



National University

of Computer and Emerging Sciences
Chiniot-Faisalabad Campus



Department of Artificial Intelligence and Data Science

Course Code	AI4002
Course Title	Computer Vision – Lab
Lab Task	14
Due Date	09:00 pm - 08 December 2025
Instructions: <ul style="list-style-type: none">• Check the attached sheet for assigned model to implement.• Every student need to upload a zip file having .ipynb and .h5 file.• Rename each file with your id_dataset_model i.e, 22F0000_MURA_ResNet50.• Submit task on Due Date. No Late Submission will be Tolerated.	

Implement Transfer Learning (Keras Applications) – Binary Classification
Task Overview <p>Each student is assigned one pretrained CNN model from Keras Applications to implement on a Bone Fracture Classification problem.</p> <p>This is a binary classification task:</p> <ul style="list-style-type: none">• Fractured• Not Fractured
Dataset Assignment <ul style="list-style-type: none">• Section A → MURA Dataset https://www.kaggle.com/datasets/cjinny/mura-v11• Section B → FracAtlas Dataset https://figshare.com/articles/dataset/The_dataset/22363012 <p>You must only use the dataset assigned to your section.</p>
Dataset Split <p>Merge all data into a single folder</p> <ul style="list-style-type: none">• Combine train, valid, and test into one folder.• Then split manually or programmatically into:<ul style="list-style-type: none">◦ 70% Training◦ 10% Validation◦ 20% Testing
Training Requirements <ul style="list-style-type: none">• Train for 25 epochs (fixed).• Use Binary Crossentropy as loss function.• Use Adam optimizer.• Image size:

- Use 224×224 for most models
 - Use 299×299 for InceptionV3 or Xception
- Normalize pixel values:
 - rescale=1./255
- Use model-specific preprocessing:
 - tf.keras.applications.<model>.preprocess_input()
- Batch size: 16 or 32
- Learning rate:
 - 1e-4 for initial training
 - 1e-5 for fine-tuning
- Use callbacks:
 - ModelCheckpoint() (save best model)
 - EarlyStopping(patience=5, restore_best_weights=True)
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Data Augmentation

Use ImageDataGenerator or tf.data with:

- Random rotation (5–10 degrees)
- Width/height shift (0.1)
- Horizontal flip
- Zoom (0.1–0.2)
- Shear (0.1)

Avoid aggressive augmentations because fractures are subtle.

Evaluation Requirements

Every notebook must have:

- Confusion matrix
- Classification report
- Accuracy / Loss plots
- ROC Curve (optional but recommended)

Output Requirements (Submission Format)

Upload one ZIP file containing:

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

Rename exactly like this:

DatasetName_ModelName.h5

Example:

MURA_ResNet50.h5

FracAtlas_VGG16.h5

Do NOT upload dataset in ZIP.