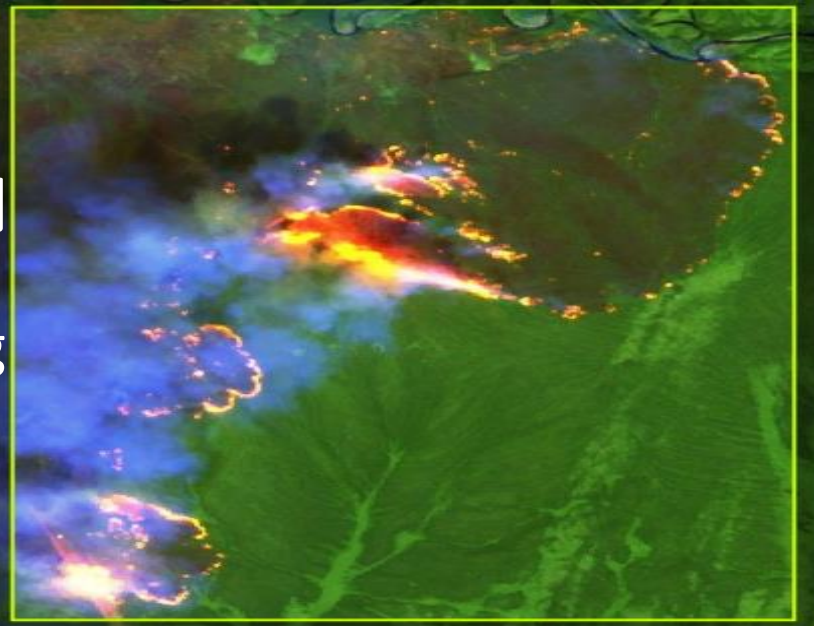
Software Design Document
Wildfire detection using ANN



