UCF CRCV REU – Week 6

By: Felipe Monsalvo

Detection of Coastal Features from Satellite Imagery using Computer Vision

UCF CRCV REU - Project 29

Lead: Harry Newton, Ph.D., Leidos Data Scientist

REU Student: Felipe Monsalvo

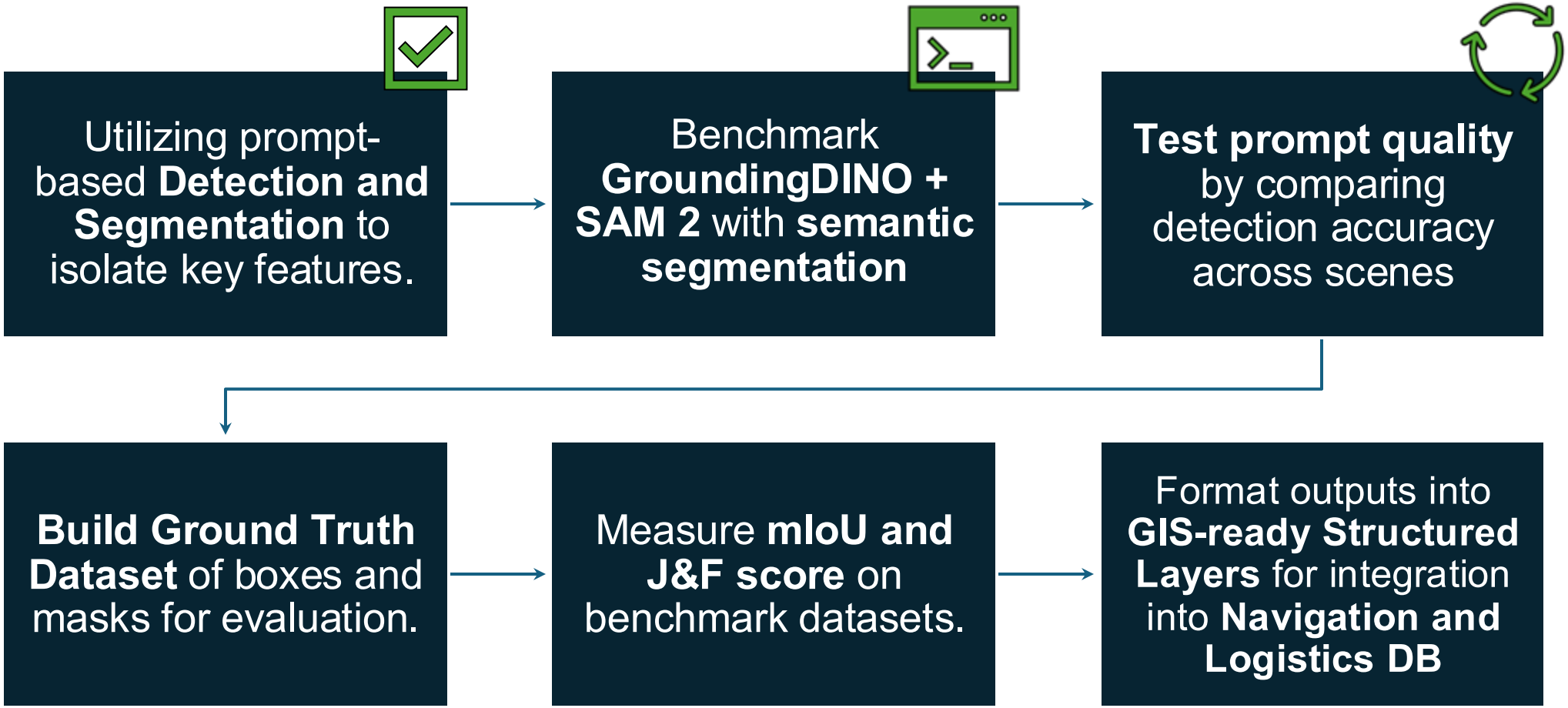


Enabling AI to interpret satellite imagery with near-human accuracy



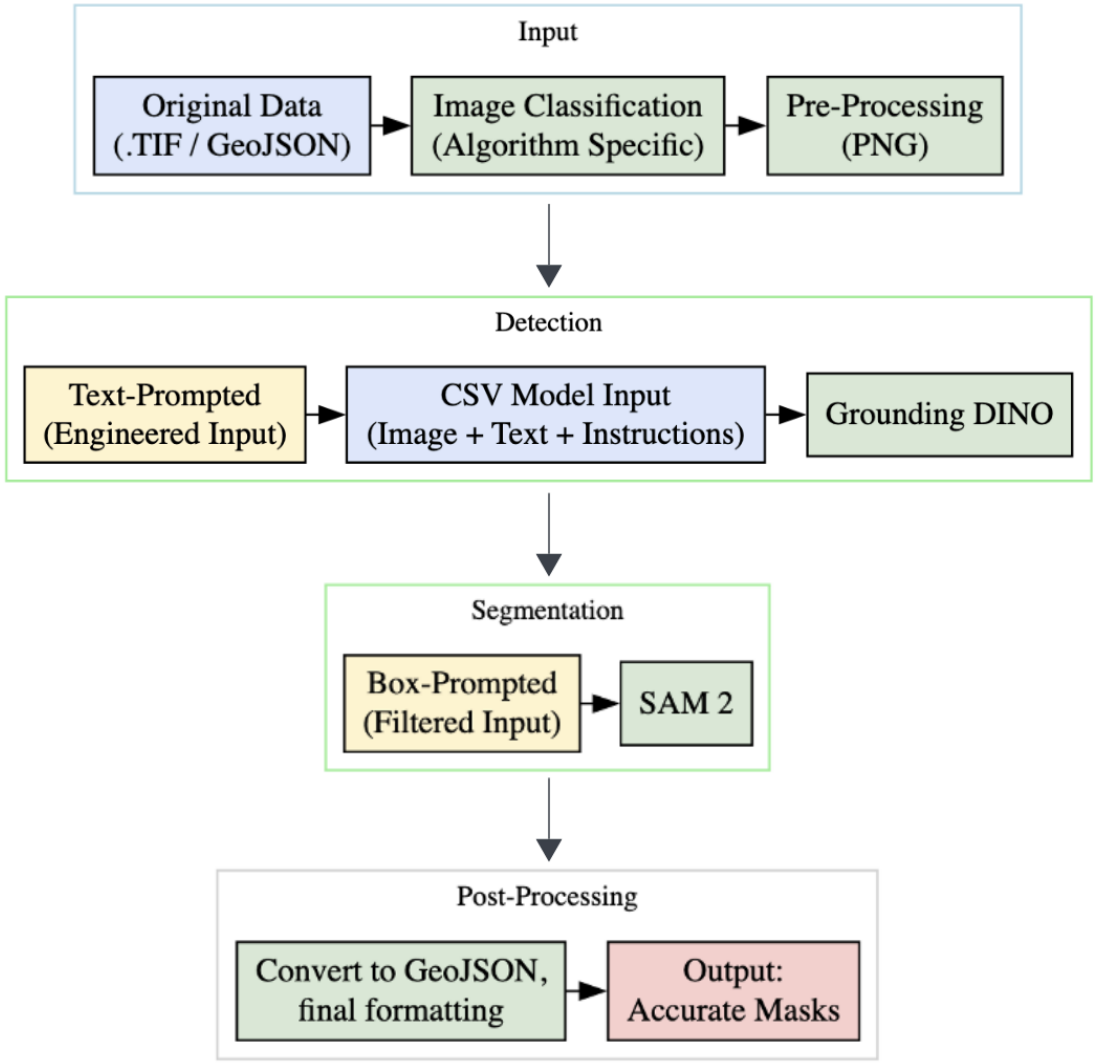
Supports maritime logistics & national safety systems

