

# 5G MOBILITY

PROTOTYPE  
MID-TERM PRESENTATION

Carolina Araújo	93248
Hugo Almeida	93195
Miguel Almeida	93372
Orlando Macedo	94521



## **Traffic cameras and Radars from PASMO project**

1. Number of vehicles to circulate (as well their velocity) at the moment and monthly
2. Traffic
3. Presence of animals, people or strange objects on the road
4. See the number of cyclists, runners or people walking on bike lanes
5. Detect inflow of the zone - with cameras estimating how many people are in Praia da Barra and Costa Nova
6. Presence of stopped vehicles on the road

## 2 - GOALS: Traffic cameras and Radars from PASMO project

### **Nice to Have**

1. Presence of vehicles on the side of the road
2. The velocity on the radar can tell whether the road and the weather are in good conditions for the current velocity. If people go too fast the conditions are good

### **Future Work**

1. Detect models of cars and check ambiantal footprint taking in account max velocity allowed and model consumption

#### **Car 2 Infrastructure / Infrastructure 2 Car**

1. Detect adverse conditions
2. Rain sensors
3. Light sensors detect that the headlights turned on
4. Detect if the fog headlights turned on
5. Calculate the carbon footprint by detecting the model of the car and how much it consumes
6. Warn cars if another one is coming with excessive speed. This can be important in terms of vehicles with priority

### **Nice to Have**

1. Check if there are gas stations in the same road within a plausible distance, to know if with the current amount of gas/battery, a car can safely reach it. If a substantial number of cars pass with low amounts of gas and a gas station isn't near, it might be a sign that there is a need to create a new one

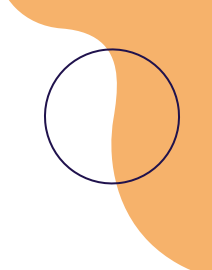

### **Future Work**

1. Explore additional features with this type of communication

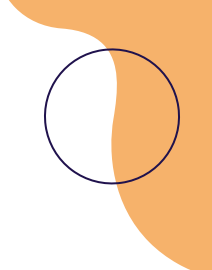

# Tasks

- Car Communication (90 %)
- VNF Orchestration (30 %)
- Computer Vision (70 %)
- Backend REST API (70 %)
- Frontend (70 %)
- CI Pipeline ( 100 % )

# Car Communication and Computer Vision

- 
- 
1. Research OBDII protocol e SUMO (100%)
  2. Implement a car emulator to generate and send data (100%)
  3. Communication Infrastructure 2 Car (60%)
  1. Research for Machine Learning and pattern recognition tools (100 %)
  2. Train a custom Object Detection Model (100%)
  3. Object Detection (100 %)
  4. Object Tracking (70 %)
  5. Mapping between image position and geo coordinates ( 30 % )

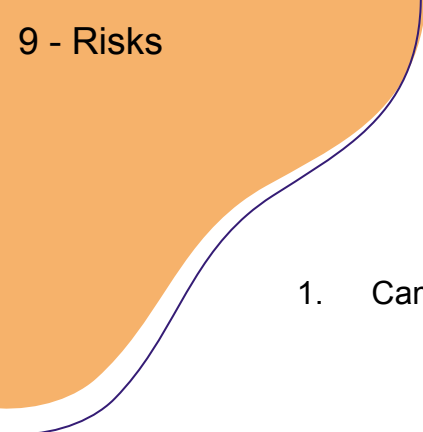
# Backend and Frontend

- 
- 
1. Define what database to use for each scenario (100%)
  2. Create the databases schema (100%)
  3. Define the endpoints necessary to the Rest API (95%)
  4. Celery Tasks (65%)
1. Design and develop an interface for the web applications (100 %)
  2. Connect to the Rest API (60%)



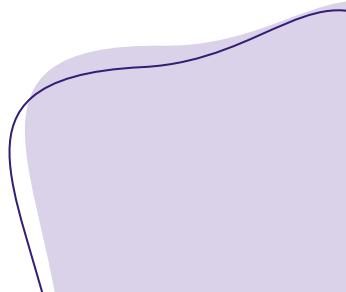
# CI-Pipeline

1. CI Pipeline (100 %)



# Fears/Risks:

1. Camera Streams Unstable
2. Not having timestamps from the camera streams
3. Radar Broker in final development
4. Time needed to separate zones in the camera stream (bike lanes, road, sidewalk, ...)
5. Deploy in 5G VNFs



# Calendar

## **WEEK 8 (10-05):**

- Map bounding boxes to coordinates
- Tracking with YOLO
- Image limits
- Initiate VNF descriptors
- Study Juju Charms
- Create a custom python connect with the cameras through RTSP protocol and send to YOLO

## **WEEK 9 (17-05):**

- Sensor fusion
- Finish tasks from last week
- Test workflow
- Update and test the architecture
- Continue the study and the deployment in 5G VNFs

# Calendar

## **WEEK 10 (24-05):**

- Continue workflow tests
- Continue deploy
- Finish dashboard
- Initialize the final report

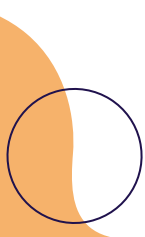
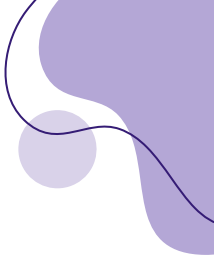
## **WEEK 11 (31-05):**

- Start to plan the video and demo
- Final adjustments (deploy, dashboard, VNF, ...)
- Release the public version of the website
- Resolve any upcoming problems

## **WEEK 12 (07-06):**

- If needed, resolve any problem as soon as possible
- Record the video
- Practice for the demo
- Study the presentation
- Test and revise the complete deploy
- Final delivery (?)

# PROTOTYPE



# THANKS

Do you have any questions?

OUR WEBSITE: <http://xcoa.av.it.pt/~pi202021g11/>

OUR REPOSITORY: <https://github.com/5g-mobility>

CREDITS: This presentation template was created by **Slidesgo**, including icons by **Flaticon**, infographics & images by **Freepik**

