

Fire and Smoke recognition in crowdsourced images with YOLO networks

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A **YOLOv4 detector** was implemented using deep learning techniques and trained with **custom datasets** for image **fire and smoke detection** in crowdsourced images.

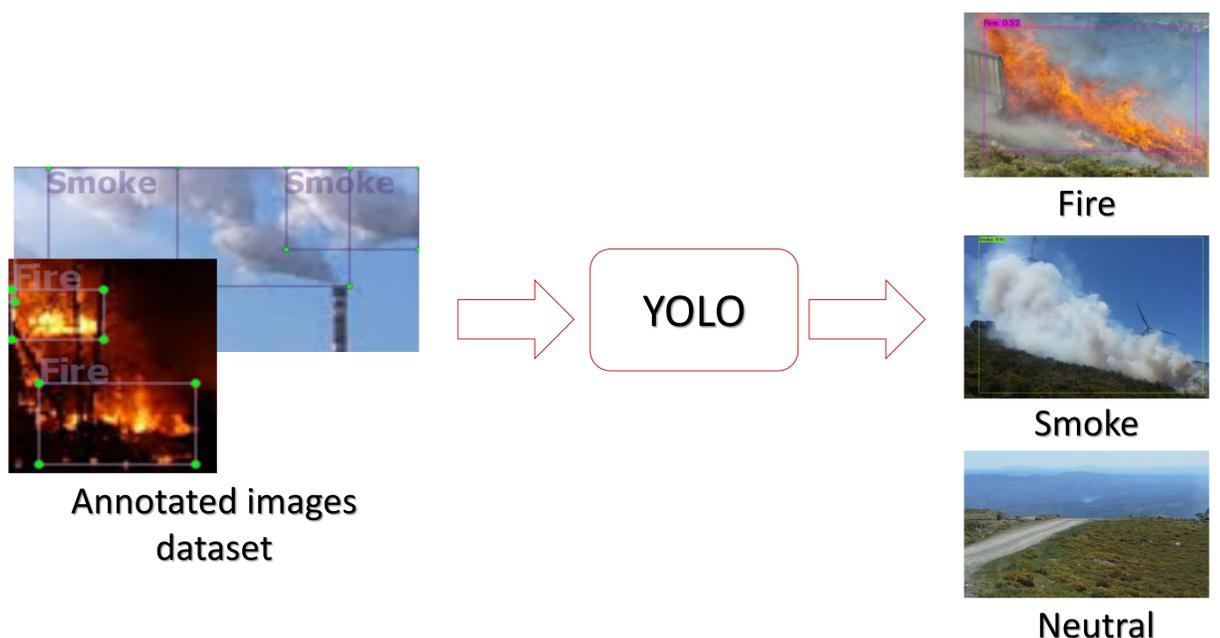
Main Goals

- Development of an intelligent fire detection system to be integrated into the FireLoc system.
- Building of an image dataset for forest fire recognition.

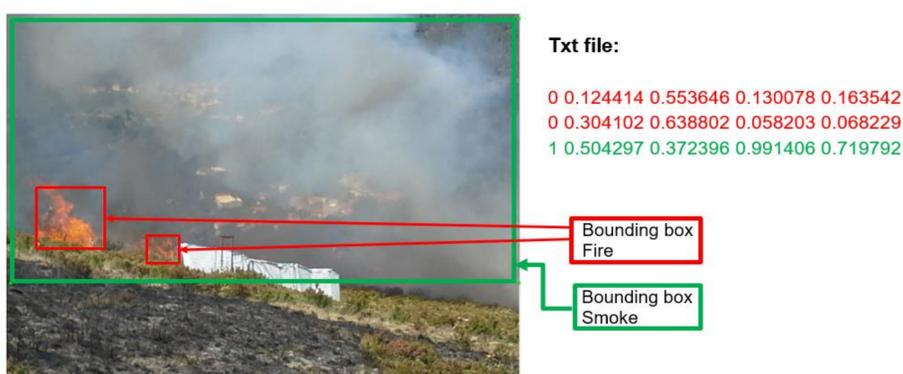
Proposed Method

- In the **training phase** the custom dataset is used to train the model.
- In the **detection phase**, parts of the images with fire and smoke are marked with bounding boxes.
- The **post-processing step** allows classification results to be obtained.

YOLO image object detection



Dataset annotation

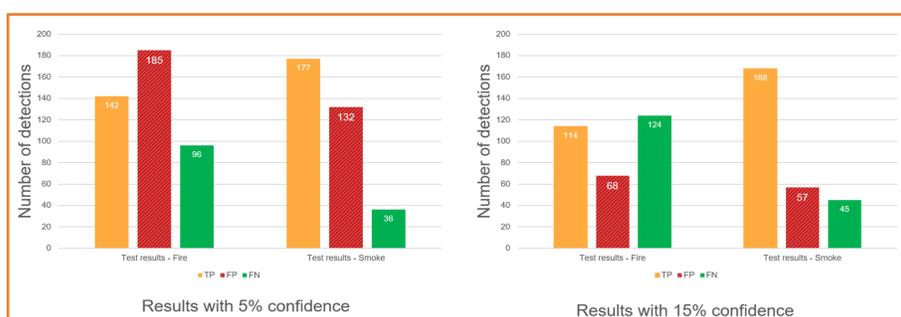
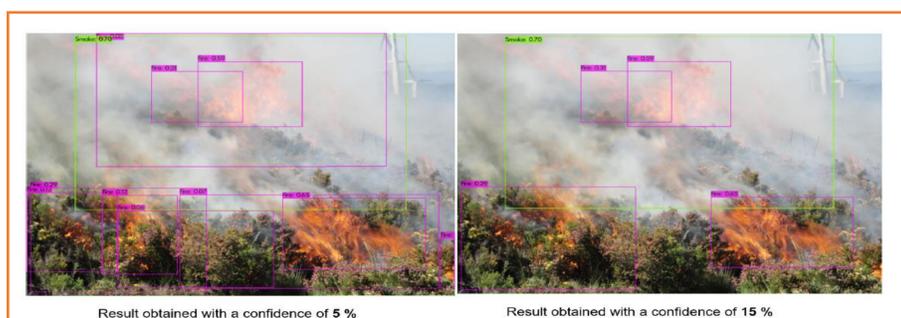


Classification results after post-processing

	Predictions confidence 5 %	
	Fire/Smoke	Neutral
Ground-truth Fire/Smoke	178	0
Ground-truth Neutral	15	22

	Predictions confidence 15 %	
	Fire/Smoke	Neutral
Ground-truth Fire/Smoke	173	5
Ground-truth Neutral	6	31

Detection results



Conclusions and Future work

- An intelligent fire detection system in static images and video was developed.
- Post-processing of results was crucial for supporting decisions in FireLoc Project.
- Improve detection results by incorporating new crowdsourced contributions in training.
- Build new deep models (YOLOv5) using the developed datasets.