Project Scope: Open-Vocabulary Vision Pipeline



Vision Pipeline Flow

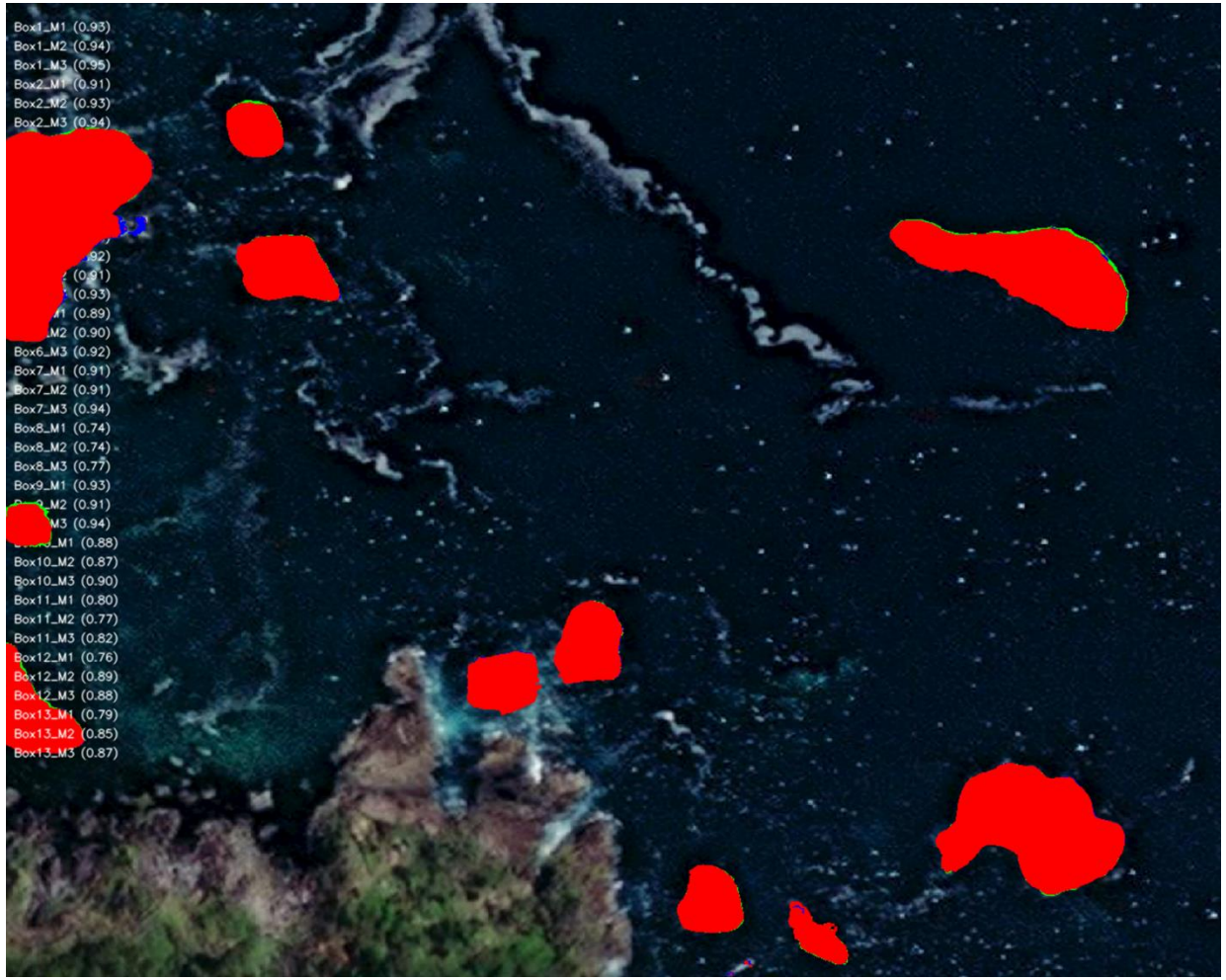
- **Pre-Processing & Input:** Convert .TIF/GeoJSON to .PNG and CSV (image + text)
- **Detection:** Run GroundingDINO with text prompts and instructions to get bounding boxes
- **Segmentation:** Use SAM2 with box input to generate masks
- **Post-Processing:** Format masks as GeoJSON
- **Output:** Export GIS-ready layers

