



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:

- 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

Each student is assigned one pretrained CNN model from Keras Applications to implement on a Bone Fracture Classification problem.

This is a binary classification task:

- Fractured
- Not Fractured

Dataset Assignment

- Section A → MURA Dataset
<https://www.kaggle.com/datasets/cjinny/mura-v11>
- Section B → FracAtlas Dataset
https://figshare.com/articles/dataset/The_dataset/22363012

You must only use the dataset assigned to your section.

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

Training Requirements

- 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)`
-

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.