Project Title: *Object Detection in Images*

Object detection is a fundamental computer vision task that involves identifying and localizing multiple objects within an image or video. It goes beyond simple image classification by not only recognizing what objects are present but also determining where they are located in the visual scene.

```
!git clone https://github.com/ultralytics/yolov5
%cd yolov5
!pip install -r requirements.txt
```

```
Cloning into 'yolov5'...
remote: Enumerating objects: 17372, done.
remote: Counting objects: 100% (59/59), done.
remote: Compressing objects: 100% (39/39), done.
remote: Total 17372 (delta 42), reused 20 (delta 20), pack-reused 17313 (from 3)
Receiving objects: 100% (17372/17372), 16.26 MiB | 9.48 MiB/s, done.
Resolving deltas: 100% (11907/11907), done.
/content/yolov5/yolov5
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```

```
from google.colab import files
uploaded = files.upload()
```

Choose Files download.jpg

- **download.jpg**(image/jpeg) - 7569 bytes, last modified: 4/14/2025 - 100% done

```
Saving download.jpg to download.jpg
```

```
import os
from pathlib import Path
img_path = list(uploaded.keys())[0]
!python detect.py --weights yolov5s.pt --img 640 --conf 0.25 --source {img_path}
```

```
detect: weights=['yolov5s.pt'], source=download.jpg, data=data/coco128.yaml, imgsz=[640, 640], conf_thres=0.25, iou_thres=0.45,
YOLOv5 🚀 v7.0-411-gf4d8a84c Python-3.11.12 torch-2.6.0+cu124 CPU

Downloading https://github.com/ultralytics/yolov5/releases/download/v7.0/yolov5s.pt to yolov5s.pt...
100% 14.1M/14.1M [00:00<00:00, 31.3MB/s]

Fusing layers...
YOLOv5s summary: 213 layers, 7225885 parameters, 0 gradients, 16.4 GFLOPs
image 1/1 /content/yolov5/yolov5/download.jpg: 384x640 1 car, 505.3ms
Speed: 3.2ms pre-process, 505.3ms inference, 57.5ms NMS per image at shape (1, 3, 640, 640)
Results saved to runs/detect/exp
```

```
from IPython.display import  Image, display
result_img_path  = Path("runs/detect/exp") / img_path
display(Image(filename = result_img_path))
```

Step 1: Clone YOLOv5 Repository Download the official YOLOv5 repository from GitHub. It contains all necessary scripts for detection, training, and model export.

Step 2: Navigate to YOLOv5 Directory Change the working directory to the cloned YOLOv5 folder. This ensures all commands run relative to the YOLOv5 codebase.

Step 3: Install Required Packages Install all dependencies listed in the requirements.txt file. These include libraries like PyTorch, OpenCV, and other utilities.

Step 4: Upload Image File Upload an image from your local machine to Colab. This image will be used as the input for object detection.

Step 5: Define Image Path Extract the uploaded image's filename from the upload dictionary. This path will be passed to the detection script as input.

Step 6: Run Object Detection Execute YOLOv5's detect.py script with specified parameters. It performs detection on the image and saves output with bounding boxes.

Step 7: Display Detection Result Locate the saved output image in the results directory. Display it in the notebook to visualize the detected objects.