Program Project

Program Identification

Program ID: T5

Program Title: Computer Vision

Program Information:

Project Title:	**Implementing Object Detection with YOLO Algorithm**

Description

Project Overview:
This project focuses on implementing object detection using the YOLO (You Only Look Once) algorithm on a chosen dataset. Trainees will learn how to set up and fine-tune a pretrained YOLO model for object detection tasks, evaluate its performance, and demonstrate real-time object detection on streaming video data.
Group Number: Match capstone project team

Project Content Outline:

1. **YOLO Algorithm Implementation (30 marks):**

- Utilize a pretrained YOLO model (e.g., YOLOv4, YOLOv5) with the latest version available.
- Fine-tune the pretrained model on a chosen object detection dataset, such as COCO or VOC.
- Optimize the model parameters and hyperparameters as needed for the specific dataset and task.

2. **Evaluation of YOLO Model (20 marks):**
- Evaluate the performance of the fine-tuned YOLO model on a separate validation dataset.
- Measure detection accuracy, precision, recall, and other relevant metrics to assess model performance.

3. **Application on Streaming Video (20 marks):**
- Implement YOLO for real-time object detection on streaming video data.
- Integrate the pretrained YOLO model with video streaming frameworks or libraries to demonstrate real-time detection capabilities.

4. **Model Optimization and Speed Improvement (20 marks):**
- Explore techniques for optimizing the pretrained YOLO model for speed and efficiency.
- Experiment with model compression, pruning, or quantization techniques to reduce inference time while maintaining performance.

5. **Presentation (10 marks):**
- Prepare a presentation summarizing the project objectives, methodologies, results, and insights.
- Showcase the performance of the pretrained YOLO model on object detection tasks and its application on streaming video data.
- Present the project outcomes to peers, highlighting key insights and lessons learned.

Proposed Dataset:

- Dataset: COCO - Common Objects in Context
- Description: The COCO dataset is a large-scale object detection, segmentation, and captioning dataset containing over 200,000 images labeled with 80 categories.

Use Case: Trainees can utilize this dataset to fine-tune and evaluate the pretrained YOLO model for object detection tasks.
Total Marks: 100

Note:

- Trainees are encouraged to experiment with different pretrained YOLO models and explore techniques for optimizing model performance and speed.
- Collaboration, knowledge sharing, and feedback from instructors and peers are highly encouraged throughout the project.
- The project aims to provide a practical learning experience in implementing YOLO for object detection tasks, leveraging pretrained models, and applying them to real-time streaming video data

Project Outcomes

By the end of this **project** trainee will deliver:

A. Python code in a Notebook with Markdown documentation
B. Presenting your algorithms results comparison and insights in last section of the notebook.