HYDROGLOW:
Geospatial Pipeline for Floating Solar Feasibility

San Diego State University

HydroGlow

Project Overview

Objective: The goal of this project is to build software that helps users determine whether a specific waterbody (e.g., a reservoir, pond, or lake) is suitable for installing solar panels that float on the water's surface. This method of setting up solar panels is known as "floating solar."

Deliverables: The HydroGlow system allows users to (1) generate high-accuracy waterbody polygons, (2) enrich those polygons with accurate metadata, (3) produce a suitability analysis of any waterbody polygon, and (4) determine the proximity of relevant infrastructure to a waterbody.

Motivation: The pipeline is intended to assist the team at solar energy company Watts on Water to identify viable sites for installing floating solar.

Components Used

- Python (used for ML model, GUI, and fetching data)
- QGIS (used for mapping)
- ArcGIS (used for importing datasets and mapping)
- Google Colab (used for running the ML model)
- Google Drive (used for storage of datasets, CSV files, Excel files)
- Google Earth Engine (used for visualization)
- Excel (used for table formats for CSV files)

Meet the Team

Wilson Cao
CV/ML Engineer

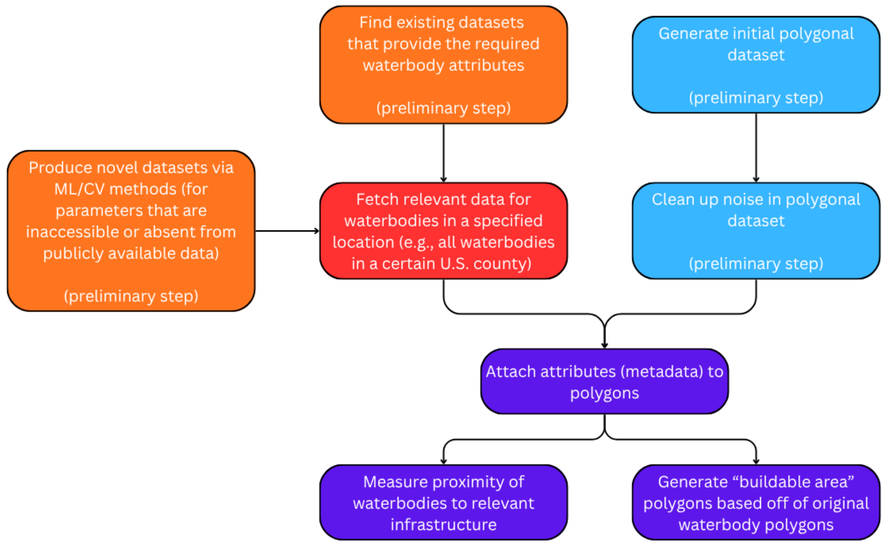
Eren Ugur
Project Lead

Alden Cam
CV/ML Engineer

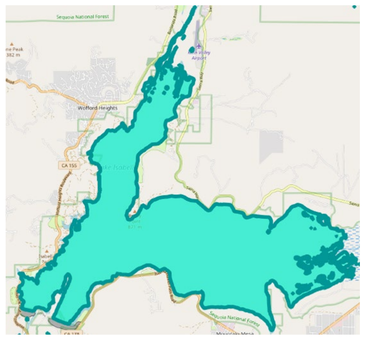
Yousif Faraj
Backend & Deployment Engineer

Mohammed Alsharif
Data Engineer/GIS Specialist

System Level Diagram

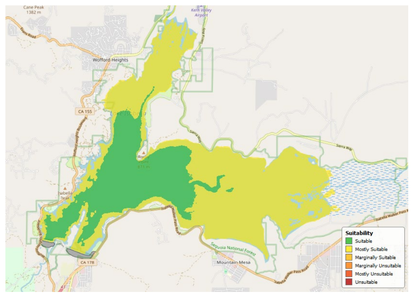


Testing & Verification

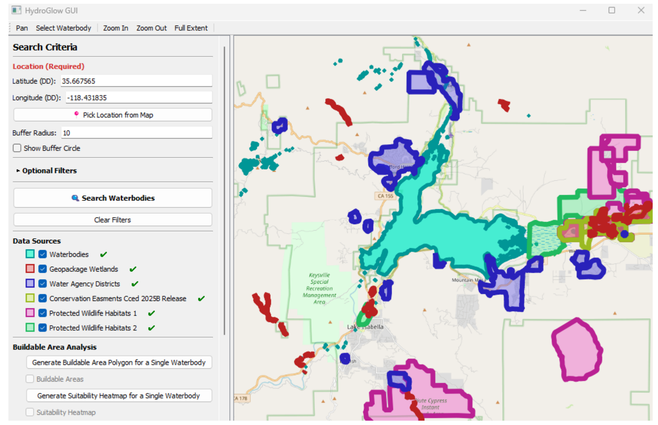


- Random forest classifier
- 70/30 split for train/test samples

- 99% and above overall accuracy
- Visual verification of polygons
- GEE -> Python vectorization -> GPKG



Graphical User Interface (GUI)



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Watts on Water

Conclusion

The HydroGlow project demonstrates a scalable approach for detecting and mapping waterbodies from data acquisition and machine learning methods. Including but not limited to NAIP imagery, GEE, and random forest classification, the team's system is able to both accurately and efficiently identify waterbody features amongst an allocated geographical area.

In collaboration with Watts on Water, our work will hopefully be implemented as a real-world application in the future. Our project outputs can be used to assist the identification of viable waterbodies to deploy AquaPV (floating solar).

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