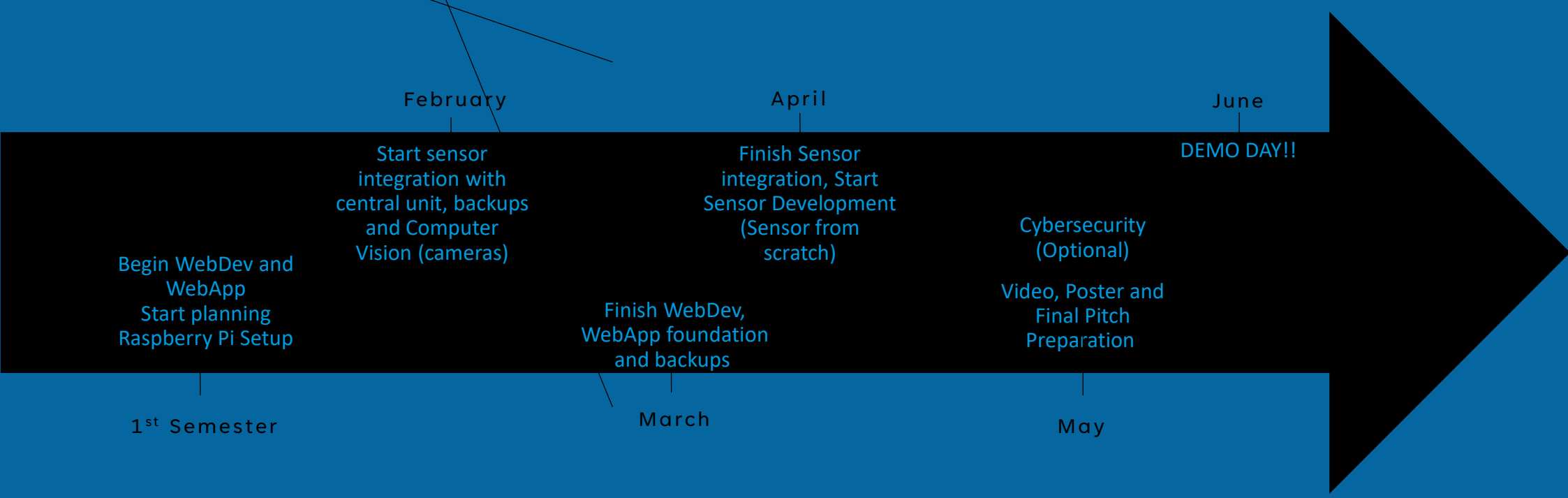
Information Processing
Sensors and Actuation
Data Management
Energy

TITO PEREIRA

PUBLIC RELATIONS

Network
Data Management
Information Processing
Software

SCHEDULE


1st Semester
Begin WebDev and WebApp
Start planning
Raspberry Pi Setup
February
Start sensor integration with central unit, backups and Computer Vision (cameras)
March
Finish WebDev, WebApp foundation and backups
April
Finish Sensor integration, Start Sensor Development (Sensor from scratch)
May
Cybersecurity (Optional)
Video, Poster and Final Pitch Preparation
June
DEMO DAY!!

RESULTS

Fully Functioning WebSite with Weekly reports of the progress.

WebApp showing status from the sensors and allowing interaction with the actuators.

RESULTS

Sensor Integration with real data from rain and gas sensor. Doors and Windows status from distance sensors and implementation of a door lock.

Data Base built to store all the data from the sensors.

Camera video stream to detect intrusions with Computer Vision Algorithms.

Built the prototype to demonstrate all the results achieved.