CE755 Advanced Computer Engineering

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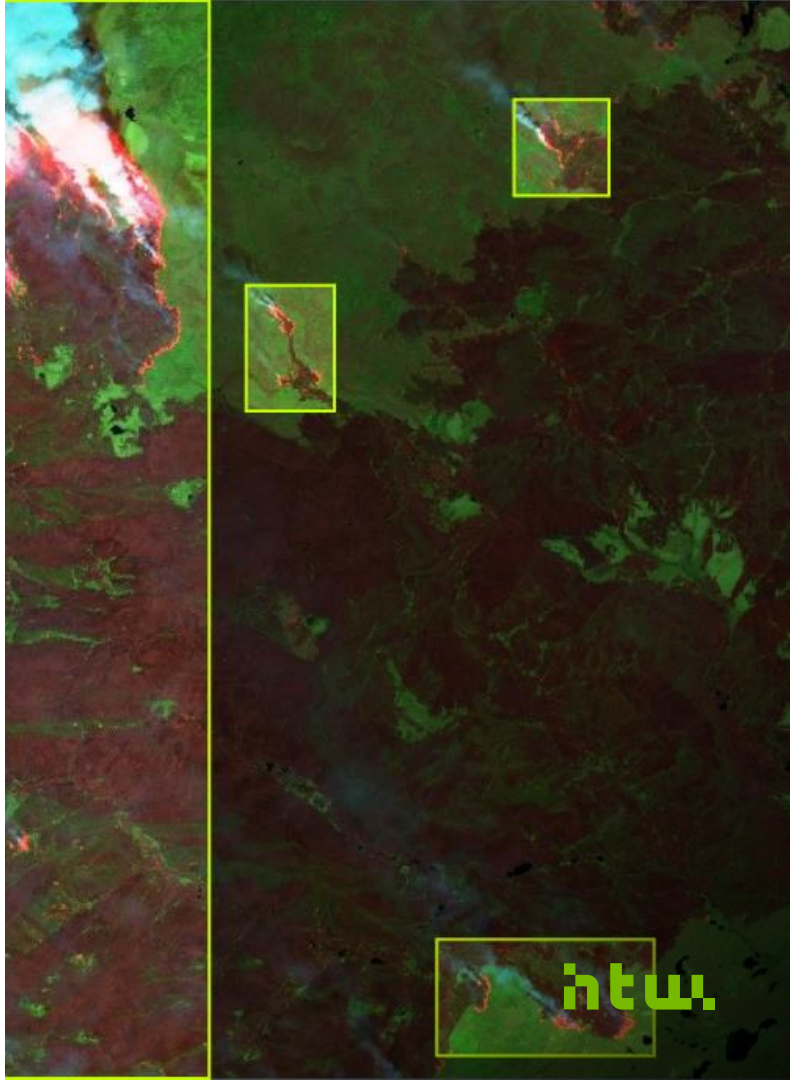
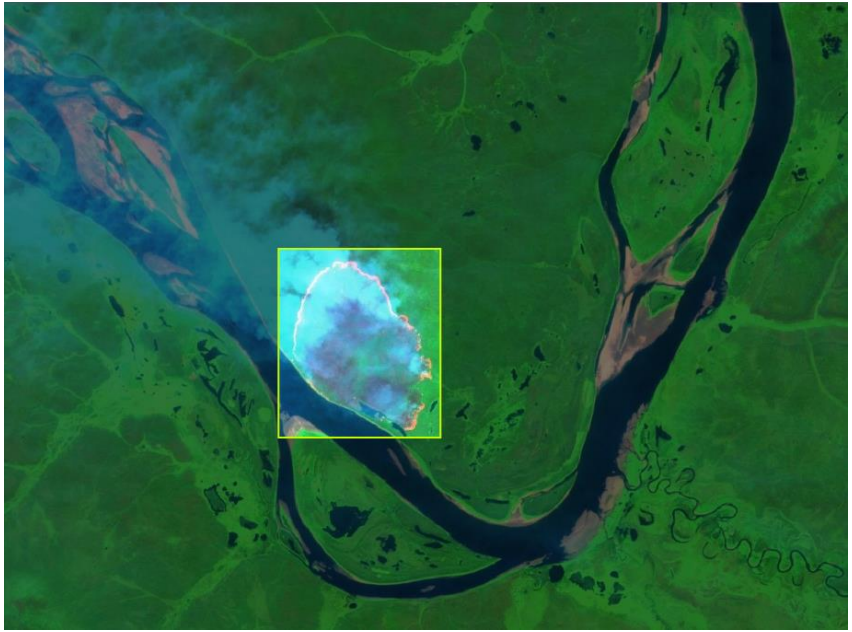
Agenda



Introduction and Goals



Goals:

- Wildfire detection using artificial neural network
- Comparison of results with group C

Software description:

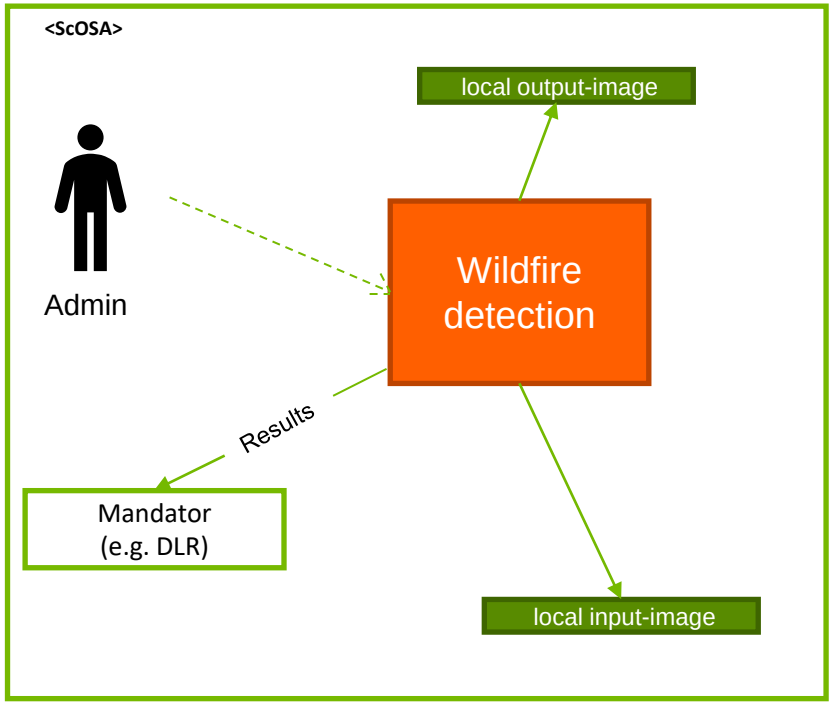
- Program checks image for wildfire using pretrained artificial neural network model
- Returns result
- Marks the fire on the image

