



ELETROCAP PROJECT

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ADVISORS AND MENTOR



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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



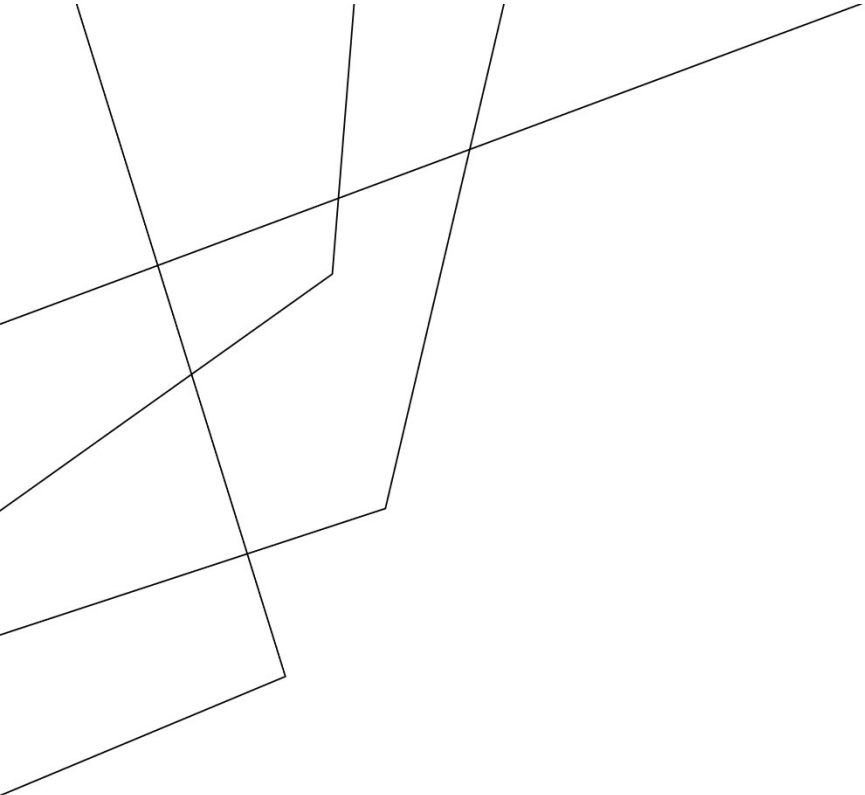
OFFICES OR
WAREHOUSES



HOMEOWNERS



OTHER BUSINESS



TECHNOLOGICAL SOLUTION

Central Unit

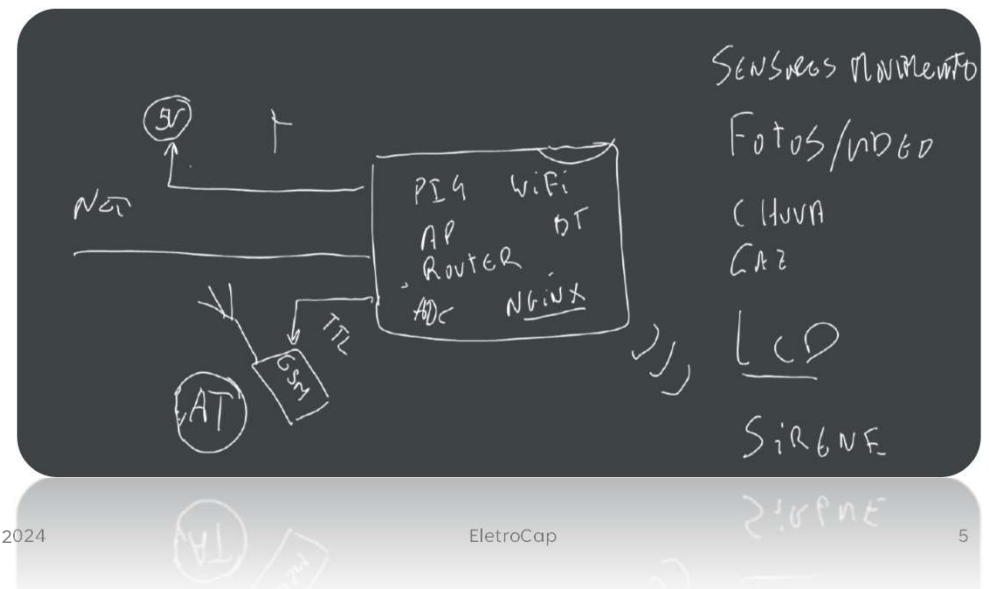
Raspberry Pi, that will process all the sensor's information.
Protected with energy and communications backups.

