

Project Proposal Scope: Define the project goal. Datasets you are planning to use, models/architectures. Training pipeline/procedures.

Title: Wild Life Fire Detection System

Reference: [lets-stop-wildfires-hackathon-2.0](#)

Datasets: <https://public.roboflow.com/object-detection/wildfire-smoke>

- Captured by [HPWREN cameras](#)

Model: [EfficientDet-D0](#)

Model Explanation: <https://arxiv.org/pdf/1911.09070.pdf>

Training Notebooks:

- [Smoke-Detection-using-Tensorflow-2.2](#)
- <https://colab.research.google.com/drive/1KWNgx33jwsWssn6oxunm1EUoOx64KrL6>

STM Camera Interface: https://www.st.com/resource/en/application_note/an5020-digital-camera-interface-dcml-on-stm32-mcus-stmicroelectronics.pdf

Summary:

My objective is to expand on Project Skylab, the wildfire-smoke detector. The existing project has provided a working solution to identify wildfires but lacks any scalable/embedded implementation.

My proposal outlines the integration of this detector within an STM device and onboard camera. The MCU will send a notification upon detection with the current location and timestamp. Object detection is achieved by Google's Tensor Flow EfficientDet-D0 model which has a very small footprint (~4M parameters). Quantization and encoding methods can further shrink the model size. Large effort is needed to implement the model onto the MCU device. Currently, the model is tested on every image frame it receives since it is uploaded from a remote location (> 5s per frame). Additional steps are needed to subsample and/or aggregate the real time data from the camera.

Testing the device will be achieved by placing the MCU in front of a monitor where gifs/videos will be played to simulate a real time experience.