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GitHub Link of the Project:

https://github.com/KraKE-bit/ALTAIR_RECruit/blob/main/Week-2/Bird_Detection_Model/Bird_Detection.ipynb

This project focuses on building a deep learning based bird species detection system using the **YOLOv11** object detection model. The goal was to train a model capable of accurately identifying different bird species (sparrow, owl, eagle) from images.

The model was trained on a custom annotated dataset prepared and exported from Roboflow, then trained and evaluated using Google Colab with GPU acceleration.

Details of the model:

- 1) **Model Type:** YOLOv11 (nano)
- 2) **Framework:** Ultralytics YOLO
- 3) **Training Environment:** Google Colab (T4 GPU enabled)
- 4) **Dataset Source:** Roboflow (custom annotated dataset)
- 5) **Training Epochs:** 50
- 6) **Loss Function:** YOLO object detection loss
- 7) **Optimizer:** SGD / Adam (default YOLO settings)

Here's the Model Performance:

| Metric | Value |
|-----------|-------|
| mAP@50 | 89.3% |
| Precision | 96.3% |

Recall **83.9%**

So what I did is:

1. Dataset Preparation:

Images of various bird species were collected. Then I annotated using Roboflow's annotation tool for object detection (bounding boxes). And then I exported in **YOLOv11 PyTorch format**.

2. For Model Training:

YOLOv11 model loaded in Colab using Ultralytics. I imported the datasets from Roboflow via API. And then trained for 50 epochs using GPU for faster convergence.

3. Model Evaluation:

The model performance evaluated using test data. Metrics such as mAP, precision, and recall were computed.

4. Prediction & Visualization

The model was tested on various unseen images of birds. Output images were displayed with bounding boxes and predicted species labels. Well some weren't displayed properly so I had to go through the process again and made a new folder containing new datas and trained the model on that file and then I found my annotated images.