Data Collection and Preprocessing Phase

Date	15 November 2024
Team ID	739839
Project Title	Fireguardian yolov8 Empowered wildfire smoke surveillance
Maximum Marks	6 Marks

Preprocessing Template

FireGuardian's YOLOv8-powered wildfire smoke surveillance system uses advanced preprocessing techniques, including image resizing, noise reduction, and contrast enhancement, to improve detection accuracy. It filters relevant features, normalizes pixel values, and enhances clarity, enabling real-time identification and monitoring of wildfire smoke in varying environmental conditions for timely intervention.

Section	Description
Data Overview	Give an overview of the data, which you're going to use in your project.
Resizing	Resize images to a specified target size.
Normalization	Normalize pixel values to a specific range.

Data Augmentation	Apply augmentation techniques such as flipping, rotation, shifting, zooming, or shearing.
Denoising	Apply denoising filters to reduce noise in the images.
Edge Detection	Apply edge detection algorithms to highlight prominent edges in the images.
Color Space Conversion	Convert images from one color space to another.

Image Cropping	Crop images to focus on the regions containing objects of interest.
Batch Normalization	Apply batch normalization to the input of each layer in the neural network.
	Data Preprocessing Code Screenshots

Loading Data	
Resizing	-----------------------------
Normalization	--------------------
Data Augmentation	---------------------

Inside the Loading Data cell:

```
from ultralytics import YOLO

!yolo task=detect mode=predict model=yolov8l.pt conf=0.25 source='https://ultralytic

Downloading https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8l.p
100% 83.7M/83.7M [00:00<00:00, 289MB/s]
Ultralytics YOLOv8.0.166 🚀 Python-3.10.12 torch-2.0.1+cu118 CUDA:0 (Tesla T4, 15102
YOLOv8l summary (fused): 268 layers, 43668288 parameters, 0 gradients

Downloading https://ultralytics.com/images/bus.jpg to 'bus.jpg'...
100% 476k/476k [00:00<00:00, 23.2MB/s]
image 1/1 /content/bus.jpg: 640x480 5 persons, 1 bicycle, 1 bus, 91.2ms
Speed: 15.1ms preprocess, 91.2ms inference, 35.0ms postprocess per image at shape (1
Results saved to runs/detect/predict
```

Denoising	

Edge Detection	

| Color Space Conversion | ```
#now cheking the model
!yolo task=detect mode=predict model='/content/runs/detect/train4/weights/best.pt' conf=0.25 source='/content/Wildf

Ultralytics YOLOv8.0.196 🚀 Python-3.10.12 torch-2.1.0+cu121 CUDA:0 (Tesla T4, 15102MiB)
Model summary (fused): 168 layers, 3005843 parameters, 0 gradients, 8.1 GFLOPs
``` |
| Image Cropping | ```
image = Image.open('/content/runs/detect/predict/ck0kcoc8ik6ni0848clxs0vif_jpeg.rf.8

image
```  |