TAKAMUL TECHNOLOGIES

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Test Assignment: Object Detection from Photos

Context:

The goal is to develop a model capable of detecting and identifying objects in real-world photos based on synthetic data (screenshots of objects from various angles).

Tasks:

1. **Data Preparation**:
    - Use the provided high-resolution object screenshots (synthetic data).
    - Perform preprocessing (e.g., augmentation, normalization).
2. **Model Training**:
    - Develop and train an object detection model using architectures like Faster R-CNN, YOLO, DETR, or similar.
    - Apply advanced augmentation techniques to improve the model's robustness.
3. **Testing**:
    - Use the provided real-world photographs to evaluate the model's accuracy.
    - Measure performance using metrics such as mAP, Recall, and Precision.
    - Visualize the results by annotating the detected objects in the images.
4. **Optimization**:
    - Optimize the model for real-time performance (e.g., model size reduction, deployment using ONNX or TensorRT).

Evaluation Criteria:

1. **Accuracy**: The model's ability to detect objects accurately in real-world photographs.
2. **Performance**: The efficiency and speed of the model.
3. **Code and Documentation**: Cleanliness, structure, and clarity of the code and accompanying explanations.
4. **Approach**: The rationale for architecture choice, error analysis, and suggested improvements.

Deliverables:

- The codebase (Jupyter Notebook or Python script).
- A README file describing the approach, instructions for running the code, and conclusions.
- (Optional but appreciated) A presentation visualizing the results.

Deadline:

5 - 7 working days.

link with inputs:
https://drive.google.com/drive/folders/1YuaGIOEcTVuv_JT3DatRT9P6zfQNk57c?usp=sharing