

CLOUD-BASED COMPUTATION FOR ACCELERATING VEGETATION MAPPING AND CHANGE DETECTION AT REGIONAL TO NATIONAL SCALES

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Abstract—Mapping vegetation and landscape change at fine spatial scales is needed to inform natural resource and conservation planning, but such maps are expensive and time-consuming to produce. For Landsat-based methodologies, mapping efforts are hampered by the daunting task of manipulating multivariate data for millions to billions of pixels. The advent of cloud-based geospatial computing platforms, such as the Google Earth Engine (GEE), enables a solution to big data problems by providing an environment for massively parallel processing of simple to complex algorithms. In addition to the obvious processing benefits, GEE supplies access to petabytes of remote sensing, topographic, and climatological data, including the entire Landsat archive. As a proof of concept, we will demonstrate the utility of GEE in vegetation change detection and mapping at both regional and national scales. We showcase two current projects utilizing GEE: 1) a random-forest based ensemble model incorporating information from leading change detection algorithms and 2) a nearest neighbors model combining forest inventory plots and spatial predictors to produce regional to national forest vegetation maps. Our early results suggest that this programming approach is ideal for rapid prototyping of change detection and forest vegetation modeling, including flexibility in specifying model forms and spatial covariates. We envision that this type of computing system could support many of FIA's national data products.

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