YOLO_OBJECTDETECTION

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Chapter 1

Dataset Preparation

Dataset preparation script for YOLO Object Detection Project.

This script downloads, filters, augments, and organizes datasets for training an object detection model.

build_dataset.**augment_images** (*input_dir*, *n_target*)

Augments images from a given directory to reach a specified target count.

Parameters
- **input_dir** (*str*) – Directory containing original images.
- **n_target** (*int*) – Desired total number of images after augmentation.

Returns None

build_dataset.**get_filtered_dataset** (*class_name*, *target_count*, *max_people=1*)

Filters a FiftyOne Zoo dataset to retain only samples containing the target class.

Parameters
- **class_name** (*str*) – The class name to filter (e.g., "Dog", "Cat").
- **target_count** (*int*) – The number of filtered samples desired.
- **max_people** (*int, optional*) – Maximum allowed people per image when filtering "Person". Defaults to 1.

Returns A FiftyOne dataset containing exactly *target_count* samples, each of which has at least one Detection with label *class_name*.

Return type fiftyone.core.dataset.Dataset

Chapter 2

Model Training

Model Training Script for YOLO Object Detection Project.

This script trains a YOLOv8 model on the prepared dataset and evaluates its performance on the validation set.

Chapter 3

Video Annotation GUI

GUI.**open_file** ( )

GUI.**process_video** (*video_path*)

Chapter 4

Results and Discussion

Here you can summarize:

- Training/validation curves
- mAP / class-by-class accuracy
- Sample annotated frames

Chapter 5

Conclusion

Wrap up:

- What worked
- What we learned
- Potential next steps

Chapter 6

Introduction

This project develops a YOLO-based object detection system, including:

- **Dataset Preparation** (*build_dataset.py*)
- **Model Training** (*yolov8_train.py*)
- **Video Annotation GUI** (*GUI.py*)

Chapter 7

System Overview

The pipeline consists of:

1. Downloading, filtering & augmenting images
2. Training a YOLOv8 detector
3. Running a Tkinter GUI to annotate new videos

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