Wildfire Cause Prediction

Ganesh Thanu
gthanu@ncsu.edu

Arun Gaonkar
agaonka@ncsu.edu

Nikhil Prashant Patil
npatil@ncsu.edu

1 Project Idea

Wildfires are a natural occurrence and it is becoming extreme and widespread. Hotter, drier weather caused by climate change or natural events like lightning can cause a fire in the forest. Human activities are also a major contributor to wildfire. After finding the cause, preventive measures can be taken to protect the forest from fires.

In this project, a Machine Learning model is proposed for the prediction of the cause of forest fires. The model can be used with Data Analysis techniques to forecast the cause of a wildfire using the dataset, which comprises geographic records of forest fires and causes for over 20 years. To build the predictive model, the parameters being considered are forest fire size, geography, burn duration, number of fires, etc.

2 Dataset

The forest fire dataset *1.88 Million US Wildfires* [1] obtained from Kaggle [2] is used for building the model. This database contains geospatial records of wildfires that occurred in the US from 1992 to 2015. The wildfire records are taken from the reporting systems of federal, state, and local fire organizations. This database is referred to as *Fire Program Analysis Fire-Occurrence Database* (FPA-FOD).[3]

3 Software

`Python libraries`, `Google Colaboratory`.

4 Team work:

- Data cleaning and transformation : Arun
- Data visualisation : Ganesh
- Data pre-processing : Nikhil
- Training and Prediction: Ganesh, Arun, Nikhil

5 Midterm Milestone

Data Pre-processing, Exploratory Data Analysis, Model Selection.

[1] Short, Karen C. 2017. Spatial wildfire occurrence data for the United States, 1992-2015 [FPAFOD20170508]. 4th Edition. Fort Collins, CO: Forest Service Research Data Archive. `https://doi.org/10.2737/RDS-2013-0009.4`

[2] `https://www.kaggle.com/rtatman/188-million-us-wildfires`

[3] `http://regclim.coas.oregonstate.edu/FireStarts/fpa-fod_RODBC_01.html`

6 References

[1] G. E. Sakr, I. H. Elhajj, G. Mitri and U. C. Wejinya, Artificial intelligence for forest fire prediction, 2010 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, 2010, pp. 1311-1316, doi: 10.1109/AIM.2010.5695809.

[2] P. Cortez and A. Morais, A data mining approach to predict forest fires using meteorological data, Proceedings of the 13th Portugese Conference on Artificial Intelligence, pp. 512-523, 2007.