
Satellite Image based Wildfire Detection

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1. Papers to Study

I plan to study the following two papers related to pattern detection in spatial data and machine learning techniques for wildfire spread prediction:

1. Xiongfeng Yan, Tinghua Ai, Min Yang, Hongmei Yin. *A graph convolutional neural network for classification of building patterns using spatial vector data.* <https://doi.org/10.1016/j.isprsjprs.2019.02.010>
2. Henintsoa S. Andrianarivony, Moulay A. Akhloufi. *Machine Learning and Deep Learning for Wildfire Spread Prediction.* <https://doi.org/10.3390/fire7120482>

2. Background and Motivation

This project aims to develop a Wildfire spread detection using satellite images.

The problems in geo-spatial domain require urgent attention. Wildfires are becoming more frequent and destructive due to climate change and human activity. They cause economic damage and are a risk to human safety. Current advancements in machine learning might help tackle the problem by providing alerts and help in minimizing the damage.

I was interested in the geospatial domain by the work companies like Satalantis do in the field. As part of my Introduction to Data Science course we were also given a walk through of a research paper about methane detection in the atmosphere using satellite images which introduced ResNet50 model.

I believe this project will help me garner necessary knowledge in the field of geospatial machine learning and put to test my current understanding of machine learning algorithms. I would also be exploring deep learning models and architectures for completion of the project.

3. Importance of the Papers

A graph convolutional neural network for classification of building patterns using spatial vector data: The paper introduces graph convolution neural networks which is claimed to be better suited for spatial vector data and building perceptual patterns from it.

Machine Learning and Deep Learning for Wildfire Spread Prediction: This paper provides insights into the ML and DL techniques for wildfire spread prediction and limitations of current methods.

Together, these works will establish a foundation for developing a predictive model for Wildfires.

30 4. Datasets

- 31 • **Wildfire Prediction Dataset:** Satellite images of areas that previously experienced
32 wildfires in Canada. [https://www.kaggle.com/datasets/abdelghaniaaba/wildfire-prediction-](https://www.kaggle.com/datasets/abdelghaniaaba/wildfire-prediction-dataset)
33 dataset