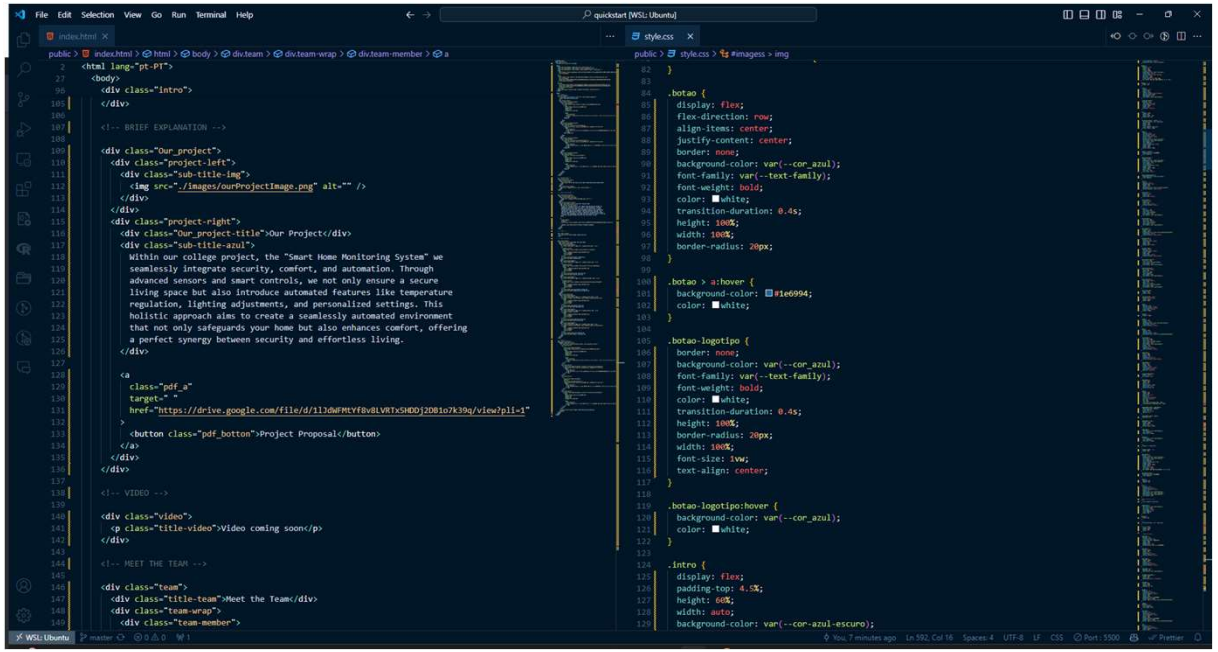
Web Dev

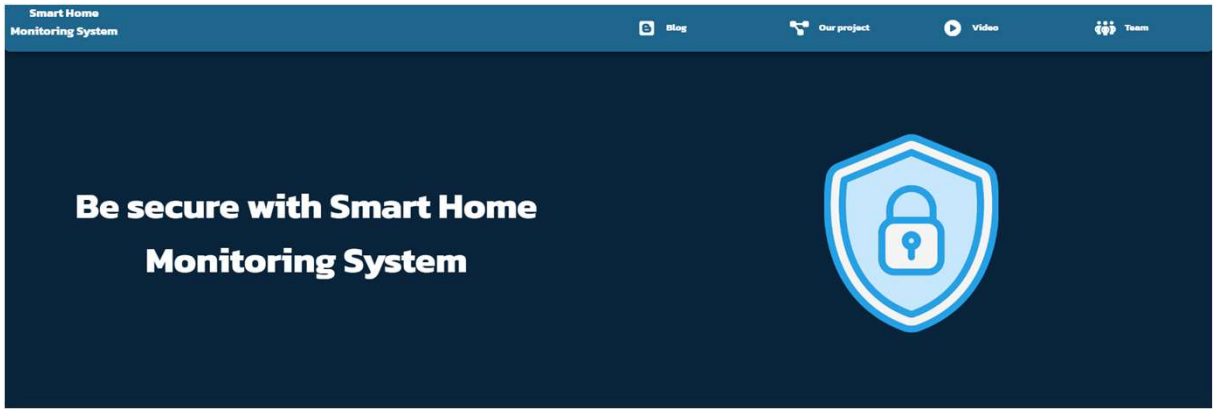
Web Site and Web APP

MARCO CURTO

ANDRÉ BARBOSA

2024

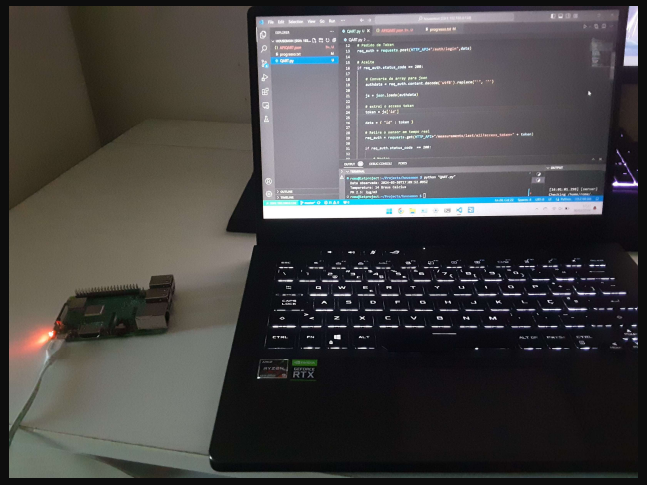


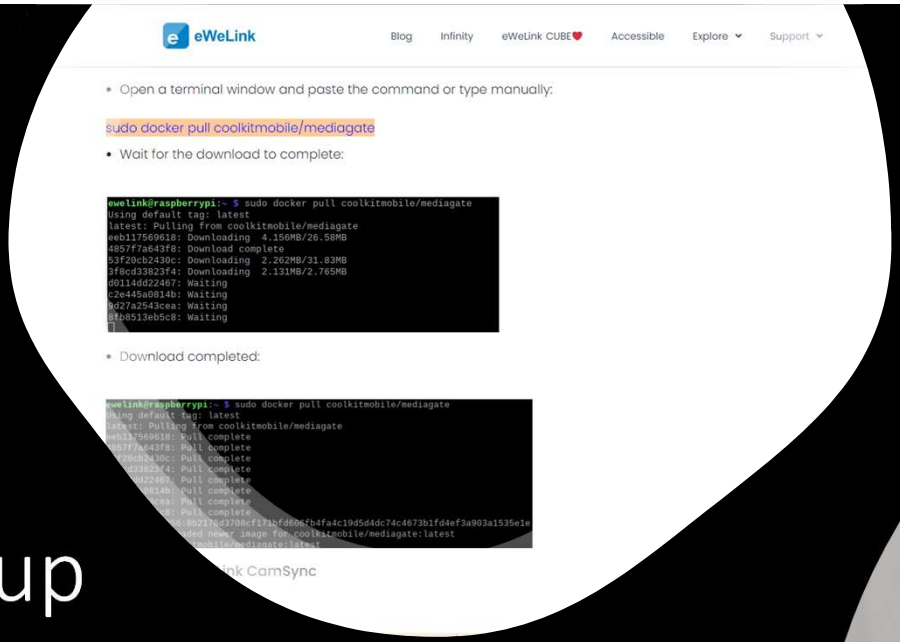


Central Unit

ARTUR FERREIRA

RODRIGO SERENO





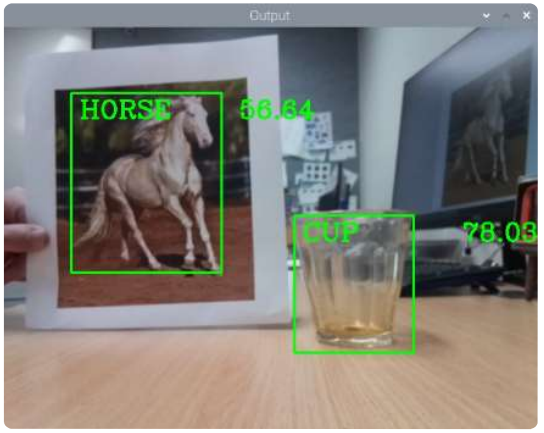
