



# GIS Web Application of Real-time Image Processing



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## Abstract

This project presents a prototype framework for developing an online real-time image classification and scenario generation GIS application. The product involves a series of ESRI mapping and open source scripts, and communicates between client side web browser and server side web folder, and provides a user friendly environment for image classification.

## Introduction

Satellite image classification for identifying land cover and land use is a computationally intensive task. It requires longer computing time which can interfere with normal computer operations. Utilizing the disk storage space and powerful computation capability of Idaho State University's Resource Data Center, we can massively speed up the background processing and provide an interactive online resource that allows stakeholders to view current land use and land cover and visualize prospective scenarios. This product uses open source scripts in a server web folder to automate the classification process and provide timely feedback of the results to end user.

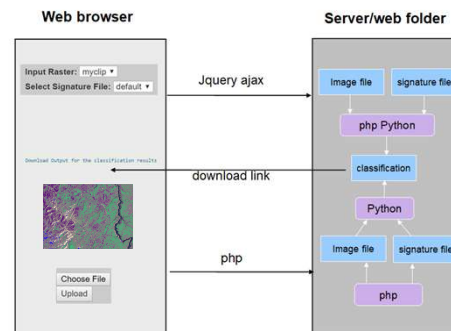
## Acknowledgement

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## Methods

The product runs on a 32 virtual processors, 48G Ram, 10T hard drive Windows server with Windows Server 2012R, ArcGIS Server 10.5, php7.2, Python 2.7.

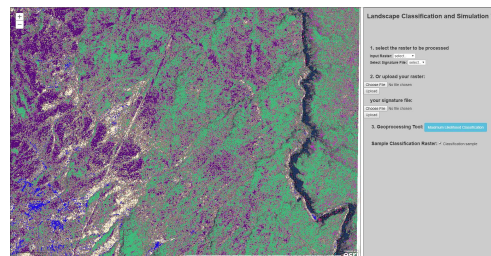
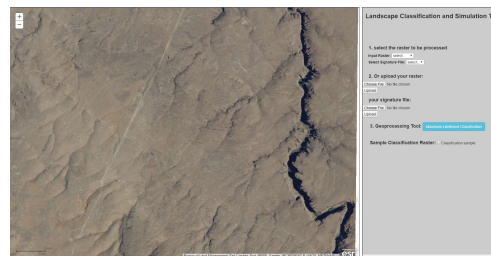
The client-side web product was developed in HTML5, with ArcGIS javascript Api 3.3, and JQuery 3.2.1 with ajax http-request.



## Results

The Land Cover Classification and Scenario Generation Tool provides a web interface for end users to view, select, upload images and signature file in study area. It runs scripts for classification on the server, and generates a download link of the classification results on the web page. A preliminary map service is now available to view at:

<http://geoviz.rdc.isu.edu/IDFG/MLclass2.html>



## Future work

- High resolution large satellite images classification takes hours to process. An email notify system will be set up for users to notify them when the results are ready
- Scenario generation capabilities will be developed for stakeholder engagement
- Due to security concerns, file uploading has size restrictions that limit the size of the study area. A future solution would employ a FTP site which will accept large files on server.
- With multiple satellite images, landscape transition can be approached through scripts on server. The web interface will be modified accordingly to receive multiple images.
- A user based authentication system will be implemented for enhancing cyber security.
- The Python script will be published on ArcGIS server as ArcGIS geoprocessing service. It will be available via ArcMap Desktop as well.

**Strategic Partners:**  
Idaho Fish and Game

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