AI Coastal Upwelling Detection in the Mid-Atlantic Bight NJ\$EDA UTGERS

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BACKGROUND

- Upwelling events of 2+°C difference in temperature within ~5 km offshore are considered
- NASA GOES-16 geostationary satellite has a spatial resolution of 0.5-2.0 km. Its images are used for its observations on Sea Surface Temperature.



Figure 1. Upwelling is an oceanic process that occurs when wind direction, Coriolis Deflection, and Ekman transport push surface water offshore, and the Cold Pool replaces it as it moves to the surface.

METHODS

- Using a Declouding Dataset (NOAA's ERDDAP servers), we clarify satellite images of sea surface temperature.
- If the image indicates evidence of upwelling and is a clear enough determinant, it is used in the training dataset of the convolutional neural network.

RESULTS





Figure 2: A is a satellite image composite August 1st, 2022, indicating clear upwelling. B is a satellite composite from August 14th, 2022, indicating clear upwelling. C is a composite from August 5th, 2022 indicating no upwelling. D is a composite from August 26th, 2022, indicating no upwelling.

ECONOMIC DEVELOPMENT AUTHORITY





CONCLUSIONS

- With the continuation to train the convolutional neural network with the assistance of different fully connected and pooling layers, the satellite images will be taken in as the dataset, and the model will be able to predict upwelling given a satellite image of this nature.
- The model is still being developed given different qualities of satellite image.

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