

Object-oriented Classification based Random Forest for Aerial Images with DSM

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This work develop an objected-based classification framework using Aerial images according with DSM. Our workflow is shown in Figure 1.

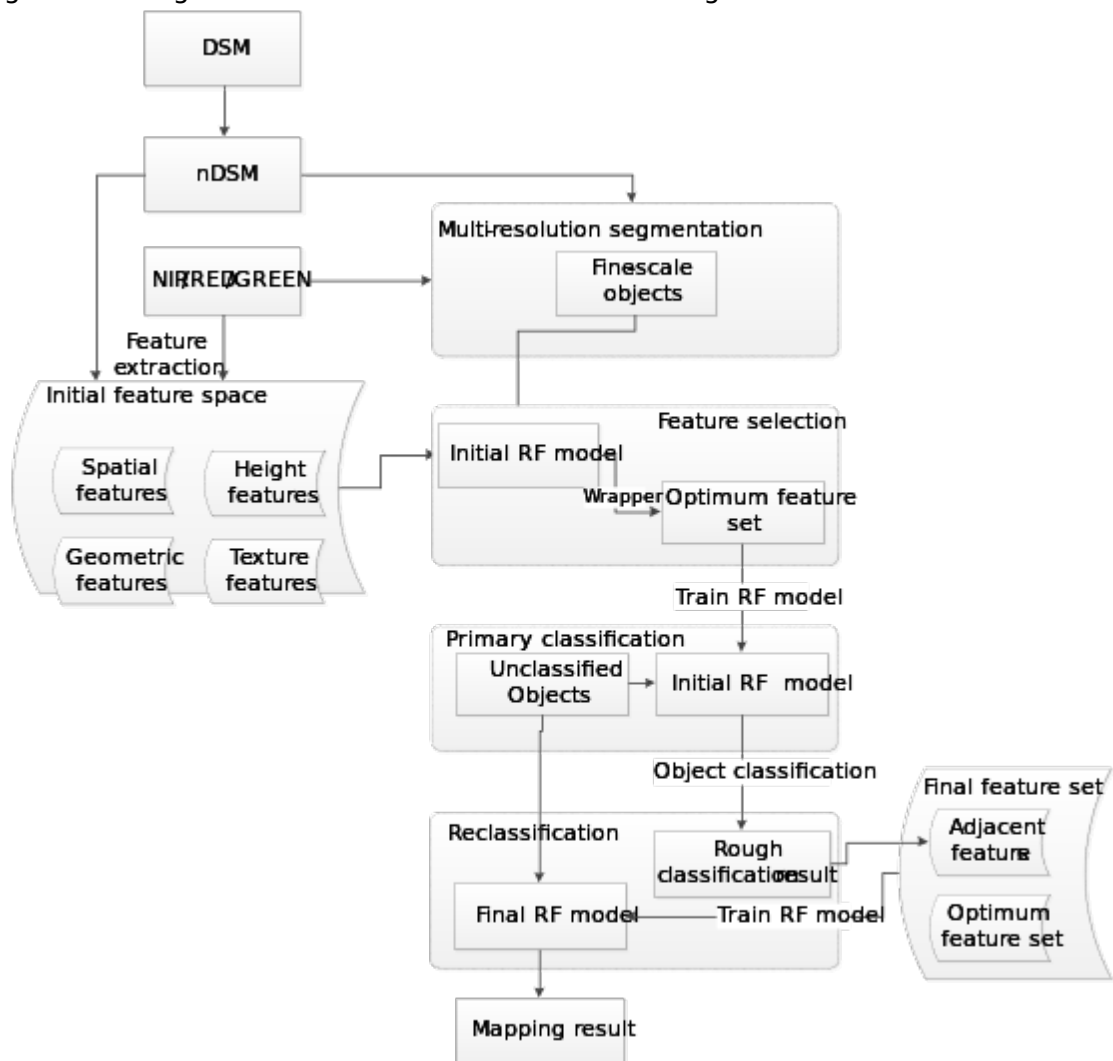


Figure 1. Flowchart of object-based urban LULC classification framework

- 1) DSM data is first used to obtain the nDSM data. We treat DSM images as point clouds regarding each pixel as a point. The ground points are obtained using a filtering algorithm and DEMs are interpolated by ground point interpolation. Then nDSM is subtracted by the DSM and the DEM

- 2) Multi-resolution segmentation algorithm is applied to generate fine scale homogeneous objects.
- 3) In the following step feature extraction objects are calculated on objects and the adjacent objects, including height features, spectral features, shape features and texture features. Redundant features and irrelevant features are existing in the initial feature space. The invalid features are filtered by the wrapper method.
- 4) A random forest classifier is trained based on the optimal feature space, and the initial labels of the objects are obtained.
- 5) Extract adjacent features from the initial classification results.
- 6) Adjacency features and optimal feature subset are composed and used for retraining the RF classifier.
- 7) Obtain the final classification objects labels and mapping the result.
- 8) Corresponding classification map regularization rules are applied to optimizing classification results. In this step, we use some features and topological relations to constrain the classification of objects, and further improve the classification accuracy.

Since we are writing the paper, so the details of step5 are not explained here.