FIRELAB
ELABORATION PHASE

Projeto em Informática
DETI LEI 2020/21

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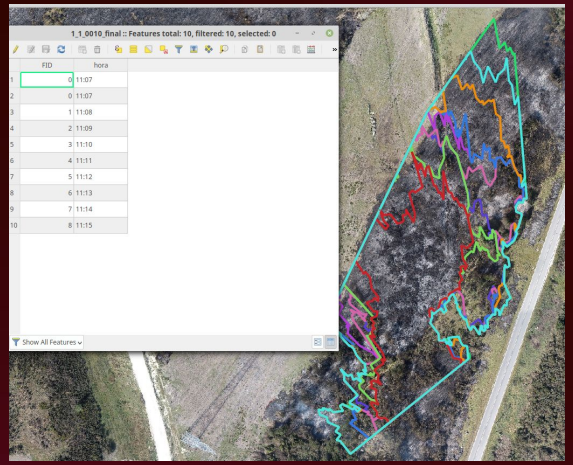
CONTEXT

Characterization of different vegetation types



Segmentation of the burnt area and its evolution in time

Smoke dispersion data

STATE OF THE ART

MoST PROJECT

Preprocessing and extraction tools developed by IEETA, INESC TEC and GEMAC

FARSITE

Fire growth simulation modeling system that uses spatio temporal information.

DISPERFIRE

Simulation of fire behavior to calculate fire progression and smoke dispersion.

GOALS' PRIORITY & MODULES

1. Data processing
2. Visualize and compare data
3. Export data and animations
4. Navigation between timestamps

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Provided Modules and Tools

Segmentation tool

Georeferencing module

Tool to extract footage frames

PERSONA

Olga Silva

Age: 30

Occupation: Researcher at the Environment Department at UA

Education: PhD in Science and Environmental Engineering

Core needs:

- Automated processes
- Interwoven tools to maximize productivity

ACTORS

Researcher

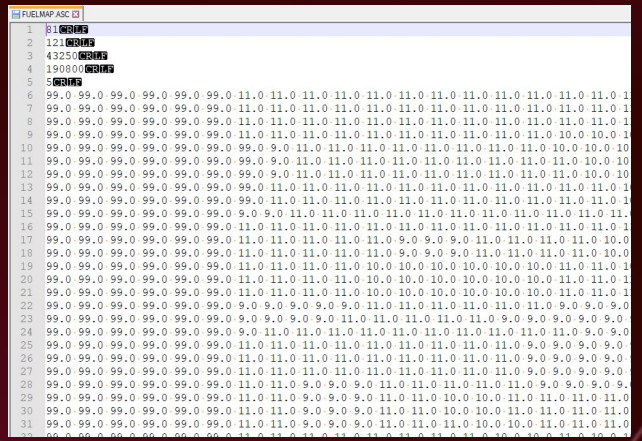
- Segment images and classify the vegetation
- Turn the photos into orthophoto
- Extract the shape of the burnt area/ fire front
- Turn points of an image into georeferenced points
- Visualize and compare models and the original video recordings
- Export data

System manager

- System maintenance,
- Manage users' accounts

KEY REQUIREMENTS: FUNCTIONAL

- Image Segmentation
- Reliable automated vegetation classification tool
- Fire progression visualization over map
- Exporting data to desired formats