Sensor Integration

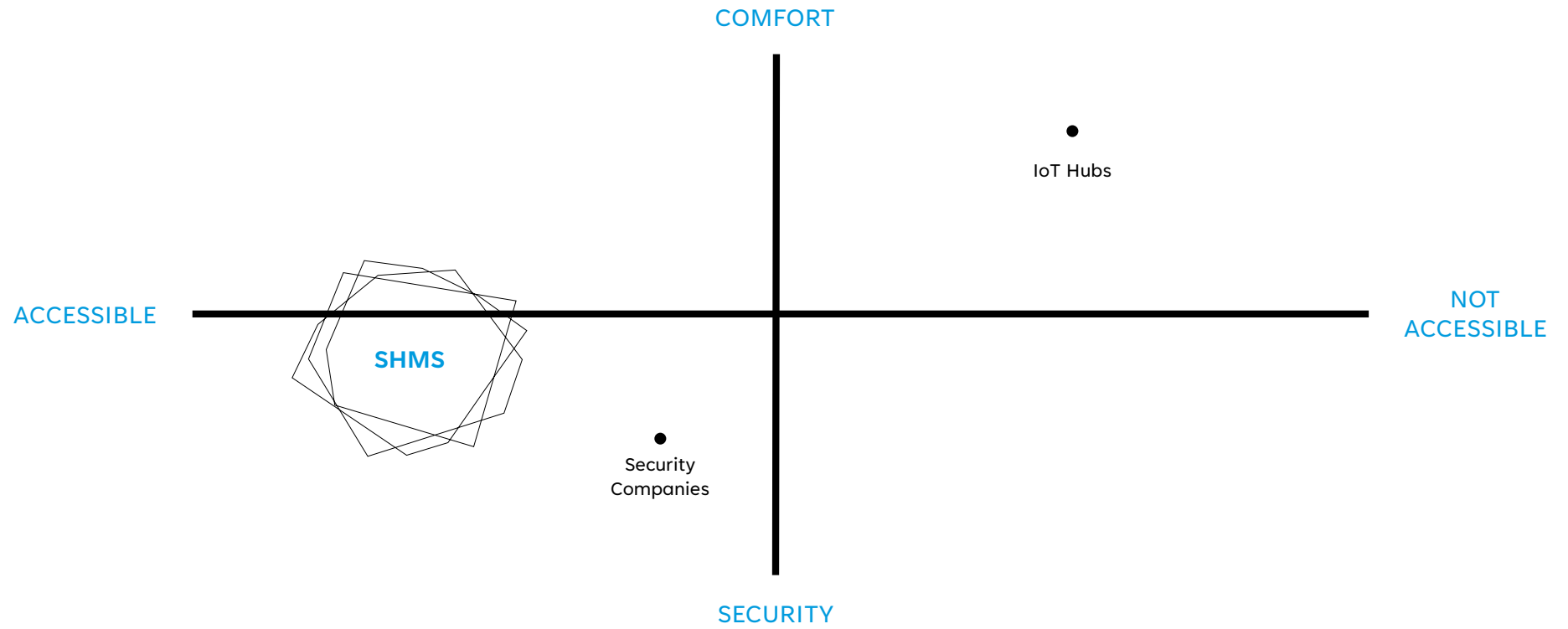
Prototype with a discrete collection of sensors, e.g. movement, rain or light.

