AI5100/AI2100/EE6380 Deep Learning, Fall 2025
Indian Institute of Technology, Hyderabad
Kaggle Competition
Total Marks: **50 points**
Assigned on 14.10.2025 (Monday), Due date **22.11.2025 (Saturday)**

1 Dataset Overview

In this kaggle competition we will be working on the multispectral images which contains satellite images and with the corresponding labels for semantic segmentation tasks.

1.1 Data Description

Each example in the dataset contains the following:

- **image:** Multi-spectral satellite image as a 3D array with shape [16, H, W]
  - 16 spectral channels for a given image.
  - Values are `float32` type, in the range [-3, 3]
  - Height and width of the corresponding image.
- **label:** Corresponding label/mask as a 2D array with shape [H, W]
  - Values are `uint8` type, typically binary (0 or 1)
- **i:** Spatial coordinate i (`int32`)
- **j:** Spatial coordinate j (`int32`)
- **start_time:** Start time of the satellite observation (string)
- **end_time:** End time of the satellite observation (string)
- **ind:** Index within the original data array (`int32`)
- **size:** Resolution size of the image (`int32`)

2 Problem Statement

In this competition, there are three set of files presented:

1. `x_train`: The main training data comprising of 1713 multispectral images.
2. `y_train`: The corresponding masked images; ground truth for the above training data samples.
3. `x_test`: The test data of 183 multispectral images.

The dataset is temporarily found here in this link. The objective is to be come up with a semantic segmentation model where the corresponding pixel is classified based on the label of interest. In short, the input is a multispectral image, and the output is a segmented mask corresponding to the particular label.
In addition, the main metric used in this competition here is:

1. **Dice Coefficient**: The metric that is similar to that of the Intersection over union.

It is important to note that the evaluations have to be done using this metric only. Ensure that the evaluation and reports are clear, replicable, and methodologically sound.

3 Important Rules & Guidelines

1. This competition is on the individual activity and not as a group. Note that the individual has to mention the **roll number** as the team name at the time of enrollment of the competition. If this is not mentioned, then the work will not be evaluated.
2. No external datasets are to be used in this competition.
3. Any pretrained or transfer learning are strictly prohibited.
4. Cheating/plagiarism results in any form will result in **immediate zero points** in the competition.
5. Deviations from instructions result in immediate zero marks.

4 Submission Requirements

Submissions must strictly adhere to the following format:

1. Submit one python file (.ipynb) file with the following format; `roll_no_project.ipynb` along with the best model weights (either .pt or .pth) and also a report summarizing the different strategies used in the competition, with the following format; `roll_no_project.pdf`.
    - The report should contain the steps and the observations related to data loading, model building, training, testing,, and evaluation.
    - Further the justification for choosing the model along with the hyperparameters considered should also be detailed.