Input file format of the modeling tool

KEY REQUIREMENTS: NON-FUNCTIONAL

Availability

Performance

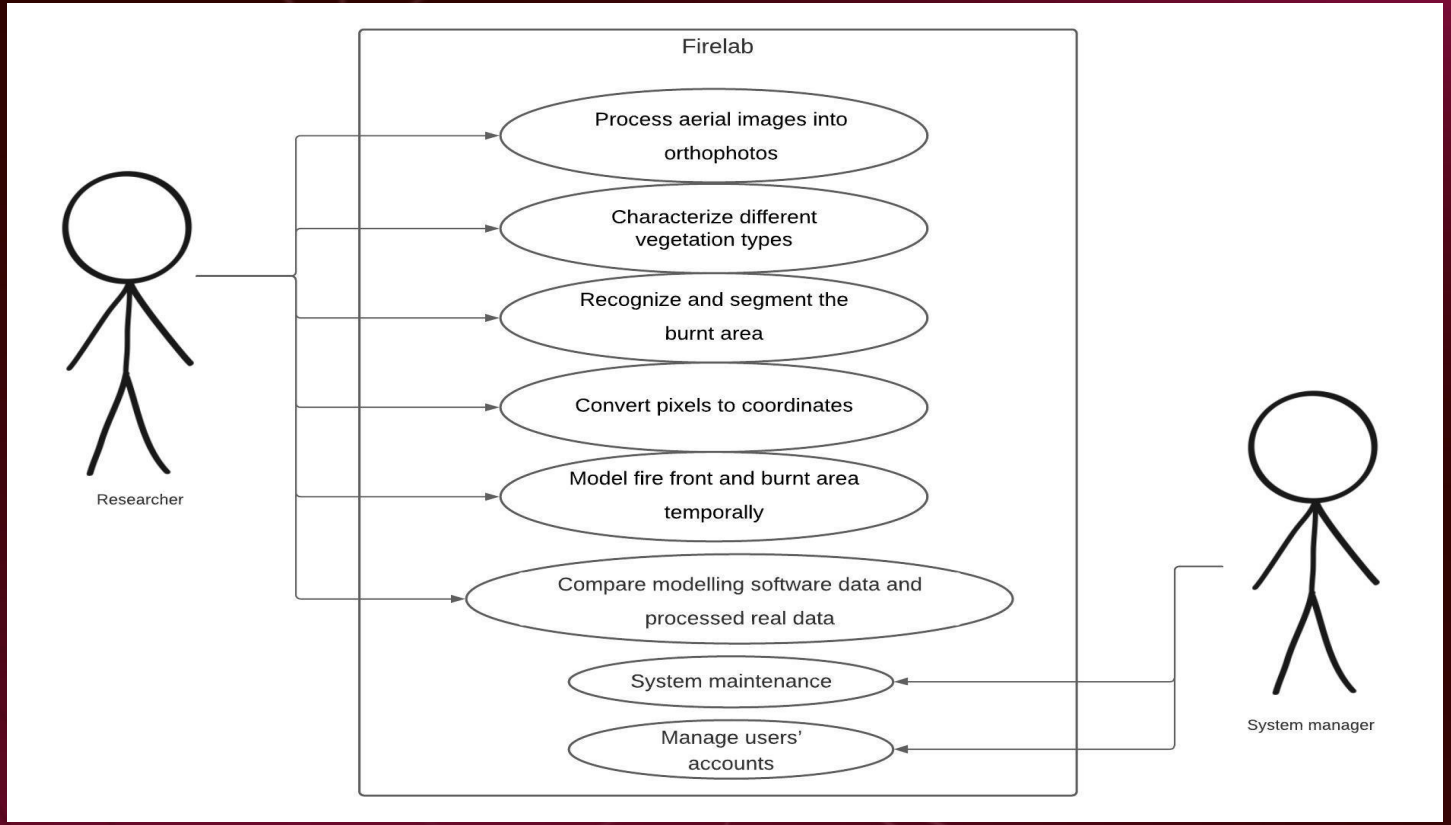
Usability

Interoperability

Reliability

Security

USE CASES


Firelab
Process aerial images into orthophotos
Characterize different vegetation types
Recognize and segment the burnt area
Convert pixels to coordinates
Model fire front and burnt area temporally
Compare modelling software data and processed real data
System maintenance
Manage users' accounts
Researcher
System manager

