A Bird's Eye View: Monitoring the California Least Tern Using Unmanned Aerial System (UAS) Imagery
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Background

- Endangered Species Act 1973
- Field monitoring can be costly, disturb the wildlife, expose personnel to safety risks and damage resources
- Future applications for IRS: Intelligence, Reconnaissance, Surveillance

Objective

Develop an approach to automate analysis of UAS imagery for California Least Tern monitoring using geospatial mapping and machine learning

Process

1. Collect images of Tern nesting areas using UAS system
2. Construct a mosaic of the collected UAS images
3. Use Candidate Proposal to extract points of interest from the mosaic
4. Use an Artificial Intelligence (AI) system to identify and map the location of the California Least Tern

Tools

DJI Inspire 1
Zenmuse X5 Camera w/ 25mm lens
ArcGIS Pro
Matlab
Tensorflow
Docker

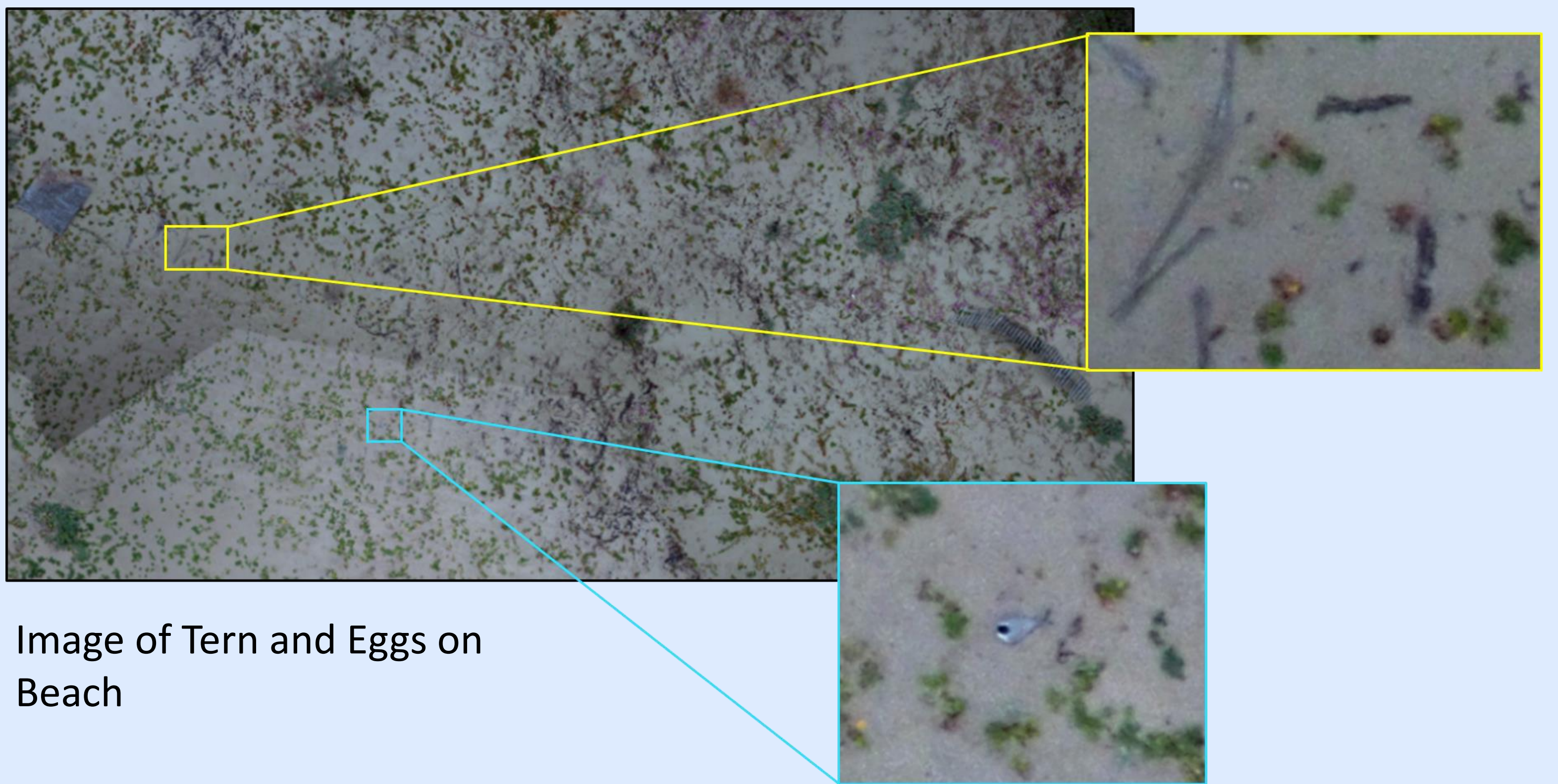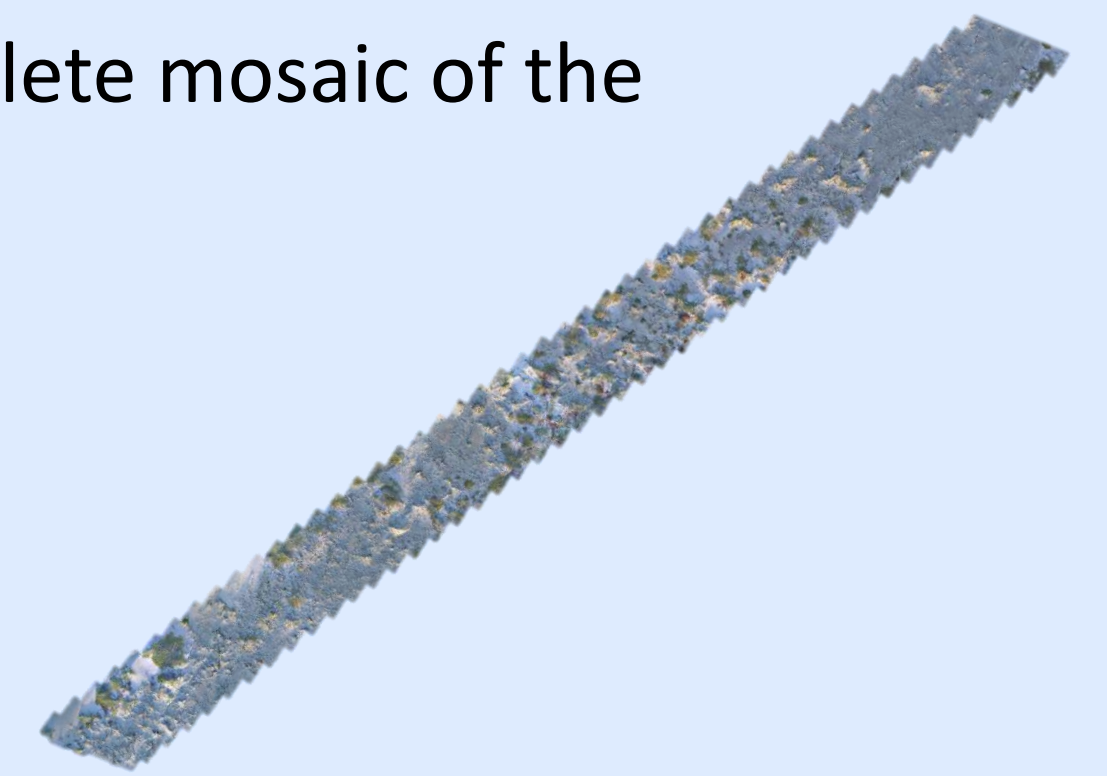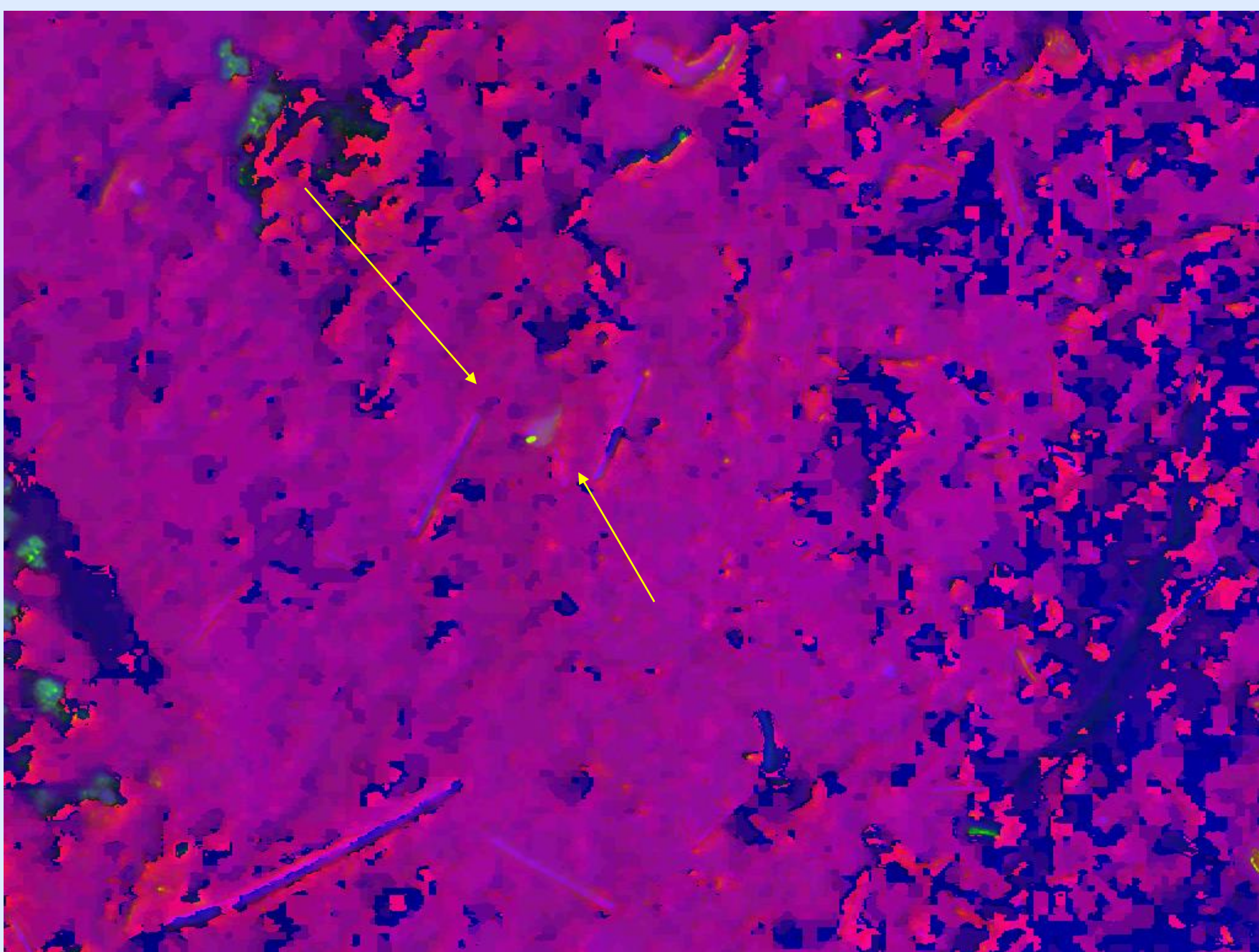California Least Tern

Complete mosaic of the beach

Image of Tern and Eggs on Beach

Hue Saturation Value as used for Candidate Proposal

Results

- Completed a process to create a quality mosaic that can be analyzed in an efficient manner
- Candidate Proposal using Hue Saturation Value color spectrum results in easy to identify features distinguishing the California Least Tern from their environments
- AI system consistently and accurately identifies the California Least Tern in the provided images with approximately 90% accuracy

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