

# The integrated approach on Segment Anything Model-based pseudo labelling and weakly supervised model for land use and land cover segmentation

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The recent advance of zero-shot segmentation models, such as the Segment Anything Model (SAM), has had a huge impact on remote sensing deep learning applications. SAM is a prompt-based foundation model for segmentation, and because it is trained with an enormous amount of data, it can almost 'segment anything,' including small objects in remote sensing. However, SAM's primary focus is on segmentation rather than classification, which poses a challenge when additional object-specific information is required. We addressed this problem by utilizing the rich spectral information of NIR bands. By employing NIR-based spectral indices, the frequently segmented object masks, such as buildings or shadows, could be classified efficiently. Furthermore, we also created an edge-driven model that can fully utilize the pseudo labels. Instead of relying solely on the semantic information of the objects, the model also incorporates edge information. Applying edge information to the model resulted in an observed improvement in the efficiency of utilizing the pseudo labels. Our integrated approach using SAM and spectral indices-based pseudo label generation, along with the edge-driven model, demonstrates the potential to improve land use and land cover (LULC) classification in remote sensing applications.

**Keywords:** segment anything model, land use land cover, pseudo label generation, deep learning