USE CASES

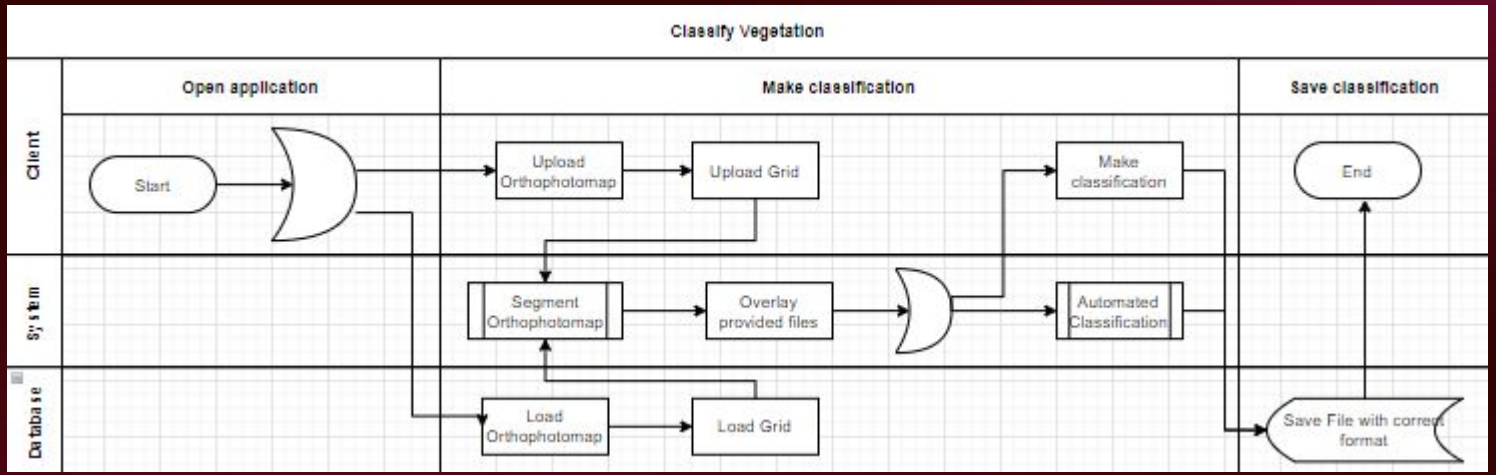


Diagram displaying the Vegetation Classification use case chain of events

SCENARIOS

6.6 *Classify Vegetation*

Groundwork

- In the WS the segmented orthophotomap should be displayed with each cell that composes it clearly contoured
- For each cell, the color of the contouring should match the classification. For example:
  - Grey –> Not Yet Classified
  - Red –> No Vegetation
  - Yellow–> 10-20%
  - Light Green –> 21-50%
  - Dark Green –> 50-80%
- To successfully display the overlay, the user must have already generated the orthophotomap and imported the grid, to see those processes please refer to 6.4 and 6.5 respectively

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Steps

- On the floating side menu, select the Tree icon (KBS – CTRL+O)
  - The WS should now display the segmented orthophotomap correctly color coded
- On the bottom right, select the "Automate Cell Classification" button (KBS-CTRL+A)

Success

- The WS should now display the segmented orthophotomap correctly color coded

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Failure

- Orthophotomap not yet imported
  - Show error message "Orthophoto map has not yet been imported"
  - Give option to cancel action or fall back to 6.4
- Grid not yet generated/imported
  - Show error message "Grid has not yet been imported"
  - Give option to cancel action or fall back to 6.5

6.7 *Alter previously made vegetation classifications*

Steps

- On the floating side menu, select the Tree icon (KBS – CTRL+O)
  - The WS should now display the segmented orthophotomap correctly color coded
- Find the cell which classification you wish to alter
  - Hovering over the cell should expand the contour, slightly grey out the middle of the cell and the following text should be displayed "The current classification is" and below the text a textbox that contains the current classification. The textbox should be connected to a drop-down menu containing all possible classifications
- From the drop-down menu, select the desired classification
- Press the button labeled "Save mapping" on the bottom right (KBS-CTRL+S)
  - This should overwrite the updated mapping to the chosen fuel map file

