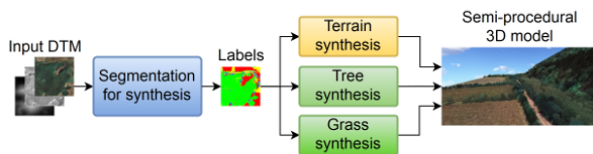


Segmentation of Aerial Images for Plausible Detail Synthesis

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The visual enrichment of digital terrain models with plausible synthetic detail requires the segmentation of aerial images into a suitable collection of categories. In this paper we present a complete pipeline for segmenting high-resolution aerial images into a user-defined set of categories distinguishing e.g. terrain, sand, snow, water, and different types of vegetation. This segmentation-for-synthesis problem implies that per-pixel categories must be established according to the algorithms chosen for rendering the synthetic detail. This precludes the definition of a universal set of labels and hinders the

construction of large training sets. Since artists might choose to add new categories on the fly, the whole pipeline must be robust against unbalanced datasets, and fast on both training and inference. Under these constraints, we analyze the contribution of common per-pixel descriptors, and compare the performance of state-of-the-art supervised learning algorithms. We report the findings of two user studies. The first one was conducted to analyze human accuracy when manually labeling aerial images. The second user study compares detailed terrains built using different segmentation strategies, including official land cover maps. These studies demonstrate that our approach can be used to turn digital elevation models into fully-featured, detailed terrains with minimal authoring efforts.