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



QUANTICO
SOLUTIONS

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

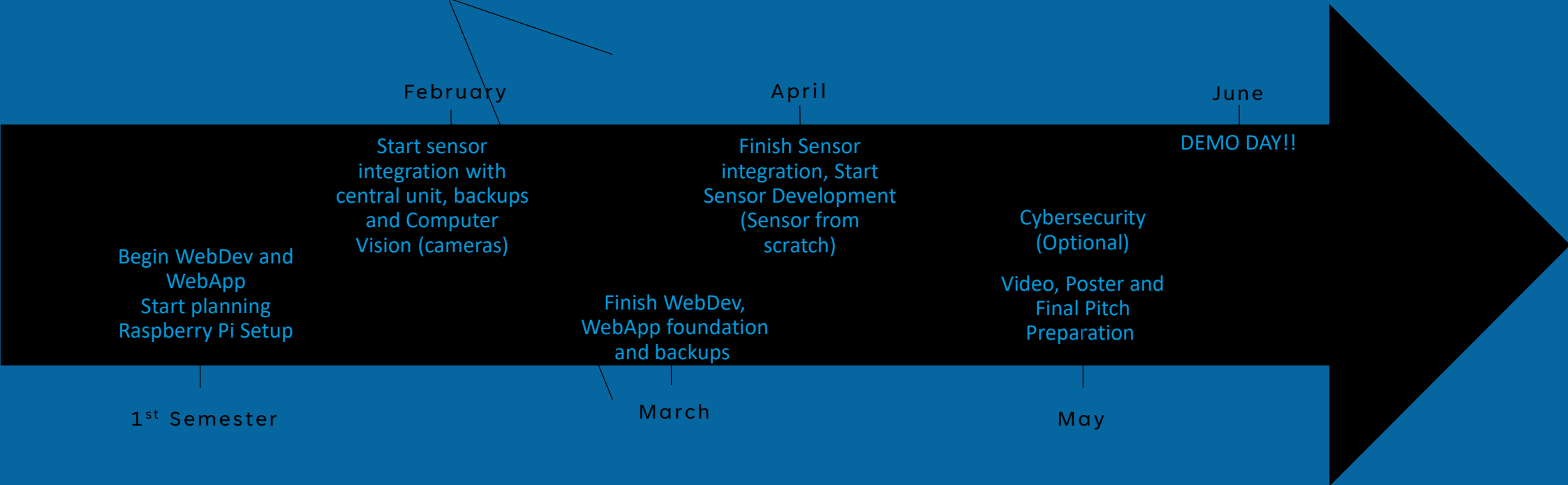


TITO PEREIRA

PUBLIC RELATIONS

Network
Data Management
Information Processing
Software

SCHEDULE



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

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File Edit Selection View Go Run Terminal Help
public > index.html > @html > @body > @div.team > @div.team-wrap > @div.team-member > @a
2 <html lang="pt-PT"
27 <body
96 <div class="intro">
105 </div>
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107 <!-- BRIEF EXPLANATION -->
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109 <div class="our-project">
110 <div class="project-left">
111 <div class="sub-title-img">
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113 </div>
114 </div>
115 <div class="project-right">
116 <div class="our-project-title">Our Project</div>
117 <div class="sub-title-azul">
118 Within our college project, the "Smart Home Monitoring System" we
119 seamlessly integrate security, comfort, and automation. Through
120 advanced sensors and smart controls, we not only ensure a secure
121 living space but also introduce automated features like temperature
122 regulation, lighting adjustments, and personalized settings. This
123 holistic approach aims to create a seamlessly automated environment
124 that not only safeguards your home but also enhances comfort, offering
125 a perfect synergy between security and effortless living.
126 </div>
127 <a
128 class="pdf_a"
129 target=""
130 href="https://drive.google.com/file/d/1l1dMfPLVf8vBLVtXtSHEDJ208io7k39q/view?pli=1"
131 >
132 <button class="pdf_button">Project Proposal</button>
133 </a>
134 </div>
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137 <!-- VIDEO -->
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139 <div class="video">
140 <p class="title-video">Video coming soon</p>
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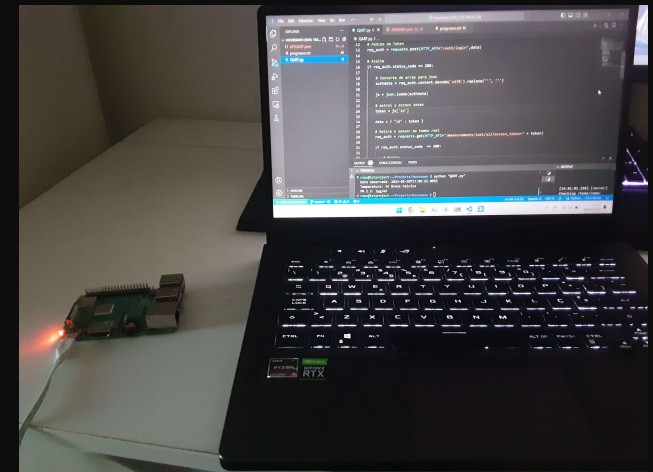

Central Unit



ARTUR FERREIRA



RODRIGO SERENO



- Open a terminal window and paste the command or type manually:

```
sudo docker pull coolkitmobile/mediagate
```

- Wait for the download to complete:

```
eWeLink@raspberrypi:~$ sudo docker pull coolkitmobile/mediagate
Using default tag: latest
latest: Pulling from coolkitmobile/mediagate
4eb1769938: Downloading 4.150MB/26.58MB
48577a643f8: Download complete
53f20cb2430c: Downloading 2.262MB/31.83MB
1f6ed33923fa: Downloading 2.131MB/2.765MB
60114d822467: Waiting
c2e445a0814b: Waiting
8d27a2543cea: Waiting
1129b13eb0c8: Waiting
```

- Download completed:

```
eWeLink@raspberrypi:~$ sudo docker pull coolkitmobile/mediagate
Using default tag: latest
latest: Pulling from coolkitmobile/mediagate
4eb1769938: Pull complete
48577a643f8: Pull complete
53f20cb2430c: Pull complete
1f6ed33923fa: Pull complete
60114d822467: Pull complete
c2e445a0814b: Pull complete
8d27a2543cea: Pull complete
1129b13eb0c8: Pull complete
Digest: sha256:02298ef173b7d06efb4fac19d5d4dc74c4673b1fddef3a903a1535e1
Loaded newer image for coolkitmobile/mediagate:latest
eWeLink@raspberrypi:~$
```