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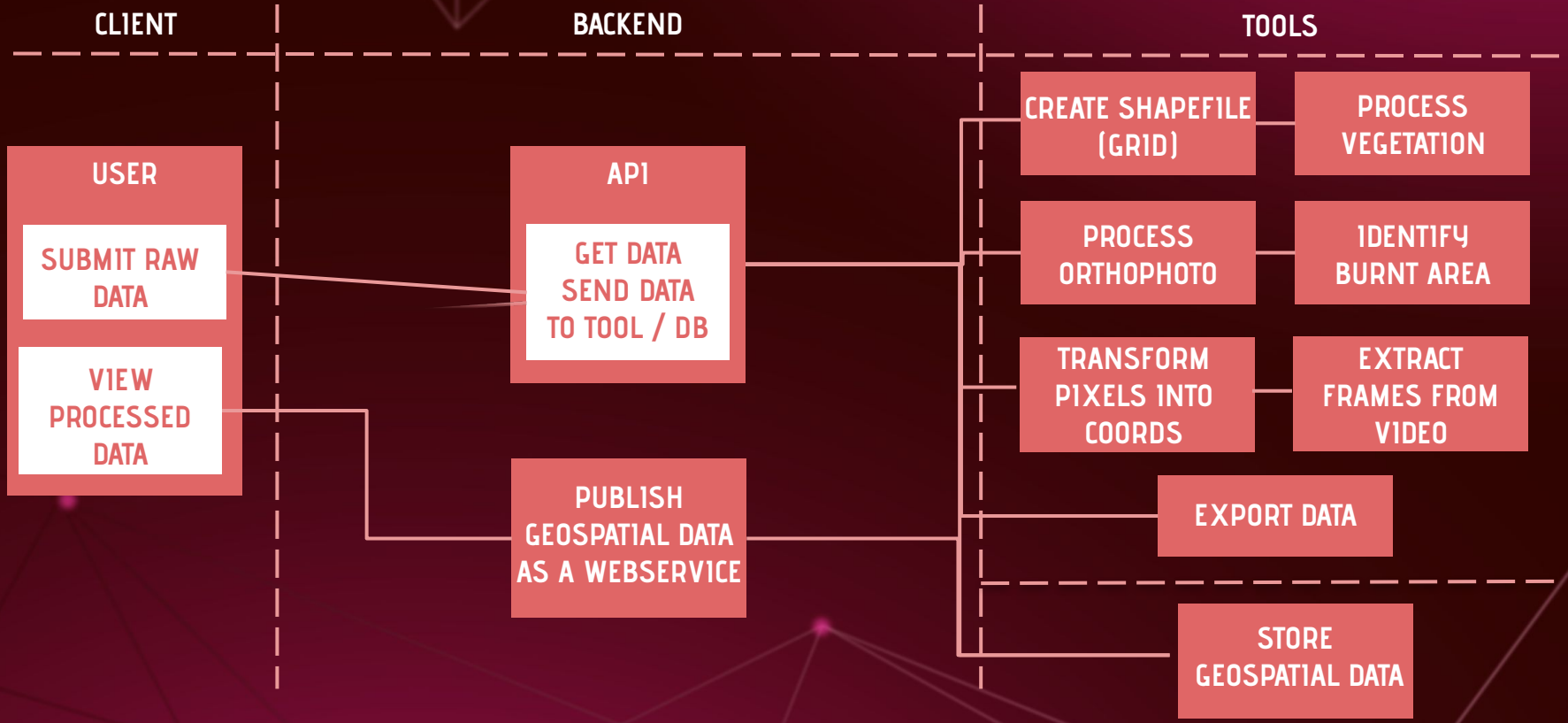
Success