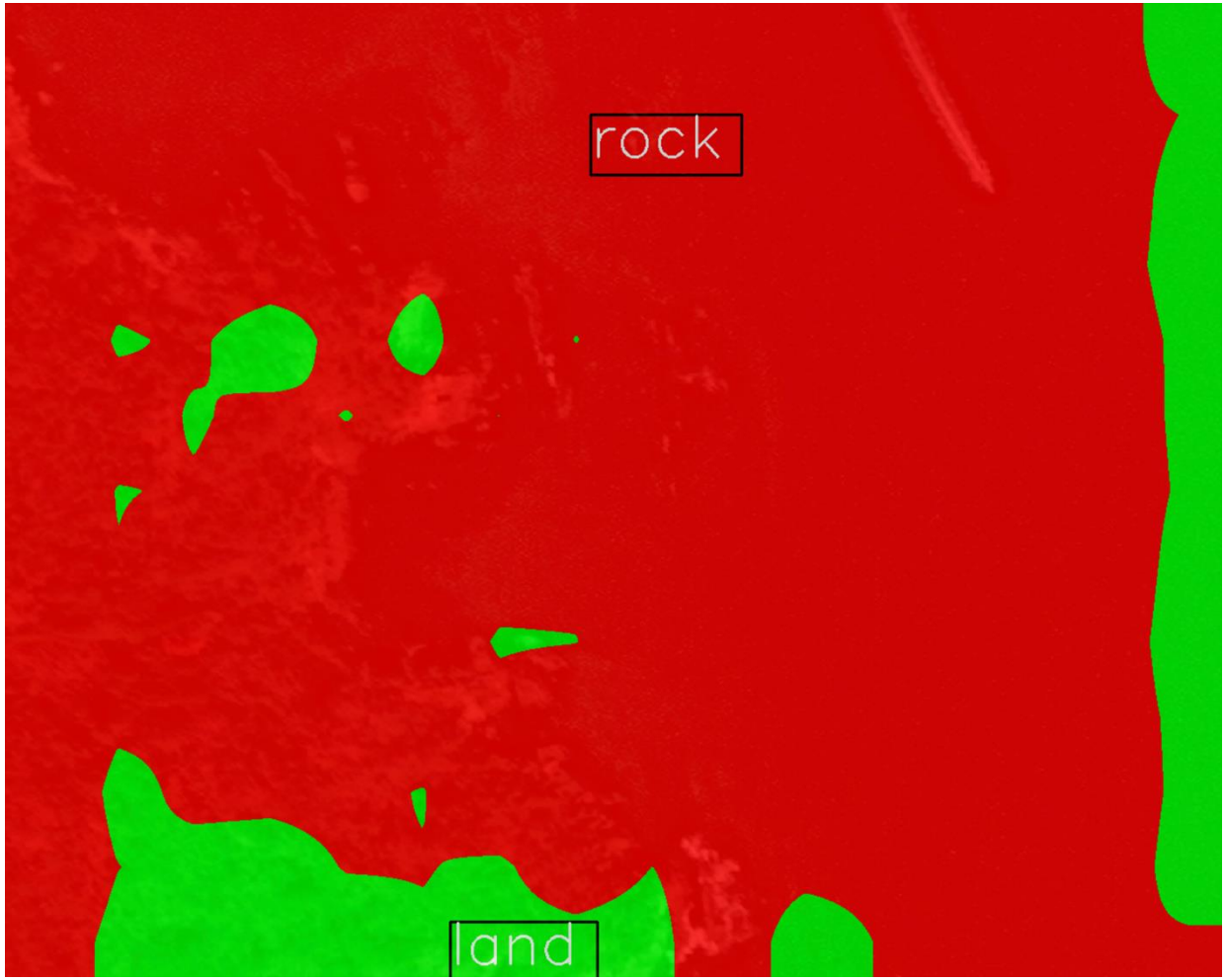


Completed

- Ran SegEarth-OV semantic segmentation to compare against GroundingDINO+SAM2 setup
- Completed full paper draft, including all major sections and expectations
- Outlined expected contributions and finalized framing of research goals
- Met with a professor from the Naval Postgraduate School to refine publication readiness and use-case focus

Current vs SegEarth-OV





In Progress

Current Steps:

- Resolve SegEarth-OV limitations related to unavailable pretrained weights
- Run tests on benchmark datasets using GroundingDINO + SAM2

Next this week:

- Refine accuracy metrics and visual outputs for results section
- Keep revising paper draft and gather feedback from mentors

Schedule

Scheduled Start	Scheduled Finish	Actual Finish	Status	Tasks	Notes
6/18	6/25	6/25	Completed	Integrate detection model to generate initial boxes for SAM2; prompts guide detection, and segmented masks refine output for downstream tasks.	GroundingDINO and SAM 2 are functional and linked
6/24	6/24	6/24	Completed	Met w/ licensed mariner and geointelligence analyst to understand problem better	Warren K. Vaneman, Ph.D., ESEP Captain, U.S. Navy (Retired)
6/26	7/3	7/3	Completed	Draft1 of final report, including literature review.	
7/3	7/10		In Progress	Benchmark GroundingDINO + SAM 2 with semantic segmentation	
7/6	7/16		To Do	Achieve standalone model performance > 90% correct classification and geolocation before full system integration. Initial agentic version.	
7/22	7/25		To Do	Revised agentic version. Test system rigorously and document performance through metrics (accuracy, F1-score, confusion matrix).	

Advice?