The Rise of Machine Learning in Marine Ecology Research

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Background
- In the Aleutian Islands, the Western stock (Figure 1) of Steller Sea lions (SSL) is endangered.
- Threatened by food competition and other climate change factors.

- NOAA is in charge of tracking and recovering their population, and AI is the next step to process through SSL imagery.
- Processing through population data can be time-consuming and costly.

Research Question
Will machine learning provide faster deliverables for the Western Steller Sea Lion population and be more accurate than human observation; and how does that differ across site locations?

Internship/Methods
- Processed 25k images of one Aleutian Island site’s images remotely identifying branded Sea Lions.
- I ran a comparison between the accuracy of the same images through R analysis.
- Program used was PhotoCount.

Results

The time it took to process 25k images:
- **3 weeks** for AI Model
- **10 weeks** for Human Observer

**AI MODEL**

**HUMAN OBSERVER**

Percent of Overall Missed Brand Sightings by AI and Observer

AI overall miss rate in different locations observed

Takeaways
- The AI model is not as good as human observers at observing Steller Sea LIONS.
- The miss rate for the AI differed among locations and has yet to be improved.
- AI is faster at providing deliverables.
- The AI model still needs more training before being relied on to process images for NOAA.

Implications

Once the AI model is properly trained to reach human accuracy:
- AI can assist in identifying important trends and patterns in ecosystems
- It saves the time and cost that human labor takes to process data.
- NOAA can efficiently create policies to protect Western SSLs.

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