- Update the contour on the cell and the fuel map

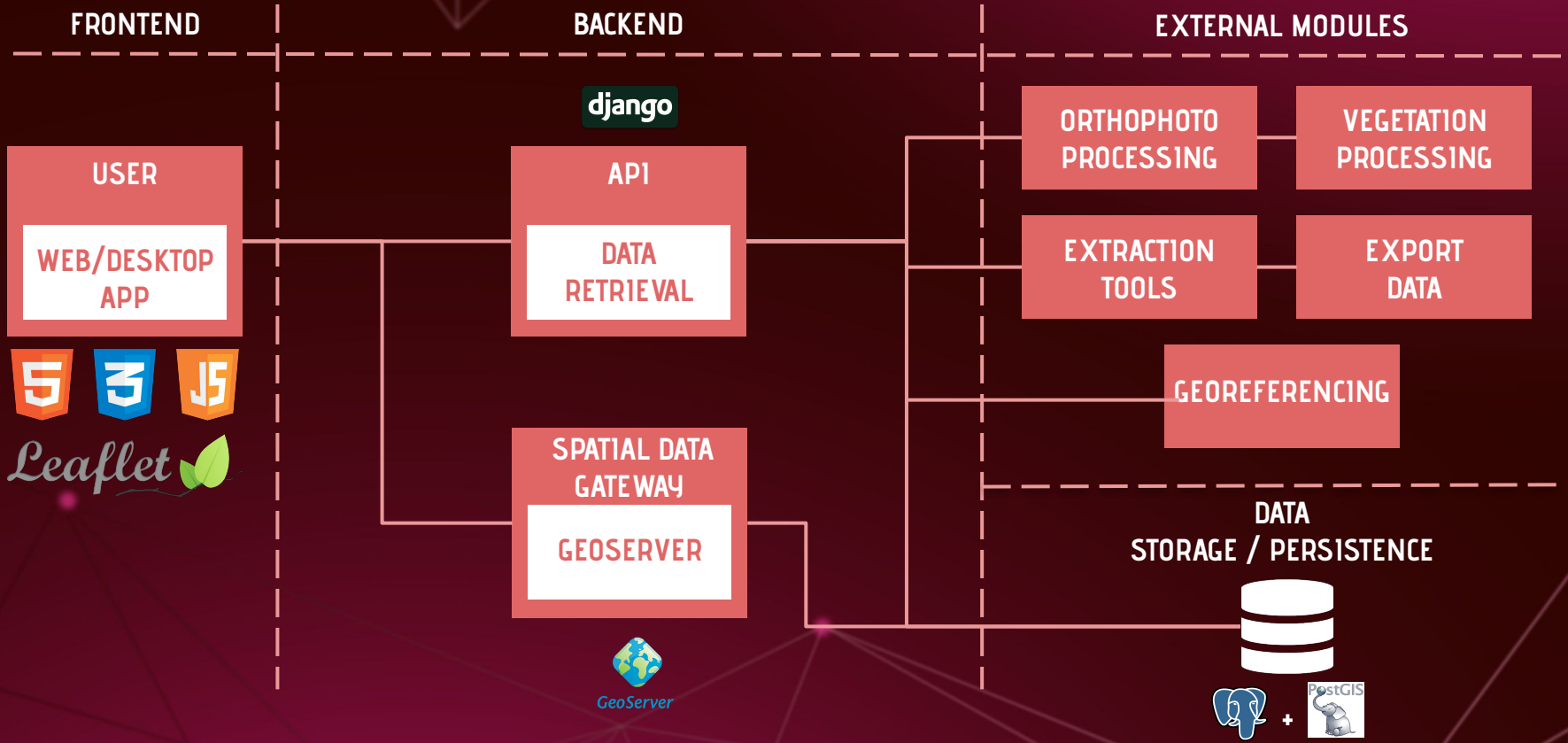
Failure

- Display error message "The indicated fuel map file no longer appears to be present in the project"

