

## Week 3 Water Segmentation using Multispectral and optical Data

### Objective:

Our goal is to develop a robust solution for accurately segmenting water bodies using multispectral and optical data. This solution is vital for monitoring water resources, flood management, and environmental conservation, where precise segmentation of water bodies can significantly impact decision-making.

### Preprocessing and Model Development:

To achieve our objective, we will focus on the following key requirements:

#### 1. Preprocessing:

- Data Preparation: Prepare the multispectral and optical data by maintaining the original shape and resolution of the images. This ensures that the spatial integrity of the data is preserved for accurate segmentation.
- Normalization: Apply normalization techniques to standardize the input data across different sensors, which will help in improving model performance and stability during training.

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#### 2. Visualization

- Band Visualization: Show the images corresponding to each band in the multispectral and optical data. This will help in understanding the data characteristics and assessing the input quality for segmentation tasks.



### 3. Model Architecture and Training:

- **Model Selection:** Use deep learning models suitable for segmentation tasks, such as U-Net, which are known for their effectiveness in pixel-level classification. The model will be trained to segment water bodies from the input multispectral and optical data.
- **Evaluation:** Evaluate the model's performance using metrics like IoU, precision, recall, and F1-score specifically for the water class, to ensure the model's segmentation accuracy meets the project's objectives.

**Deadline:** The project is to be completed by Wednesday, September 4st, at 12 PM.

The completed project will be submitted via a GitHub repository. as We will continue to update and refine the repository as we advance our work on the project.

**Notes :** Each Training/testing example has 12 channel/band and the label Y is binary mask  
and both have width/height=128