Camera Setup

ARTUR FERREIRA

TITO PEREIRA

Computer Vision

ANDRÉ BARBOSA GUILHERME FUSTIGA



Sensor Integration

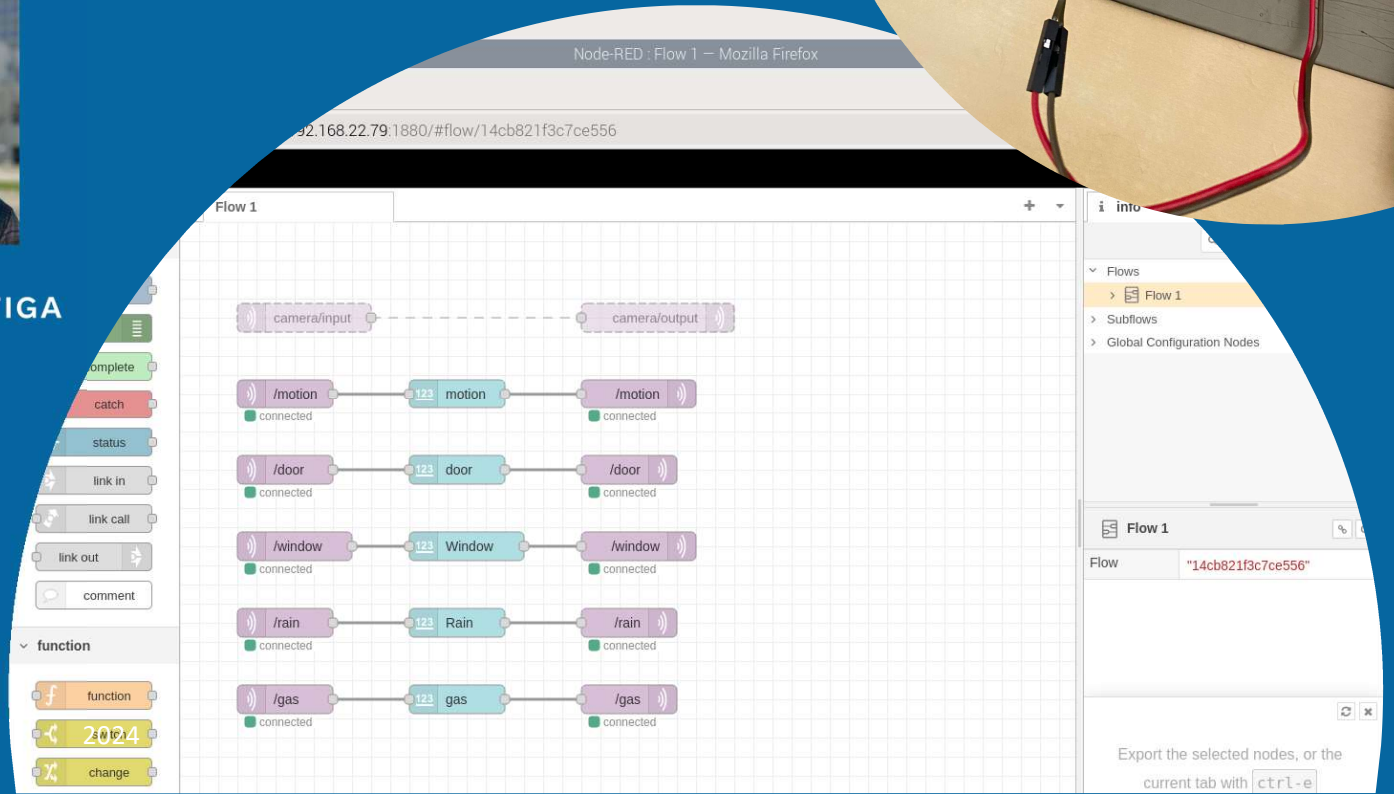
ANDRÉ BARBOSA

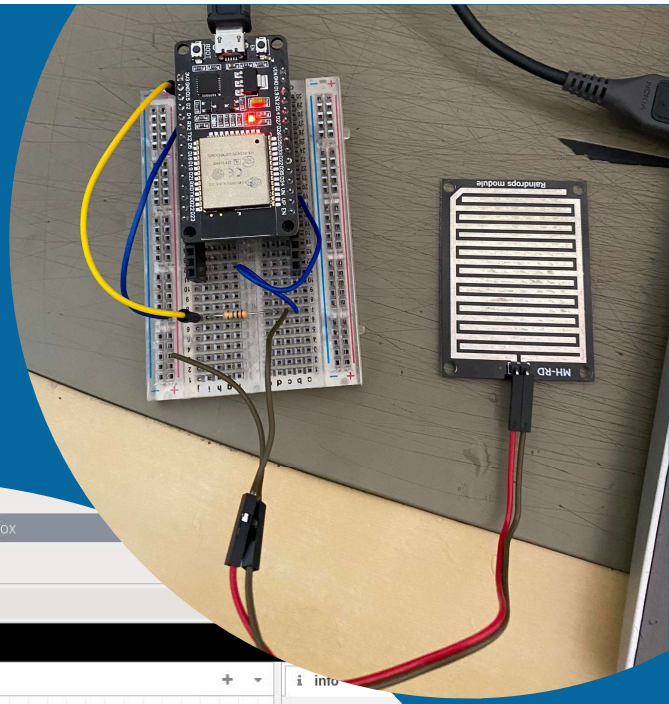
GUILHERME FUSTIGA

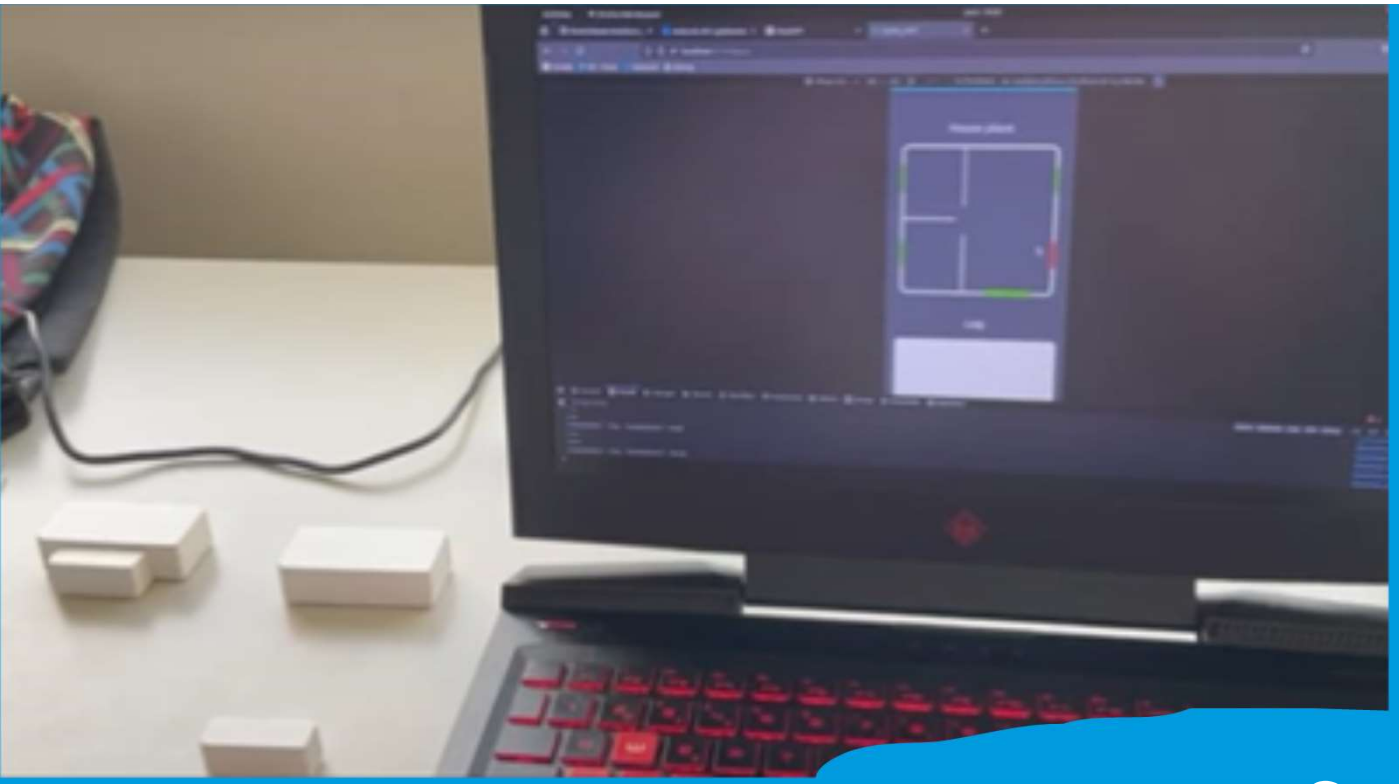
RODRIGO SERENO

