Assignment_07

Uploaded on: **3rd March 2025**
Submission: **Before 22nd March 2025 (12:30 PM)**

1. Locating ball (Inside or Outside the Fence) You are provided with two folders (../Fence/Inside and ../Fence/Outside)
   A) Observe each image in both folders carefully and make sure that they represent the correct class (I see that some of the images are NOT labelled correctly). You may reject those images that are not very clear or have been wrongly labeled.
   B) Develop the FCN for identifying the ball if it is inside or outside the fence. Describe details of architecture of the network that you used for training and validation.
   C) Provide detailed performance of the network on validation data.

2. Train a neural network to classify density matrices as valid or invalid based on their properties (Carefully follow details provided in the presentation (Matrix_Project.pdf) to learn about valid and invalid matrices etc.)
   A) Data Generation: Generate 10,000 random matrices of dimension 2 ×2 (5,000 Valid and 5,000 Invalid)
   B) Model Training: Train part of the generated data using the Fully Connected Neural and evaluate performance using accuracy, precision, recall, and F1-score
   C) Model Evaluation: Generate an independent dataset of 1,000 random 2 ×2 matrices without labels and use the trained model to predict their validity

Please NOTE:
a) Complete your assignment in time

b) If you need any clarifications, feel free to contact TA's or me well in advance so that you can complete your assignment in time