WildFire Prediction Using Satellite Images

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Problem Statement

- **Brief Overview:** This project focuses on predicting and detecting wildfires by analyzing satellite images using machine learning, particularly TensorFlow and a Convolutional Neural Network (CNN).In this project we train a CNN model using tensorflow to classify satellite images and detect fire is present or not from raw data.

- **Key Objectives:**
- To enable early detection of fire in initial stage.
- To predict wildfire breakouts using CNN.
- To Predict Potential Fire Outbreaks.
- To enhance fire forecasting by integrating satellite based image data.

Source :

Dataset Overview(Optional)

- Dataset Description:
- **Source**

  Refer to Canada's website for the original wildfires data: Forest Fires - Open Government Portal
  Original license for the data:Creative Commons 4.0 Attribution (CC-BY) license – Quebec

- **About Dataset**

1. This dataset contains satellite images (350x350px) in 2 classes : 1.Wildfire : 22710 images 2.No wildfire : 20140 images

2. The data was divided into train, test and validation with these percentages : 1. Train : ~70% 2. Test : ~15% 3. Validation : ~15%

•How

Using Longitude and Latitude coordinates for each wildfire spot (> 0.01 acres burned) found on the dataset above we extracted satellite images of those areas using MapBox API to create a more convenient format of the dataset for deep learning and building a model that can predict whether an area is at risk of a wildfire or not

About this directory

Test folder
Contains images in 2 classes to test the model: 1.Wildfire : 3480 ~ 55% 2.No wildfire : 2820 ~ 45%

Methodology

- **Approach:**

1. Data Collection and Preprocessing
2. Feature Extraction
3. CNN Model Development
4. Model Training
5. Model Evaluation
6. Real-Time Implementation
7. Improving Model Robustness
8. Post-Prediction Analysis

- **Algorithms Used:**

1. CNN- This is used for understanding patterns in images.
2. Tensorflow-This framework is used for develop machine learning and deep learning algorithms.

Conclusion

- **Summary:**

The "Wildfire Prediction Using Satellite Images" project demonstrates how advanced machine learning techniques, particularly CNNs with TensorFlow, can be effectively utilized to tackle the critical problem of wildfire detection and prediction.

- **Future Work**

We are going to locate the coordinates of area where the wildfire Breakdown has happened and send alerts to the respective disaster management

References

- https://www.kaggle.com/datasets/abdelghaniaaba/wildfire-prediction-dataset?resource=download
- https://colab.research.google.com/drive/1lOjC6Oi6SflDEKrmnbWjnL1lXUxwxzgl#scrollTo=i4vNNLdlWRen

- Source Code Link:- https://github.com/vaishu2140/Flames-tracker-wildfire-detection-system/upload/main

Thank You