

# ECCE 633 – Machine Vision and Image Understanding

## Assignment 2

Announced: **27 Oct. 2021**

Submission deadline: **10 Nov. 2021**

Acceptable forms of submission:

**Online** (using E-Learn) – single ZIP, DOC(X) or PDF file: Report and Source Code

### IMAGE SEGMENTATION

In this assignment, you will implement a remote sensing segmentation algorithm using U-Nets. Images are from the ISPRS Potsdam dataset<sup>1</sup>. Each input image in the dataset was divided into image patches of size  $300 \times 300$ . These patches are divided into training (~2000 images) and testing (~400 images) datasets (see the notebooks below) and labeled with one or more of the following labels: {"roads", "buildings", "low veg", "trees", "cars", "clutter"}. You will develop a U-Net based system that predicts such labels.

You can access the data and ground truth labels from the following [link](#)

You are required to develop the following:

- Build a U-Net neural network to solve this segmentation problem.
- Train the neural network developed in part (a) using the training data. For faster training, you should use GPU resources (you can get hours of free GPU time using Kaggle or Colab), and for better results, shuffle the training data.
- Apply the learned neural network to testing data and report the obtained accuracy. Avoid underfitting or overfitting your data. A classification accuracy higher than 70% is considered acceptable.
- Display three sample results that include color images, the ground truth labels, and predicted labels

The following notebooks can help you get started:

Kaggle (preferred) [link](#), Colab [link](#)

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<sup>1</sup> <https://www2.isprs.org/commissions/comm2/wg4/benchmark/2d-sem-label-potsdam/>