Saving the Steller Sea Lion: How AI Aids Conservation in Alaska

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Research Question

What is the accuracy of the beta AI network being developed by NOAA for studying Steller sea lions in the Aleutian islands?

Background/Context

- On the Aleutian Islands of Alaska, Steller sea lions are in danger
- Threatened by food competition and entanglements among else
- Available population data is difficult and time consuming to process
- An AI program is being developed to more easily discern population statistics
- I worked to improve the beta AI by testing its accuracy

Figure 1: Steller Sea Lion male and pups resting on the Aleutian island shores during springtime, taken by remote sensing cameras installed by NOAA

Acknowledgements: Thanks to my friends, family, UW staff and NOAA employees who helped me tremendously throughout my capstone process

Internship/Methods

- Manually processed over 20,000 images so we would have a dataset to test the AI's performance against
  - Pinned all branded sea lions within an image and identified their brand name and behavior*
- Ran a results comparison between my images and the same images as processed by the AI through R analysis

Figure 2: Two branded sea lions marked by a manual observer on the Photocount program, indicating the name of their brand and the side of their body it appears on

Results

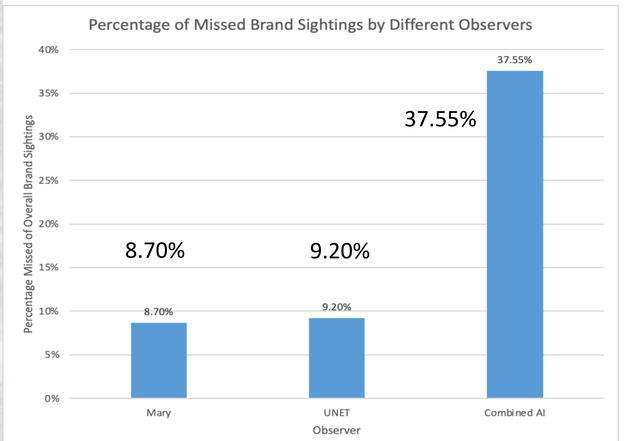

Figure 3: Percentage of missed brand sightings by observer, depicting how many of the total brands sighted by all observers were missed by each individual observer

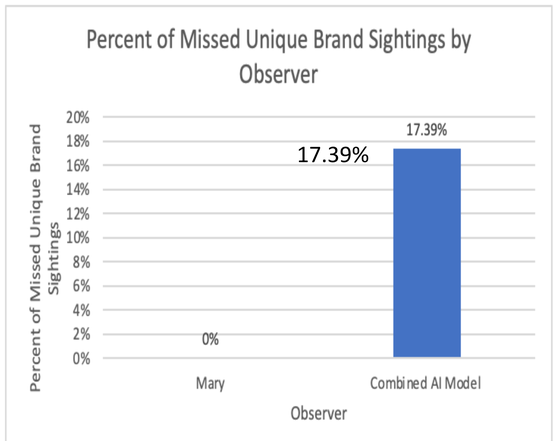

Figure 4: Percentage of missed unique brand sightings by observer, depicting how many of the total brand types seen were missed by each observer

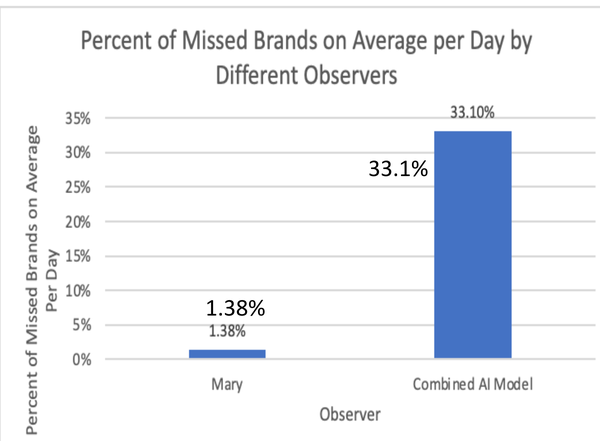

Figure 5: Daily average of missed brand sightings per day by observer, depicting how many of the total brands seen were missed by each observer each day on average

- The first layer of the AI had similar accuracy to my own, but overall, there were many brands it didn't see
- The AI was not as good as manual observers at spotting a novel sea lion
- The AI is not near the accuracy of manual observers and stills needs to be improved

What are the Greater Implications?

- This information can be used to inform future AI training
  - What beaches need more training images
- This dataset can be used again in the future to track progress of the AI
- Improving the AI brings us closer to replacing manual analysis and freeing up researcher time for other aspects of conservation

Figure 6: A cluster of sea lions rest on the Alaskan beach in summer, taken by a remote camera installed by NOAA