

METHODS FOR EARLY DETECTION OF

EMERGING

FOREST FIRE

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PRE-REQUISITES

Each and every project has certain pre-requisites which need to be satisfied or executed in order to kickstart the project with a good start. Some of the prerequisites of this project are as follows:

- Anaconda Navigator
- Tensor flow
- Keras

Libraries:

- Sklearn
- Seaborn
- Pillow
- Flask
- Numpy
- Pandas
- Matplotlib
- OpenCV

SKLearn:

➤ Classification

- Identifying which category an object belongs

Applications:

Spam detection, image recognition

Algorithms:

SVM(Support Vector Machine)

➤ **Regression**

- Predicting a continuous-valued attribute associated with an object.

Applications:

Drug response, Stock prices.

Algorithms:

SVR(Support Vector Regression), Nearest Neighbours

➤ **Clustering**

- Automatic grouping of similar objects into sets.

Applications:

Customer segmentation

Algorithms:

k-Means, spectral clustering, mean-shift

➤ **Image Preprocessing**

- Feature extraction and normalization.

Applications:

Transforming input data such as text for use with machine learning algorithms.

Algorithms:

preprocessing, feature extraction, and more...

Seaborn:

Seaborn is a Python data visualization library based on matplotlib. It provides a high-

level interface for drawing attractive and informative statistical graphics.

Pillow:

Python imaging library is a free and open-source additional library for the Python programming language that adds support for opening, manipulating, and saving many different image file formats. It is available for windows, Mac OS X and linux

Flask:

Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself. Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools.

Applications that use the Flask framework include Pinterest and LinkedIn

Numpy:

NumPy is a Python library used for working with arrays. It also has functions for working in domain of linear algebra, fourier transform, and matrices. NumPy was created in 2005 by Travis Oliphant. It is an open source project and you can use it freely. NumPy stands for Numerical Python.

Pandas:

Pandas is an open source Python package that is most widely used for data science/data analysis and machine learning tasks. It is build on top of another package named

Matplotlib:

Matplotlib is a cross-platform, data visualization and graphical plotting library for Python and its numerical extension NumPy. As such, it offers a viable open source alternative to MATLAB. Developers can also use matplotlib's APIs (Application

Programming Interfaces) to embed plots in GUI applications

OpenCV:

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products

Softwares:

- Spyder
- Jupyter notebook
- Google Collab

Spyder:

Spyder is a free and open source scientific environment written in Python, for Python, and designed by and for scientists, engineers and data analysts. It features a unique combination of the advanced editing, analysis, debugging, and profiling functionality of a comprehensive development tool with the data exploration, interactive execution, deep inspection, and beautiful visualization capabilities of a scientific package

Jupyter Notebook:

JupyterLab is the latest web-based interactive development environment for notebooks, code, and data. Its flexible interface allows users to configure and arrange workflows in data science, scientific computing, computational journalism, and machine learning. A modular design invites extensions to expand and enrich functionality.

Google Collab:

It is a virtually programmed by google. It is mostly used AI/ML programmings. More technically, Collab is a hosted jupyter notebook that requires no setup to use, while providing access free of charge to computing resources including GPUs and RAMs.

Anaconda Navigator:

1. Anaconda Navigator is a desktop graphical user interface (GUI) included in Anaconda Distribution that allows you to launch applications and manage conda packages, environments, and channels without using command line interface (CLI) commands.
2. Navigator can search for packages on Anaconda.org or in a local Anaconda Repository. It is available for Windows, macOS, and Linux.
3. The Navigator documentation includes the following:
 - Installation
 - Overview
 - Getting started with Navigator
 - Tutorials
 - Updating Navigator
 - Troubleshooting
 - Help and support
 - Release notes

- Glossary

Use of Navigator:

- In order to run, many scientific packages depend on specific versions of other packages. Data scientists often use multiple versions of many packages and use multiple environments to separate these different versions.
- The CLI program conda is both a package manager and an environment manager. This helps data scientists ensure that each version of each package has all the dependencies it requires and works correctly.
- Navigator is a graphical interface that enables you work with packages and environments without needing to type conda commands in a terminal window. You can use it to find the packages you want, install them in an environment, run the packages, and update them – all inside Navigator.

Tensor Flow:

- TensorFlow is Google Brain's second-generation system.
- Version 1.0.0 was released on February 11, 2017.
- While the reference implementation runs on single devices, TensorFlow can run on multiple CPUs and GPUs (with optional CUDA and SYCL extensions for general-purpose computing on graphics processing units).
- TensorFlow is available on 64-bit Linux, macOS, Windows, and mobile computing platforms including Android and iOS.
- Its flexible architecture allows for the easy deployment of computation across a variety of platforms (CPUs, GPUs, TPUs), and from desktops to clusters of servers to mobile and edge devices.
- TensorFlow computations are expressed as stateful dataflow graphs. The name TensorFlow derives from the operations that such neural networks perform on multidimensional data arrays, which are referred to as *tensors*.
- During the Google I/O Conference in June 2016, Jeff Dean stated that 1,500 repositories on GitHub mentioned TensorFlow, of which only 5 were from Google.

Keras:

- Keras is an open source deep learning framework for python.
- It has been developed by an artificial intelligence researcher at Google named Francois Chollet.
- Leading organizations like Google, Square, Netflix, Huawei and Uber are currently using Keras.
- This tutorial walks through the installation of Keras, basics of deep learning, Keras models, Keras layers, Keras modules and finally conclude with some real-time applications.