Link CamSync

Camera Setup



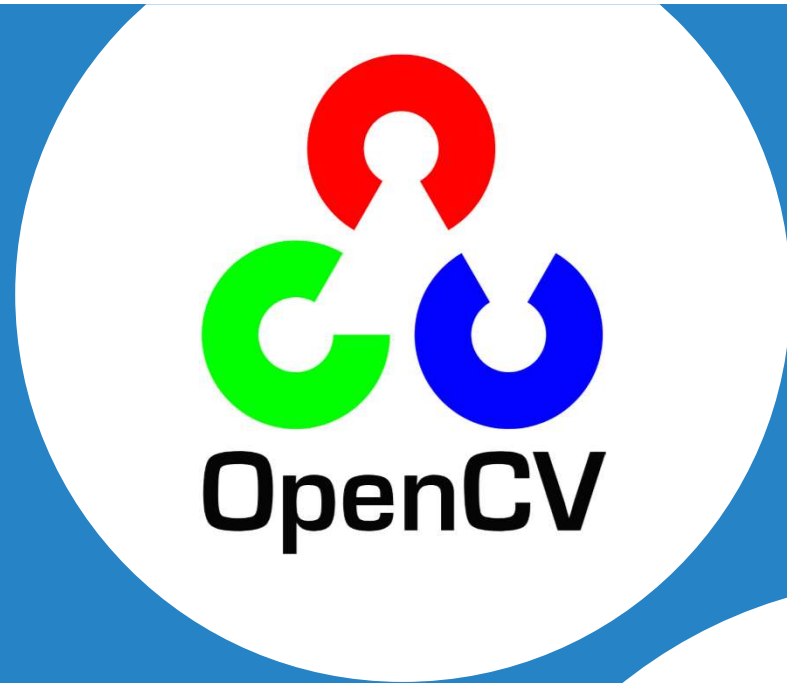
ARTUR FERREIRA



TITO PEREIRA



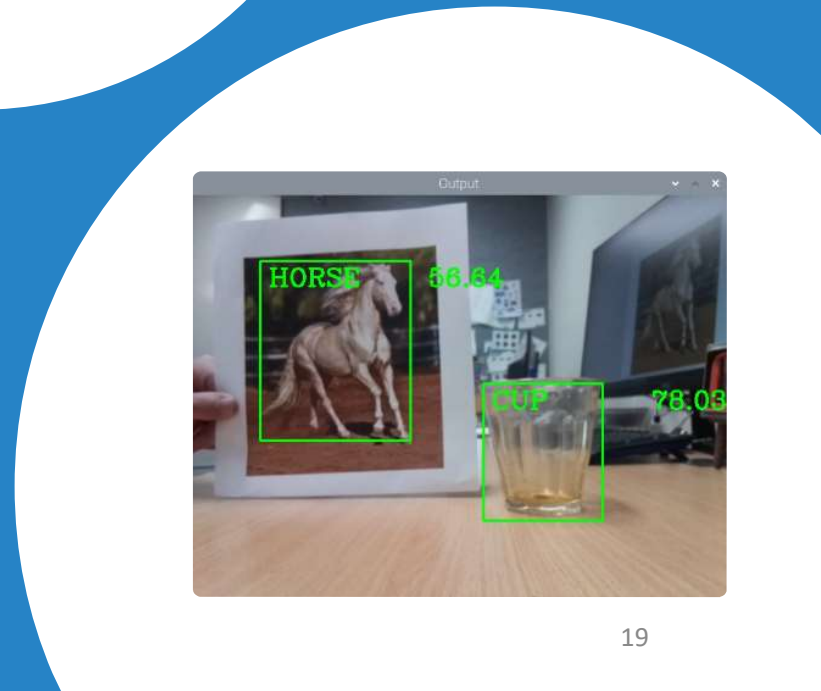
Computer Vision



