Scenario based set 1 DL:

1.Image classification Model overfits Quickly:

You are training a CNN to classify dog breeds.You achieve 98% accuracy on training within 5 epochs but validation accuracy stays at 60% and testperformance is poor

Ans:

Regularization(L1,L2 dropout)to penalise complex weights

Data augmentation to increase training set diversity

Simplify the model or reduce parameters

Early stopping to half training

More training data

ANN fails to Learn Non-Linear Pattern

Scenario 2: ANN Fails to Learn Non-Linear Patterns

Project: Simple digit classification using **Artificial Neural Network (ANN)**
Problem: Accuracy stuck around 50%; adding more epochs doesn't improve performance.

ANN may not capture non-linear features in image data

Add hidden layer with ReLU activation

Normalize inputs

Tune learning rate(1e-3 to 1e-4)

Check class balance

Scenario 3: CNN Model Predicts Same Class for All Images

Project: Face Mask Detection using **CNN**
Problem: Model always predicts "With Mask" for every test image.

Insert batch normalisation after each conv layer

Reduce the learning rate

Verify proper weight intiallization

Confirm the loss is categoricall croo-entropy

Scenario 4: Object Detection Model Detects Objects but Bounding Boxes Are Misaligned

Project: YOLOv8 used for Tiger Detection in Forest
Problem: Bounding boxes do not fit objects properly

Verify and reannotate the dataset for tight,accurate boxes

Recompute custom anchor boxes for your tiger dataset

Train with increased augmentation and appropriate imgsz

Scenario 5: Face Mask Detection Gives High Accuracy but Performs Poorly on Real Faces

Project: Real-time Face Mask Detection using **CNN**

Problem: High accuracy on test set, but poor real-time performance on webcam feed.

Model Optimization-use pruning or quantisation

Modify CNN

Preprocessing data-lightweight networks desighed for realtime

Hardware Acceleration

Data Augmentation

Inference optimization-use TensoeRT

FaceDetectiobStage

Scenario 6: CNN-Based Object Detector Struggles at Night

Project: YOLOv8-based object detection in CCTV
Problem: Model doesn't detect objects in dark/night images.

Preprocessing the image

Data augmentation

Model fine Tuning