

Abstract:

Classification and change detection of high-resolution satellite images using low-resolution labels is a challenging issue. In this project, we propose a weakly supervised method based on neural networks to generate high-resolution change maps in Maryland using low-resolution NLCD labels. Firstly, we refined the NLCD labels for testing manually. Subsequently, a 5-layer Fully Convolutional Network (FCN) and U-Net models were trained for the classification of pixels in NAIP images with the refined labels. To improve the model accuracy and stability, we tried U-Net models, chained models using other model predictions as input label, and Deep Ensemble Method to show uncertainty of predictions. IoU score was used to evaluate models. As a result, the chained model of U-Net 50 with U-Net 18 predictions as input has better performance followed by U-Net 18 model and U-Net 50 model. Dynamic World Label and soft labeling techniques can improve models in water class which was a huge challenge.