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**CSE 541: Computer vision**

**WEEKLY REPORT 2**

**[Group: 7]**

**SECTION – 1**

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Approach:

**Object Detection:**

* We have chosen the YOLO V8 model as the foundation for object detection.
* The YOLO V8 model will be trained using our AU drone dataset. This training process aims to identify objects, employing axis-aligned bounding boxes accurately.

**Oriented Object Detection (OOD):**

* We will integrate the RRPN (Rotation Region Proposal Network) model or a comparable oriented object detection model into our pipeline.
* The RRPN model is designed to take the rotated bounding boxes obtained from the YOLO V8 model and further refine them. This refinement process incorporates considerations for detected objects' orientation or rotation angle.
* The RRPN model will undergo training using a meticulously annotated dataset, ensuring oriented bounding boxes are included.
* We will establish a seamless pipeline, combining the YOLO V8 and the trained RRPN models tailored explicitly for Oriented Object Detection (OOD).

Data set Discussion:

* Datasets focus on advancing object detection methods in aerial imagery with oriented rectangular bounding boxes.
* It was captured from uncrewed aerial vehicles (UAVs) or drones featuring diverse landscapes and environmental conditions.
* Various lighting conditions, times of day, and weather patterns are represented.
* Preprocessing includes georeferencing, orthorectification, and calibration for spatial accuracy.
* Annotation efforts label objects with oriented rectangular bounding boxes for supervised learning.
* Quality assurance checks ensure dataset consistency and reliability.
* Challenges addressed include variations in object orientations, lighting, and environmental factors.
* The significance lies in advancing oriented object detection methods and evaluating proposed techniques, like Box-enhanced IoU loss function.

Weekly Progress:

We adopt a two-step approach for object detection in aerial imagery, utilising the YOLO V8 model as the foundational detector and integrating the RRPN model for oriented object detection (OOD). The YOLO V8 model is trained on our AU drone dataset, emphasising axis-aligned bounding boxes. Subsequently, the RRPN model refines the output by considering object orientation, trained on meticulously annotated datasets with oriented rectangular bounding boxes. Our datasets, captured from drones in diverse conditions, undergo thorough preprocessing for spatial accuracy. Annotation efforts and quality assurance checks ensure reliability, addressing challenges like varied object orientations and environmental conditions. This project aims to advance oriented object detection methods, emphasising the significance of proposed techniques, such as the Box-enhanced IoU loss function, to enhance model performance in challenging aerial scenarios.