ANDRÉ BARBOSA



GUILHERME FUSTIGA



Sensor Integration



ANDRÉ BARBOSA

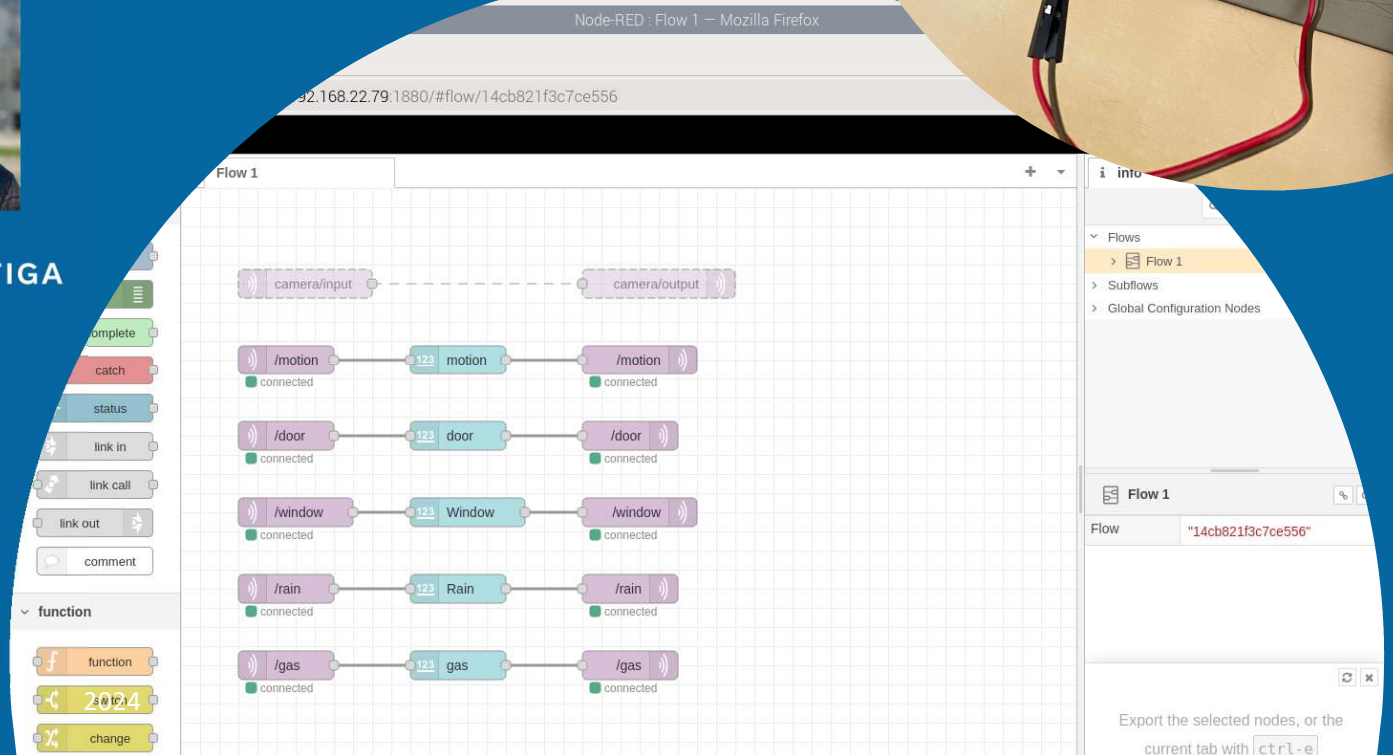
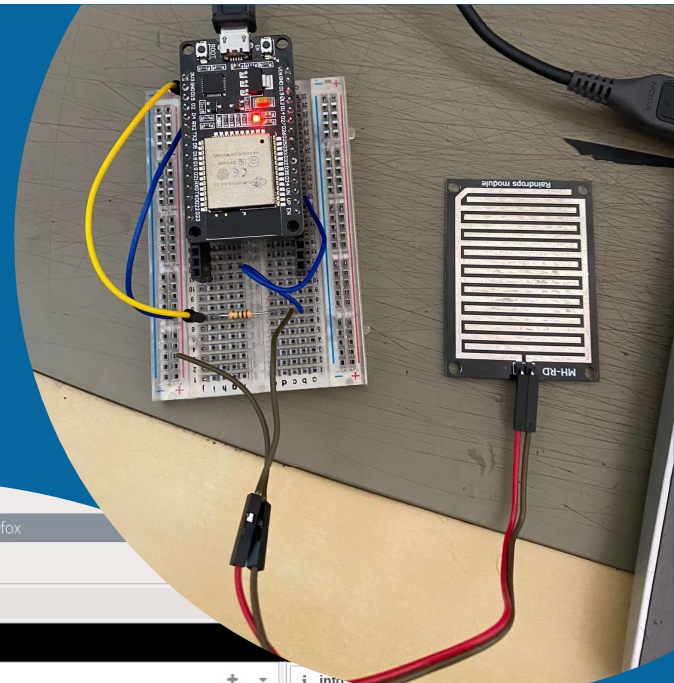