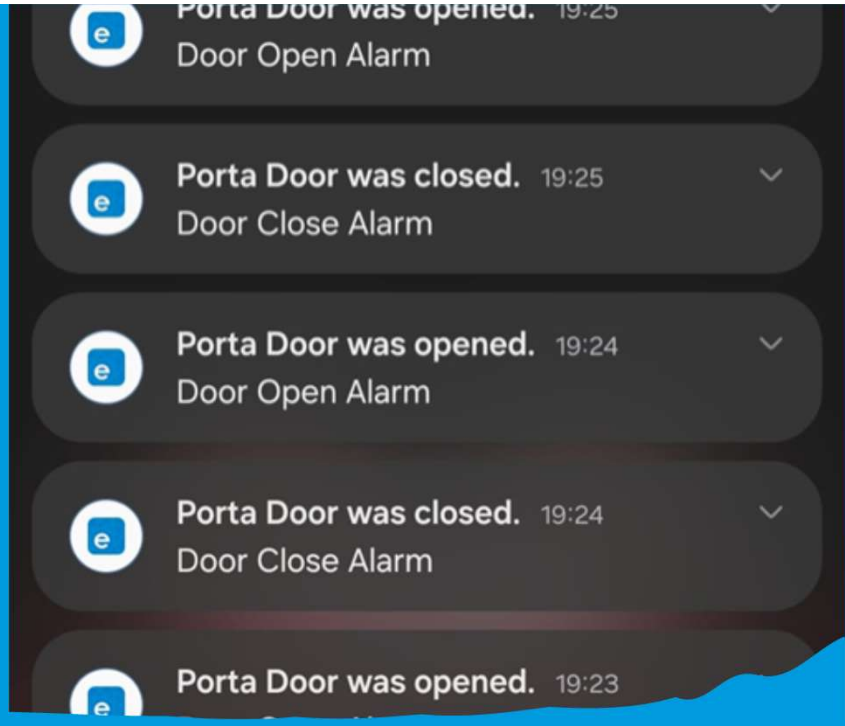
EletroCap

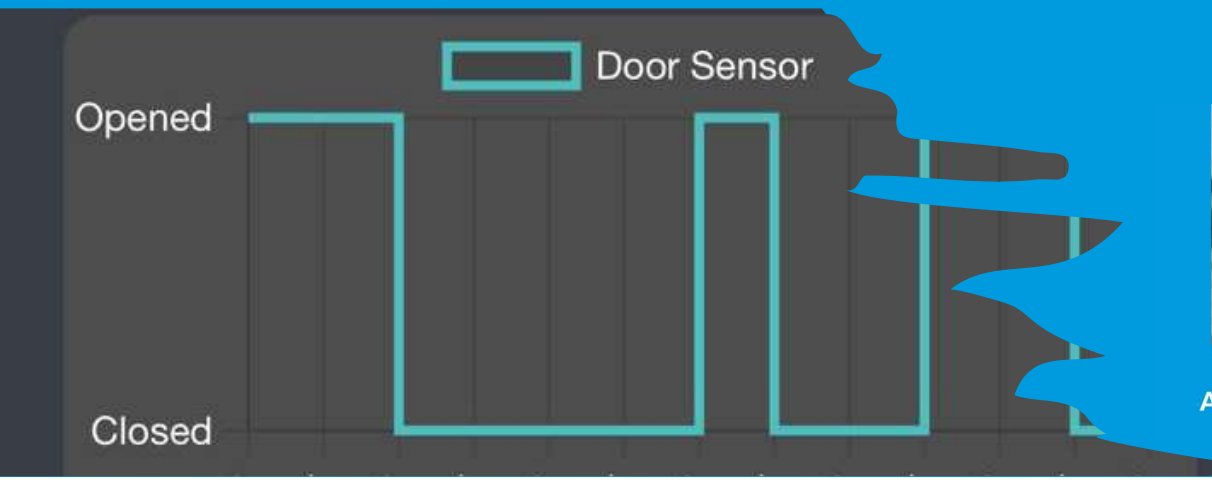
2024



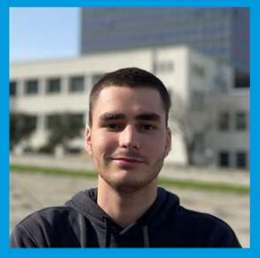




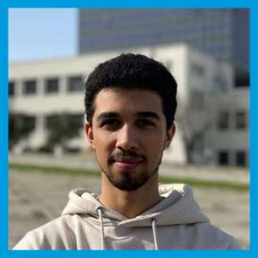




Sensor Integration



ARTUR FERREIRA



MARCO CURTO

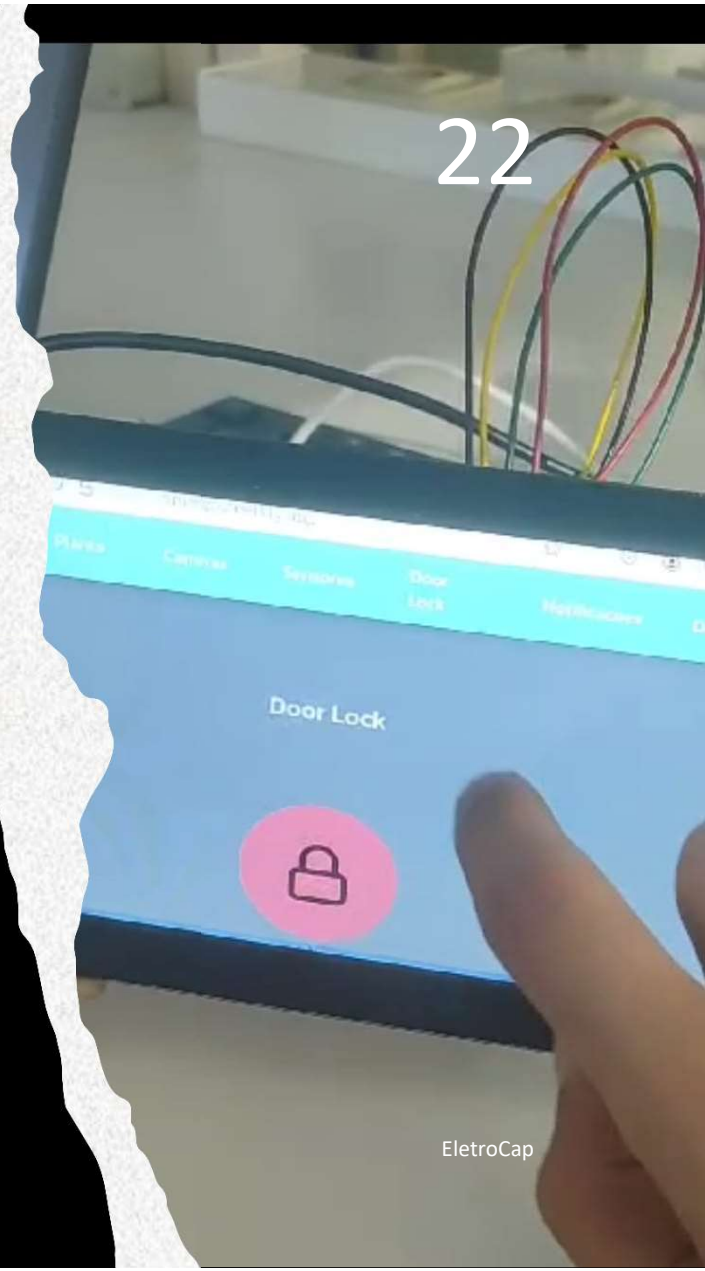
TITO PEREIRA

2024

Actuators

