



Fast segmentation of satellite images using SLIC, WebGL and Google Earth Engine

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Google Earth Engine (GEE) is a parallel geospatial processing platform, which harmonizes access to petabytes of freely available satellite images. It provides a very rich API, allowing development of dedicated algorithms to extract useful geospatial information from these images. At the same time, modern GPUs provide thousands of computing cores, which are mostly not utilized in this context. In the last years, WebGL became a popular and well-supported API, allowing fast image processing directly in web browsers. In this work, we will evaluate the applicability of WebGL to enable fast segmentation of satellite images. A new implementation of a Simple Linear Iterative Clustering (SLIC) algorithm using GPU shaders will be presented. SLIC is a simple and efficient method to decompose an image in visually homogeneous regions. It adapts a k-means clustering approach to generate superpixels efficiently. While this approach will be hard to scale, due to a significant amount of data to be transferred to the client, it should significantly improve exploratory possibilities and simplify development of dedicated algorithms for geoscience applications. Our prototype implementation will be used to improve surface water detection of the reservoirs using multispectral satellite imagery.