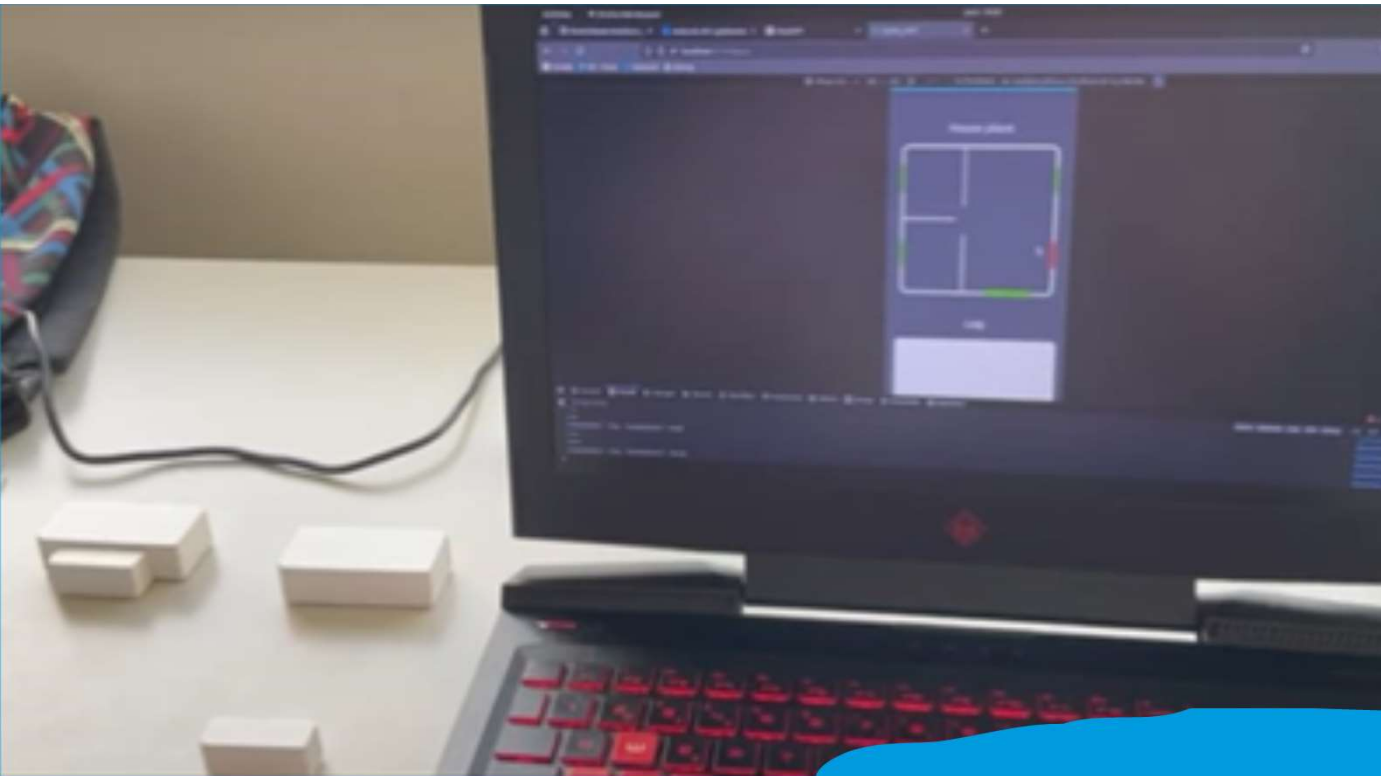
GUILHERME FUSTIGA








RODRIGO SERENO

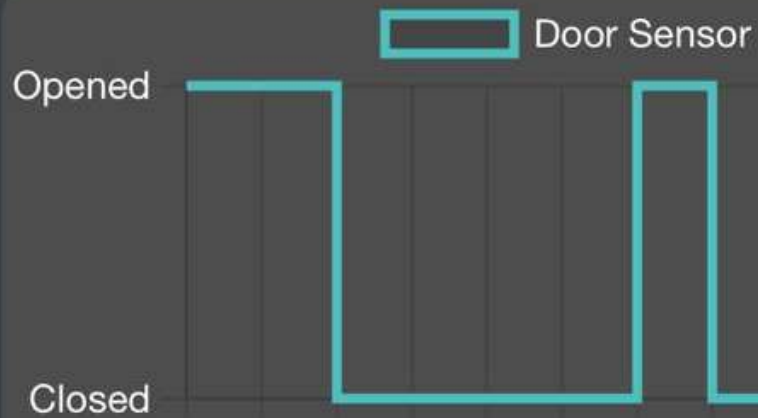
EletroCap





-  Porta Door was opened. 19:25
Door Open Alarm
-  Porta Door was closed. 19:25
Door Close Alarm
-  Porta Door was opened. 19:24
Door Open Alarm
-  Porta Door was closed. 19:24
Door Close Alarm
-  Porta Door was opened. 19:23

