**Object Detection with Detectron or YOLO**

**Instructions:**

In this assignment, you will demonstrate your understanding of object detection using either the Detectron or YOLO (You Only Look Once) framework.

Dataset: Select a dataset suitable for object detection tasks. You can use publicly available datasets such as COCO (Common Objects in Context) or any other dataset that includes annotated images for object detection.

**Steps to follow:**

a. Install and set up the chosen framework: Install and set up either Detectron or YOLO framework based on your preference. Follow the official documentation or tutorials to set up the framework on your local machine or preferred development environment.

b. Preprocess the dataset: Preprocess the dataset to ensure it is compatible with the chosen framework. This may involve converting the annotations to the required format and organizing the images and annotations accordingly.

c. Train the model: Use the chosen framework to train an object detection model on the dataset. Experiment with different architectures, hyperparameters, and training strategies to optimize the model's performance.

d. Evaluate the model: Once the model is trained, evaluate its performance on a separate validation or test set. Calculate metrics such as mean Average Precision (mAP) or Intersection over Union (IoU) to assess the accuracy and quality of the object detection results.

e. Fine-tune the model: Experiment with techniques such as transfer learning or fine-tuning to further improve the model's performance. Fine-tune the model using additional annotated data or by adjusting hyperparameters.

f. Visualize the results: Use the trained model to detect objects in sample images from the dataset. Visualize the detection results by overlaying bounding boxes and class labels on the images.

g. Document your findings: Provide a detailed explanation of the steps taken, the observations made, and the results. Include visualizations, if applicable, to support your analysis.

Introduction: Submit your assignment as a pdf, and video file that includes the following sections

Dataset: Describe the dataset used, including its source, size, and annotation format.

Methodology: Explain the steps followed, such as data preprocessing, model training, evaluation, and any fine-tuning techniques applied.

Results: Present the evaluation results, including metrics and visualizations of object detection outputs.

Discussion: Analyse and discuss the performance of the model, limitations, and potential areas for improvement.

Conclusion: Summarize the key findings and lessons learned from the assignment.

h. Include any relevant code snippets, configuration files, and visualization outputs as appendices or provide links to a code repository if applicable.