The task is to prepare a dataset that can train a model to detect any three bird species. For this task I took sparrow,eagle and owl as my 3 bird samples. The datasets I collected for them are here:

- Owl Dataset: https://universe.roboflow.com/group-7-cao/owl-adyca
- Eagle Dataset: https://universe.roboflow.com/phadungsak/eagle-a3act
- Sparrow Dataset: https://universe.roboflow.com/csirceeri-vvkjd/sparrow-pcyzx

Total 357 images I collected to train my model. For the model I chose YOLOv11 that is the latest iteration in Roboflow's platform.

Steps:

1) At first I had to open Roboflow which is a platform for computer vision projects that helps to build, train and deploy machine learning models without needing to write all the code from scratch and then created my account.
2) And then downloaded my required bird's datasets from "Roboflow Universe". Then I unizpped the the zip files in one of my folders.
3) After that I went to the "Upload dataset" section where I had to name my project and set my "Annotation Group" as : sparrow-eagle-owl . Then I uploaded my datasets.
4) Then in the settings I had to set my class names as :
   - sparrow
   - eagle
   - Owl

So that after annotation when a new image is given to the model it can predict the image based on the classes.

5) Annotation means labeling the images so the model can learn from them.
6) There may be some images that are not annotated properly yet. So in that case we have to manually set the annotation based on the specific class.
7) After annotation being done properly I tried to generate my model by evaluating some parameters :
   - Source Image
   - Train/Test split
   - Pre-processing
   - For Augmentation I set:
     1) Rotation
     2) Flippling
     3) 90 degree rotation
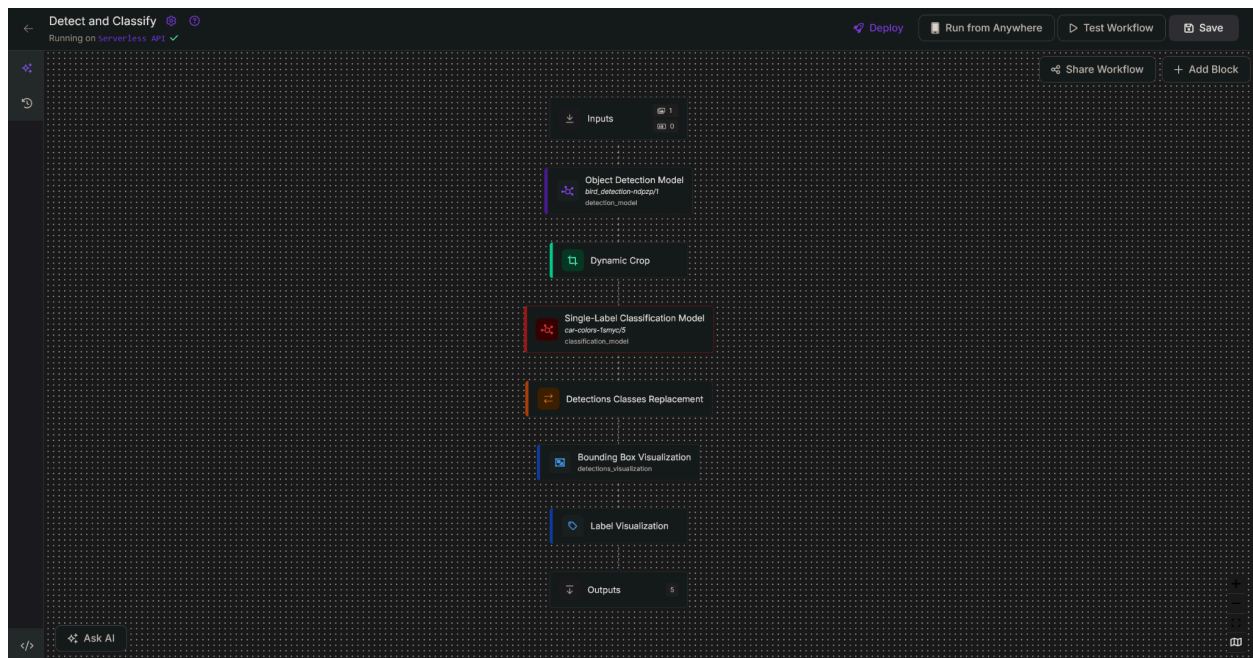   4) 15 degree shear
     5) Blurr
     6) Brightness

So that each images can be predicted with more accurately.

8) Then I set my Format as YOLOv11 and trained the model based on my provided datasets.

After training the model I got the results where:

- **mAP = 89.3%** . On average the model is highly accurate at detecting the objects.
- **Precision = 96.3%** . Almost every object the model predicted is actually correct.
- **Recall = 83.9%.** The model misses some objects about 16% of them.
  So it's mostly good at finding objects but not perfect.