Sensor Integration



ARTUR FERREIRA



MARCO CURTO



TITO PEREIRA

2024

Actuators

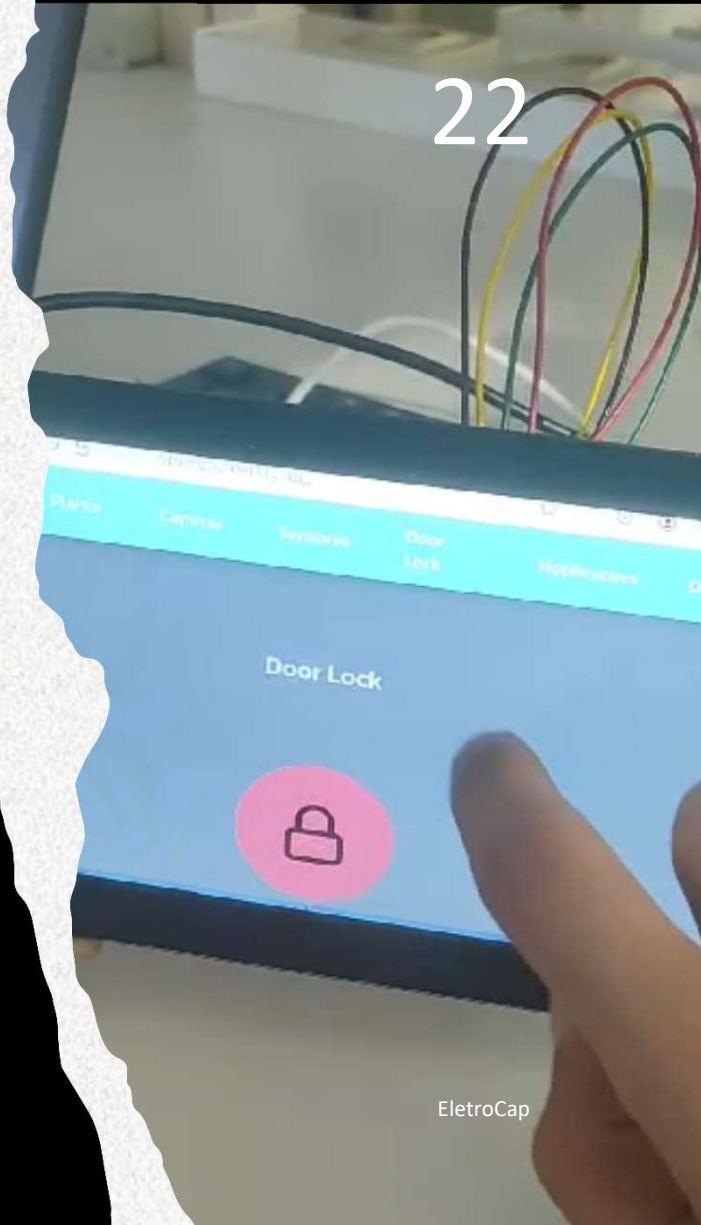


GUILHERME FUSTIGA



MARCO CURTO

22



EletoCap



TITO PEREIRA



MARCO CURTO

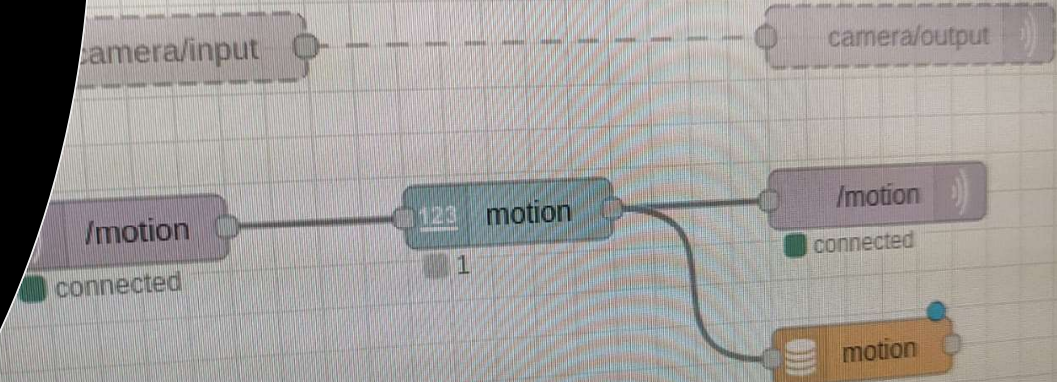
DataBase

```

history
sensors
-----
s in set (0.01 sec)
select * from sensors;
-----
name | status |