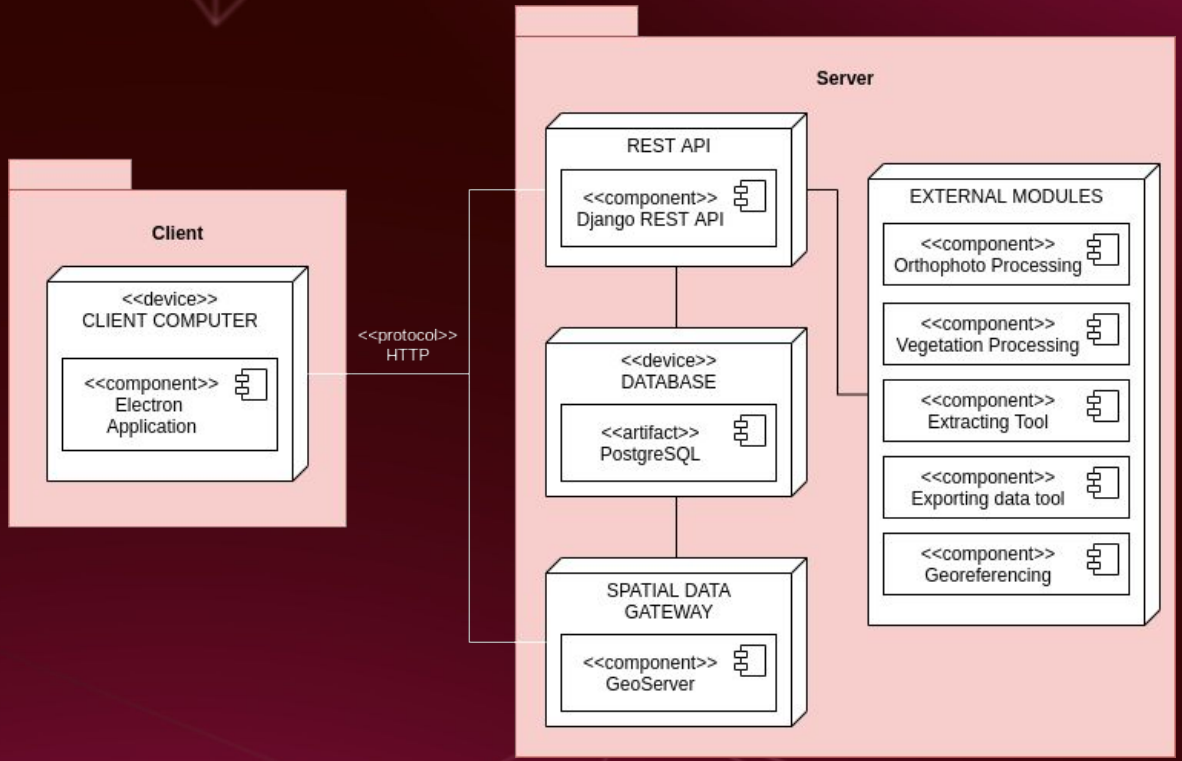
MODULAR ARCHITECTURE VIEW



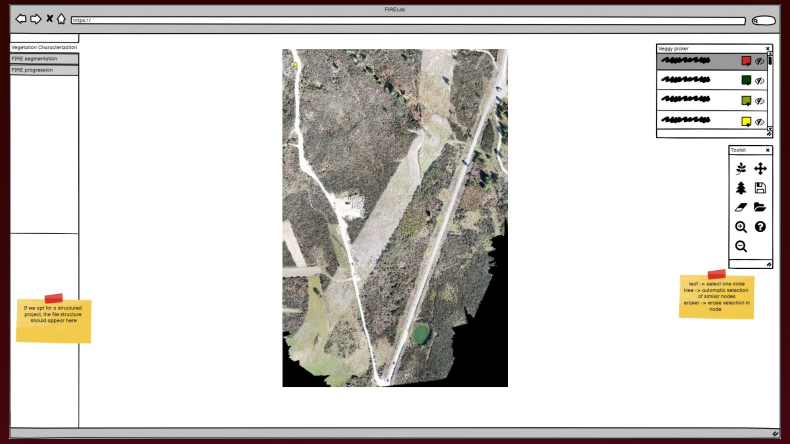
TECHNOLOGICAL ARCHITECTURE VIEW



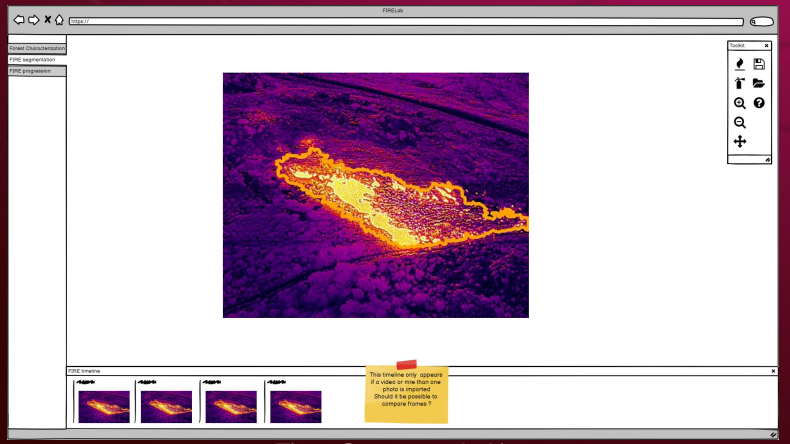
DEPLOYMENT DIAGRAM



MOCKUP OVERVIEW



Vegetation Characterization

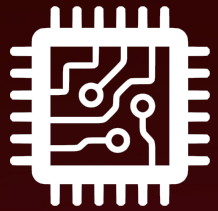


Fire Segmentation

Fire Progression

Full mockups at https://balsamiq.cloud/s8xjz0y/pqkhoit

NEXT STEPS...



Settle on some technologies to use

Implement interface in the chosen technology

Adapt scripts and modules

THANK YOU FOR YOUR TIME!

QUESTIONS?