



# National University

## of Computer and Emerging Sciences

Chiniot-Faisalabad Campus



### Department of Artificial Intelligence and Data Science

<b>Course Code</b>	AI4002
<b>Course Title</b>	Computer Vision – Lab
<b>Lab Task</b>	15
<b>Due Date</b>	09:00 pm - 14 December 2025
<b>Instructions:</b>	
<ul style="list-style-type: none"><li>Check the attached sheet for assigned model to implement.</li><li>Every student need to upload a zip file having .ipynb and .h5/.pt file.</li><li>Rename each file with your id_dataset_model i.e, 22F0000_MURA_YOLOv8s.</li><li>Submit task on Due Date. No Late Submission will be Tolerated.</li></ul>	

#### Implement Object Detection Models – Localization Task

##### Task Overview

Each student is assigned one pretrained Object Detection model (YOLO, SSD, Faster R-CNN, etc.) to implement on the FracAtlas Dataset for a Bone Fracture Localization task.

This is an object detection problem, where the goal is to detect and draw bounding boxes around fractures.

##### Dataset Assignment

All students (Section A & B) will use:

- FracAtlas Annotated Dataset ([https://figshare.com/articles/dataset/The\\_dataset/22363012](https://figshare.com/articles/dataset/The_dataset/22363012))
- You must download the dataset, review its annotation format, and prepare it for training.

##### Dataset Split

Merge all data into a single folder

- Combine train, valid, and test into one folder.
- Then split manually or programmatically into:
  - 70% Training
  - 10% Validation
  - 20% Testing

Ensure the annotation files follow the correct training format required by your assigned model (YOLO/COCO/VOC format).

##### Training Requirements for Section A

- Epochs: 15
- Batch Size: 16
- Learning Rate: 0.0001
- Optimizer: Adam
- Image Size: 512×512

- Augmentations Required:
  - Random horizontal flip
  - Random brightness adjustment
  - Minor rotation ( $\pm 5$  degrees)
  - Scale/zoom jitter

### **Training Requirements for Section B**

- Epochs: 15
- Batch Size: 16
- Learning Rate: 0.0001
- Optimizer: SDG
- Image Size:  $512 \times 512$
- Augmentations Required:
  - Random horizontal flip
  - Random brightness adjustment
  - Minor rotation ( $\pm 5$  degrees)
  - Scale/zoom jitter

### **Evaluation Requirements**

Every notebook must have:

- Precision, Recall, mAP50, mAP50-95
- Loss curves (training + validation)
- Predicted images with bounding boxes
- Inference time per image / FPS

### **Output Requirements (Submission Format)**

Upload one ZIP file containing:

1. Your Notebook (.ipynb)
2. Saved Model (.h5 or .pt)

Rename exactly like this:

DatasetName\_ModelName.h5

Example: FracAtlas\_YOLOv11n.h5

Do NOT upload dataset in ZIP.