FIRELAB
INCEPTION PHASE

Projeto em Informática
DETI LEI 2020/21

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TEAM

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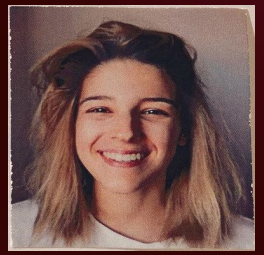
DevOps Master



Francisca Barros
Architect

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Team Manager

Mariana Ladeiro
Architect

Helder Zagalo
Advisor

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Advisor

CONTEXT

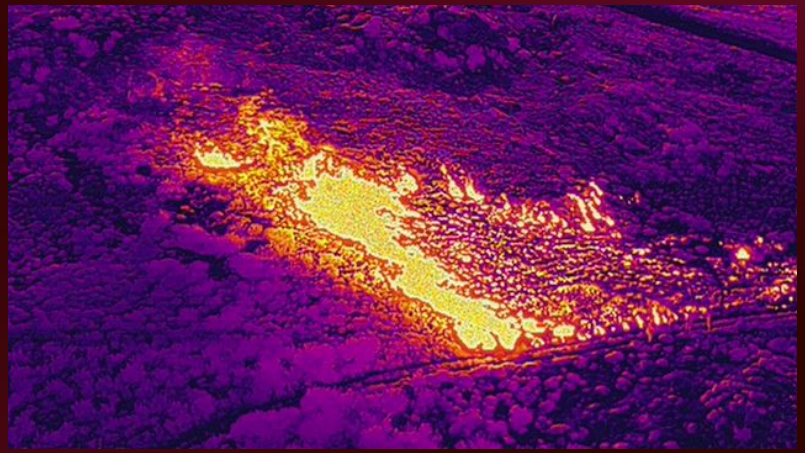
The development of this proposal fits into the MoST Project, which is financed by Fundação para a Ciência e Tecnologia (FCT).

The main objective is to obtain data in order to develop studies about fire propagation and gas emissions into the atmosphere.. Thus far, 2 field experiences were made to capture images of controlled fires using drones, which will have an integral part on our project.

PROBLEM

- Great part of the work referring to the visualization and characterization of the focus area based on vegetation is being done manually, which makes the process a lot slower, repetitive and fastidious.
- Segmenting of the burnt area from the video is a challenging task due to the erratic behavior of flames, as well as heavy smoke obstructing crucial parts of the information in more than one frame.
- The majority of the tools available at the moment are CLI meaning that only people with some knowledge in the technological area have more ease and less problems using.

PROBLEM



Example of smoke obstruction on footage taken from an experiment

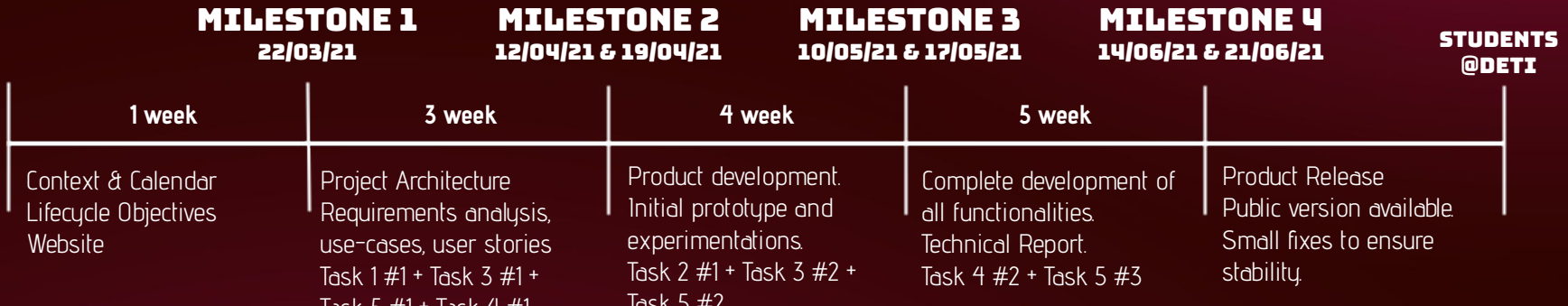
GOALS

- Aggregate and improve some tools to be integrated in an application to support processing, analysis and visualization of data about the propagation of forest fires and gas emission to the atmosphere, in a way that improves the workload of environmental engineers, investigators and data scientists.
- Transform the raw data into georeferenced data.
- Model the burnt area and fire front in a specific instance in time, as well as its evolution.

TASKS

1. Develop a module to characterize the vegetation on the focus area. (David and Luís)
2. Adapt a developed method to extract the geometry of the burnt area in images RGB for use in thermographic images. (Mariana and David)
3. Transform image coordinate (pixels) in georeferenced coordinates (latitude and longitude) and export these into specific formats to be analysed in modelling software. (Francisca and António)
4. Tool to visualize and analyse data, comparing the raw data to the processed one. (Luís and António)
5. Define the GUI that integrates all the modules above in an easy-to-use application with Google Maps integration. (Francisca and Mariana)

CALENDAR


MILESTONE 1
22/03/21
MILESTONE 2
12/04/21 & 19/04/21
MILESTONE 3
10/05/21 & 17/05/21
MILESTONE 4
14/06/21 & 21/06/21
STUDENTS @DETI
1 week
3 week
4 week
5 week
Context & Calendar
Lifecycle Objectives
Website
Project Architecture
Requirements analysis, use-cases, user stories
Task 1 #1 + Task 3 #1 + Task 5 #1 + Task 4 #1
Product development.
Initial prototype and experimentations.
Task 2 #1 + Task 3 #2 + Task 5 #2
Complete development of all functionalities.
Technical Report.
Task 4 #2 + Task 5 #3
Product Release
Public version available.
Small fixes to ensure stability.

EXPECTED RESULTS

By the end of this project we expect to:

- Lower the threshold for the expertise needed for product use and greatly increase the usability of the product.
- Have significant quality of life improvements by expanding upon available tools and minimizing the need for human input.
- Have integrated all the components under an easy-to-use interface.

RELATED WORK

FARSITE (www.firelab.org/project/farsite)
A fire growth simulation modeling system. It computes wildfire growth and behaviour for long time periods under heterogeneous conditions of terrain, fuels and weather. The outputs, for later analysis and display, are used for making fire and land management decisions.

DISPERFIRE
Real time system, able to simulate the dispersion of pollutants emitted during a forest fire. It uses adapted wind and dispersion models to simulate specific conditions of forest fire behaviour.

COMMUNICATION PLAN

Git Platform:

GitHub

Internal Communications:

Messenger, Teams

Backlog Management:

Jira

File Sharing:

Google Drive