2. Constrains

- Implemented in Rust
- Developed with as few crates as possible
- Runs on low-end hardware configuration (Raspberry pi)
- Runnable from the command line
- Finished development at the end of January 2023

3. Context and Scope

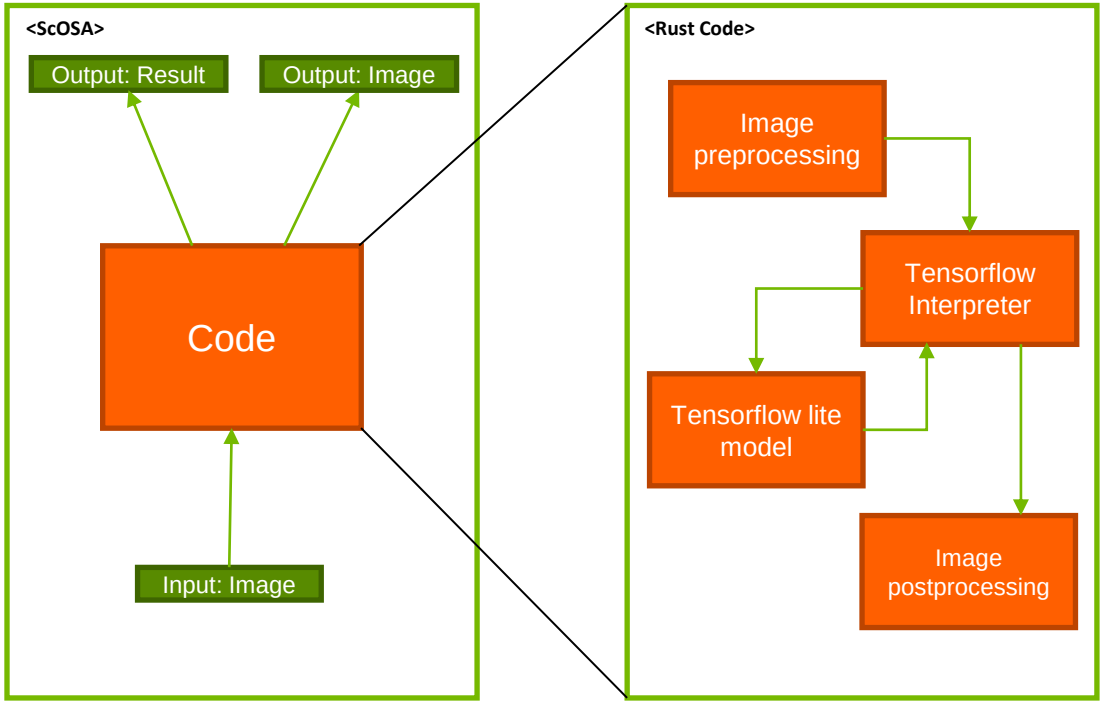
- Integrated in the ScOSA System
- Goal: Wildfire detection via satellites
- Autonomous program



4. Solution Strategy

- Create prototype in Python
- Manually create dataset for the artificial neural network
- Train a TensorFlow model with the dataset
- Preprocess the input image (downscale)
- Use TensorFlow Lite API in Rust to test model with processed image
- Return results
- Return processed image with the fire marked

5. Building Block View



6. Architectural Decisions

- Downscale image to be compatible with model
- Use pretrained model and TensorFlow API to save CPU power
- Make program autonomous to save communication between satellite and ground station

7. Quality Requirements

- More than 75% of wildfires shall be detected
- Every detected wildfire is marked on the image
- Every check of an image produces an output
- Marked output-image shall not be bigger than 1 MB

Thank you.

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