

SYSTEMATIC EVALUATION OF OBJECT BASED CLASSIFICATION OF REMOTELY SENSED IMAGES USING MACHINE LEARNING

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KEY WORDS: Object, Image, Analysis, Hazards, Earthquake

ABSTRACT:

Object-based approaches to the segmentation and supervised classification of remotely-sensed images yield more promising results compared to traditional pixel-based approaches. However, segmentation and classification methods present challenges in terms of algorithm selection and parameter tuning. Subjective methods and trial and error are often used, but time consuming and yield less than optimal results. Objective methods are warranted, especially for rapid deployment in time sensitive applications such as earthquake induced damage assessment.

Our research takes a systematic approach to evaluating image segmentation and machine learning algorithms in Trimble's eCognition software. We tested a variety of algorithms and parameters on post-event aerial and satellite imagery of the 2011 earthquake in Christchurch, New Zealand. Parameters and methods are adjusted and results compared against manually selected test cases and existing datasets representing different classifications used. In doing so, we can evaluate the effectiveness of the segmentation and classification of buildings, earthquake damage, vegetation, vehicles and paved areas, and compare different levels of multi-step image segmentations. We also compare our classification results to pixel-based approaches.