

Abstract

With the recent abundance and democratization of high-quality, low-cost satellite imagery comes the distinct need for a way to analyze and derive insight from this ever-growing torrent of data. Machine learning technologies and methods are now frequently applied to large datasets to accomplish such varied tasks as language translation, fraud detection, disease diagnosis, and automated driving. This project proposes a means to apply these same technologies to automatically detect and digitize features within satellite imagery. An end-to-end machine learning and web application framework was developed to detect, extract, and digitize arbitrary classes of geospatial features. This system is composed of a web user interface which allows users to source true-color satellite imagery and existent digitized feature data and subsequently use these data to train a machine learning model that will “learn” to automatically identify features within new imagery. This involved the development of both a web application user interface and a specific type of machine learning algorithm termed a neural network that has been shown to excel in image recognition tasks. Following the identification of these features from satellite imagery, features may be exported to a geospatial database for storage and further analysis. This system and provides the foundation for a significant retooling and augmentation of manual geospatial feature digitization workflows and creates new opportunities for geospatial analysis by deriving features from aerial images rapidly en masse.