GUILHERME FUSTIGA

MARCO CURTO

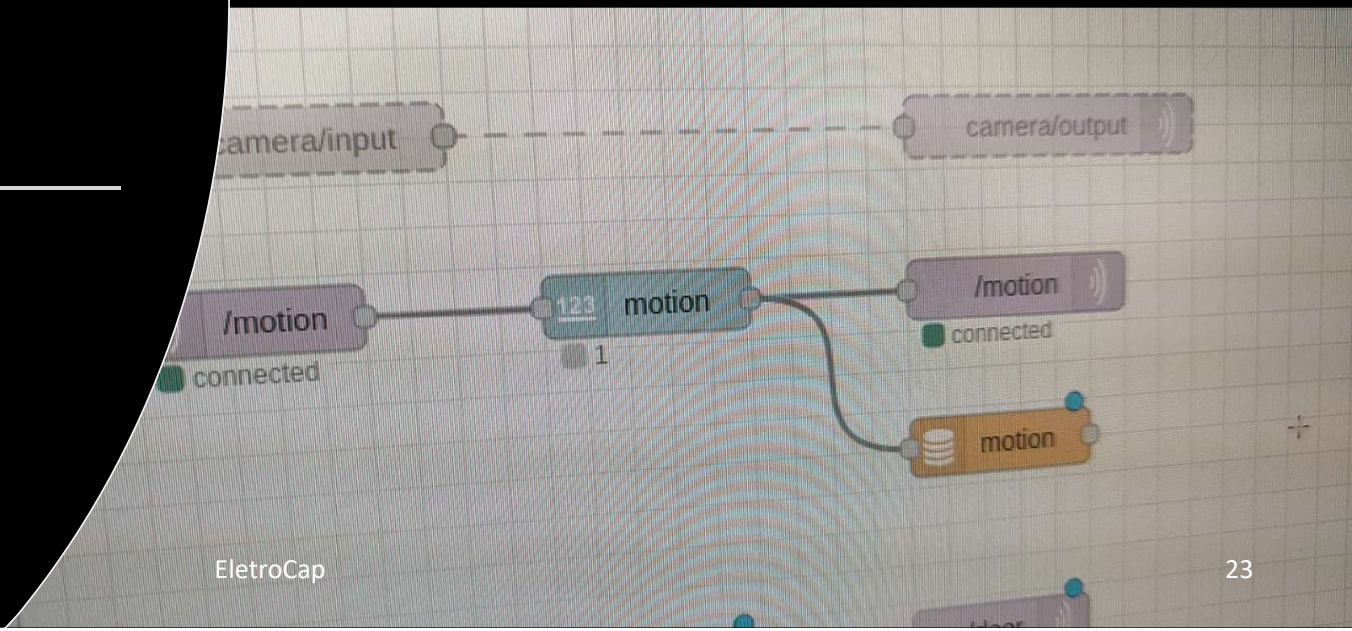


TITO PEREIRA

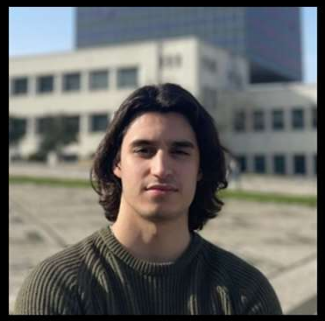
MARCO CURTO

DataBase

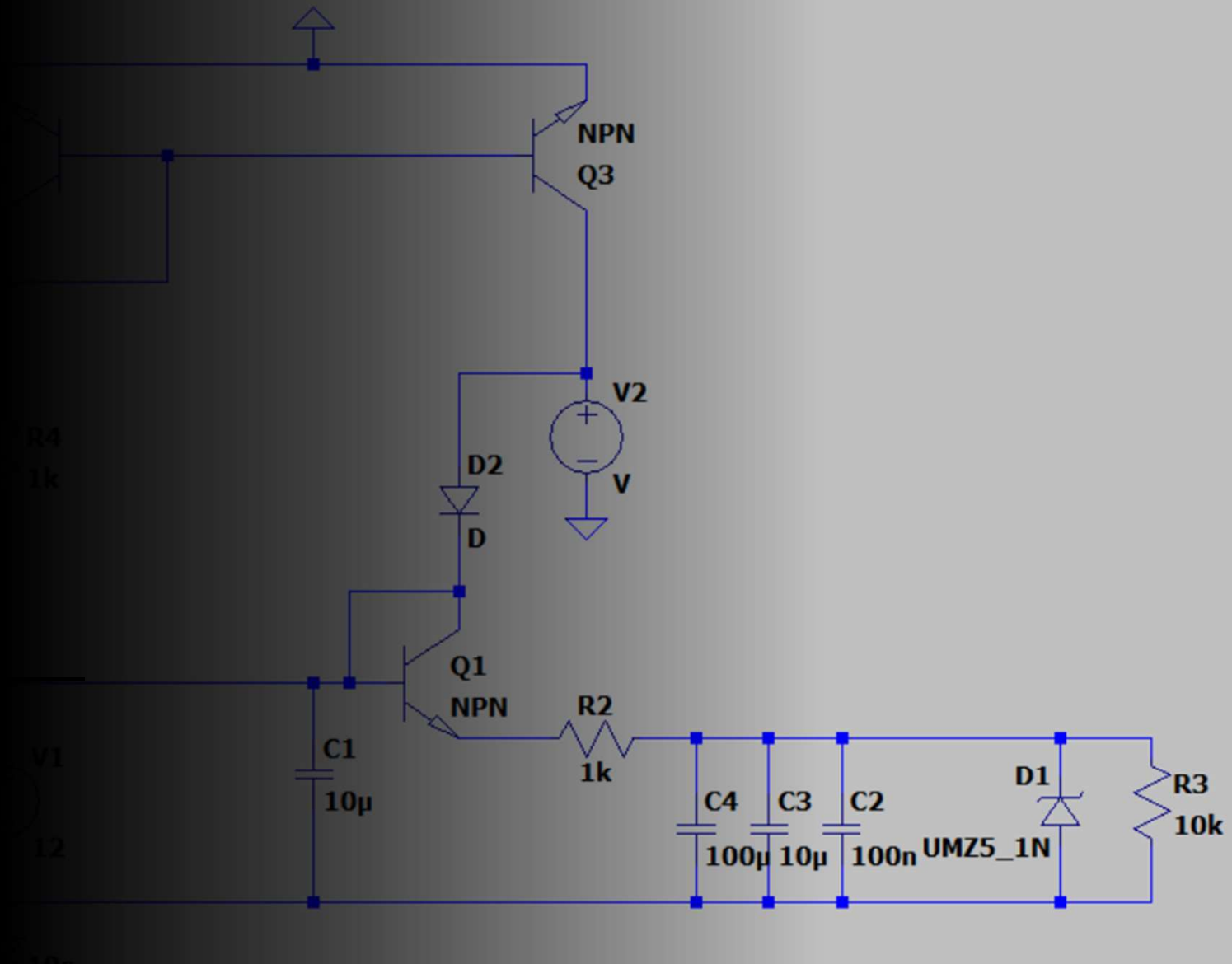
```
| history          |
| sensors          |
+------------------+
s in set (0.01 sec)

select * from sensors;