-----
0
0
0
0
0
0
-----
.02 sec)

from 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)

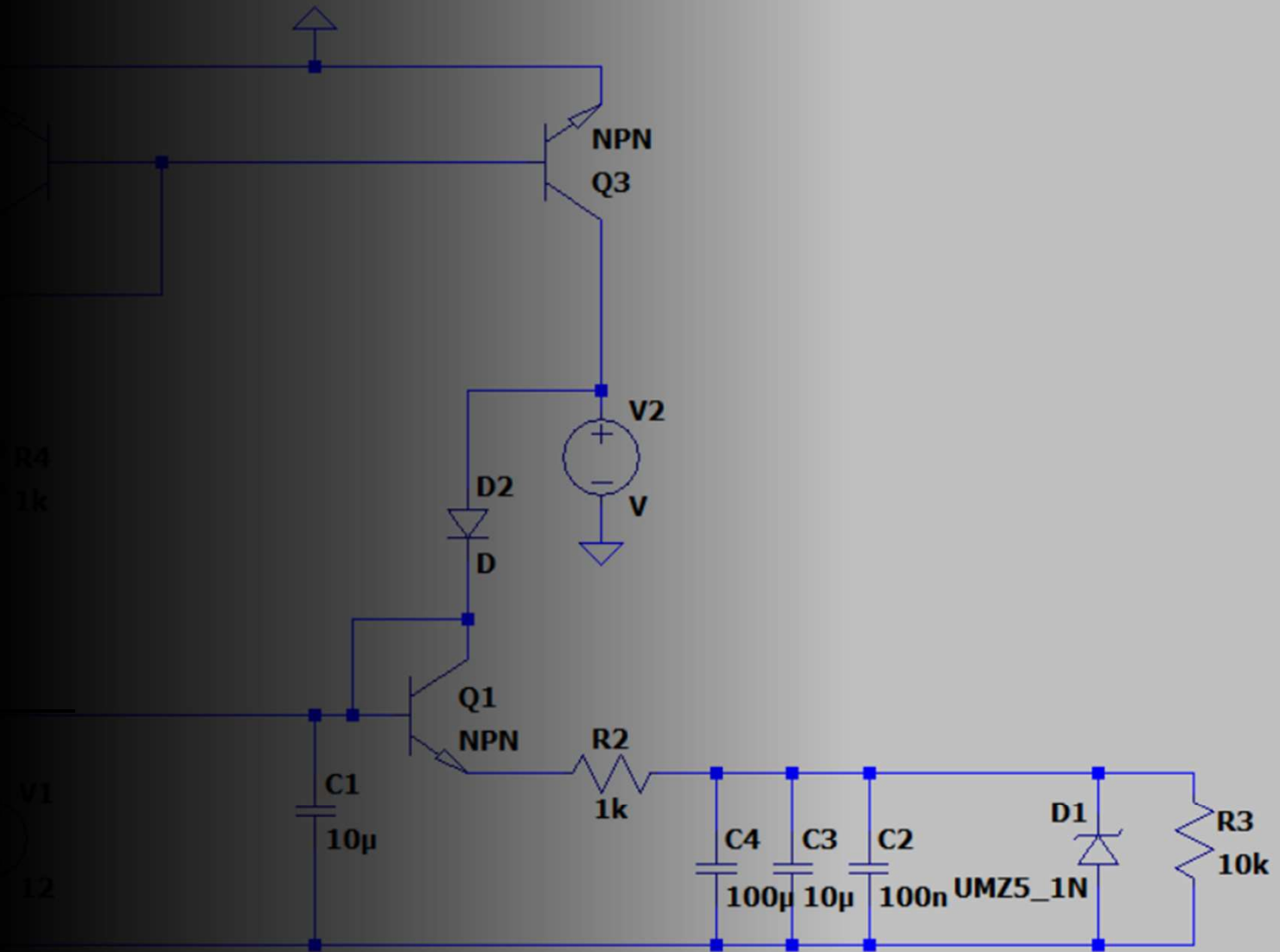
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Energy



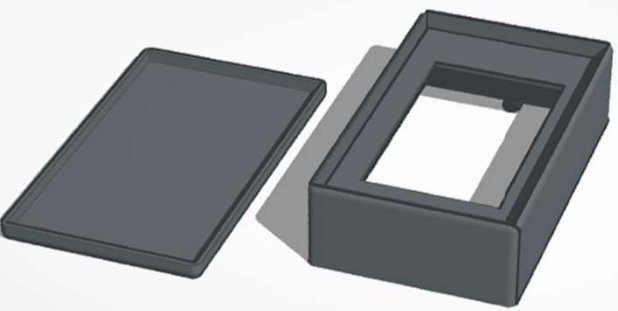
RODRIGO SERENO





central unit box

 View



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