Here is an image of the workflow:

Workflow Link:

https://app.roboflow.com/workflows/embed/eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJ3b3JrZmxvd0lkIjoiQ0xheHhQY3J1dWwwSXFvZ2ZIZ2YiLCJ3b3Jrc3BhY2VJZCI6InpMckxFZXdQbkhQVTh1OUkyOXRPUm9MZGRjZzEiLCJ1c2VySWQiOiJ6THJMRWV3UG5IUFU4dTlJMjl0T1JvTGRkY2xIiwiaWF0IjoxNzYwNzIwNTQ1fQ.Ln7ZZVXqcPFrqGfRLJ-29nFfw-wD9w8uBMgoUj6QT5Y

Here are some predictions of the model:

See how accurately the model predict the images where sparrow's image prediction is 79% correct and eagle's prediction is 94% correct and owl's prediction is 90% correct !!
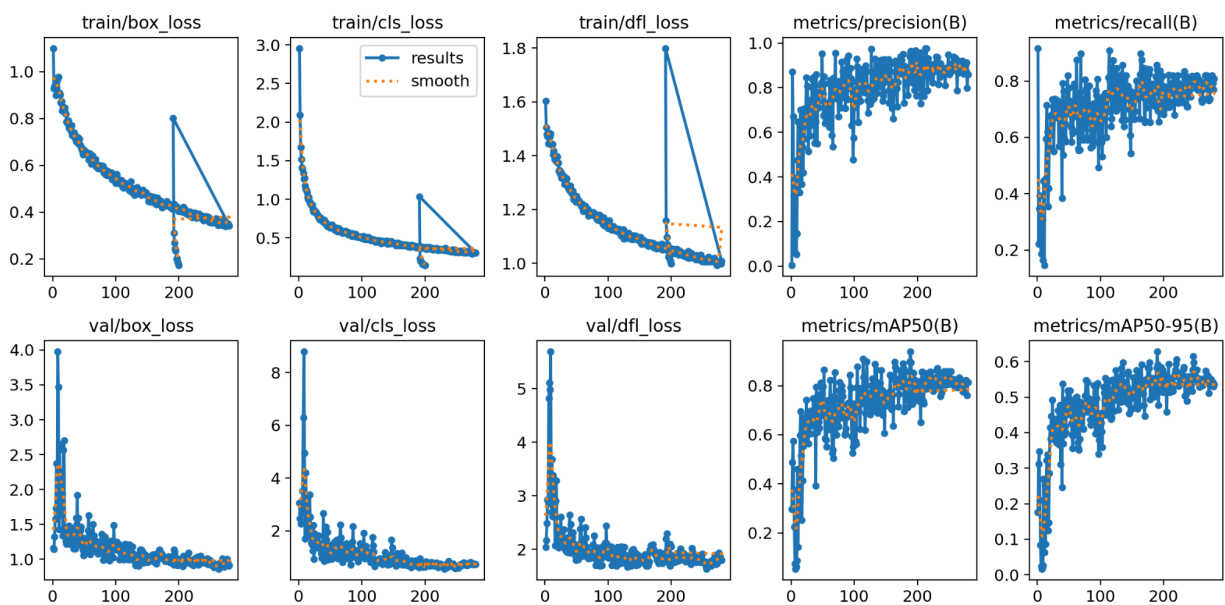
sparrow 79%

1 object det

Here's the results:

Here's my model's prediction accuracy and its evaluation parameters:

Metrics ⑦

Valid Set   External ⑦

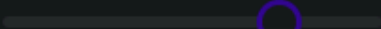| mAP@50	Precision	Recall
89.3%	96.3%	83.9%

Confidence Threshold: **50%**

0% ———————○———————— 100%

Overlap Threshold: 50

0% ———————○———————— 100%

Opacity Threshold: 75

0% ——————————○—————— 100%

Label Display Mode:

Draw Confidence   ⌄

```
{
  "predictions": [
    {
      "x": 211,
      "y": 228.5,
      "width": 410,
      "height": 189,
      "confidence": 0.936,
```

Here's how you can access my mode:

First install the library:

pip install inference-sdk

```python
# 1. Import the library
from inference_sdk import InferenceHTTPClient

client = InferenceHTTPClient(
    api_url="https://serverless.roboflow.com",
    api_key="eEATZ3kwrl29ojbGCoG6"
)

# 3. Now you can run the workflow on an image
result = client.run_workflow(
    workspace_name="rafsan-kabir",
    workflow_id="detect-and-classify-2",
    images={
        "image": "YOUR_IMAGE.jpg" # Path to your image file
    },
    use_cache=True # Speeds up repeated requests
)

# 4. Get your results
print(result)
```