Computer Vision Project

Project Title:

#	Team Member (The minimum number of team members is 6 and the maximum number is 8)	ID	Grade
1			
2			
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Project Objective

Design and implement a complete object detection system focused on a specific field. Your system should include a graphical user interface (GUI) and must be capable of:

- Accepting a static image as input.
- Detecting one or more objects in the image relevant to the selected field.
- Drawing bounding boxes around each detected object.
- Labeling each detected object with its predicted class name.

Dataset Selection

- Choose a public dataset or create a custom dataset relevant to your selected domain.
- Clearly state:
    - The name of the dataset.
    - The source (with a proper citation or URL).
    - The number of classes, the number of samples/images.
    - The purpose of using this dataset in your system.

Pipeline Implementation

1. Preprocessing and Image Enhancement

Tasks: Image Resizing, Normalization, Noise Reduction, Contrast Adjustment, Color Space Conversion, Image Augmentation, Thresholding, Blurring and Sharpening Filters, and Morphological Operations.

2. Segmentation

Tasks: Isolate regions of interest (ROIs) that may contain objects.

Example: Thresholding, Edge-based methods, Region-based methods and clustering.

3. Feature Extraction

Tasks: Extract relevant features from segmented regions.

4. Classification

Tasks: Classify detected objects into predefined categories.

Example: Traditional ML, and Deep Learning.

5. Evaluation and Performance Metrics

Tasks: Assess your model's performance using appropriate evaluation metrics such as: Accuracy, Precision, Recall, F1-score (for classification).

Documentation and Report Requirements

Your final report must be well-structured and include:

- Chosen field and motivation
- Dataset and Why it was selected
- Detailed explanation of each step in the pipeline
- Input and output of each step
- Techniques and Justification for each technique’s selection
- Visual examples of detection output
- Evaluation metrics and discussion
- Limitations or challenges faced
- References

Notes:

- **Each team member must be fully informed about the entire project, and anyone can be asked about any part of it.**
- **If the same project is duplicated by more than one team, both teams will receive zero marks. Therefore, do not give any team a copy of your project.**
- **Behave appropriately during the discussion and adhere to the examiner's instructions to ensure no points are lost.**
- **Please complete the necessary team member data in this file, print it, and bring it to the discussion along with the documentation files.**

Good luck