+------+---------+
ne    | status |
+------+---------+
      | 0      |
      | 0      |
      | 0      |
      | 0      |
      | 0      |
+------+---------+
.02 sec)

rom history;
+----------------------------+---------+
| datetime                   | counter |
+----------------------------+---------+
2024-04-30 15:51:00.000000 |       1 |
2024-04-30 15:51:00.000000 |       2 |
2024-04-30 15:51:00.000000 |       3 |
+----------------------------+---------+
 sec)
```



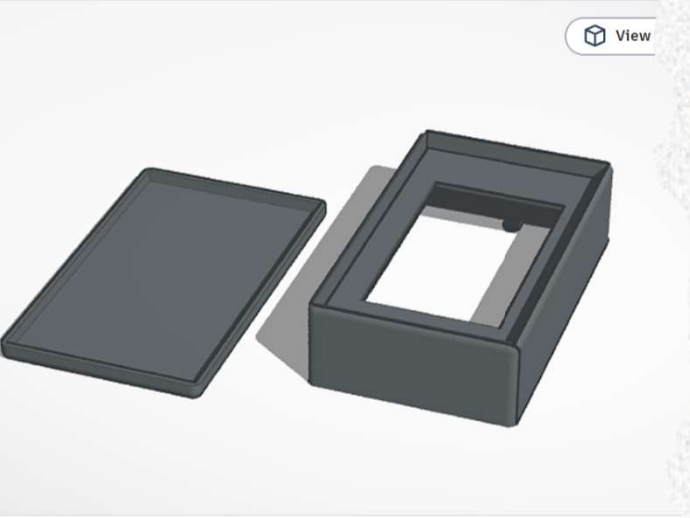
Energy



RODRIGO SERENO



central unit box



Prototype

GUILHERME FUSTIGA

MARCO CURTO

TITO PEREIRA

ANDRÉ BARBOSA

ARTUR FERREIRA

RODRIGO SERENO

Costs

- Raspberry PI and Sensors Cost
- Time to Install
- Time to Research and Develop

Benefits

- Feeling of comfort when away from home
- User Friendly
- Good Scalability
- Costs can be reduced with project growth and more experience

TÉCNICO LISBOA

WEB SITE

VIDEO