



HAWAI'I DATA SCIENCE





# Chasing Fog

## **Difficulties measuring fog**

Historically, fog quantification is done with fog gauges like the one shown on the right. However, these can be difficult to install and can collect wind-blow rain as well as fog. Trail cameras offer efficient fog monitoring with automated image capture.



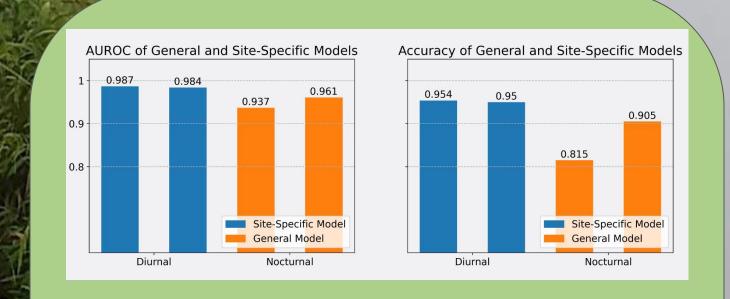
### **Cameras**?

Automating the categorization of trail camera images using machine learning models reduces the time-consuming manual process. However, generalization across different sites remains a challenge, with existing approaches requiring site-specific group-based manual classification achieving an average accuracy of 94%.

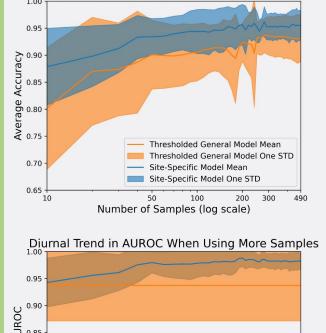


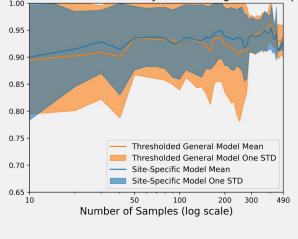
# Model performance

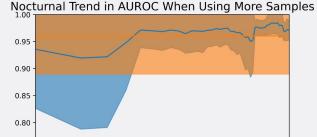
A dataset of ~24,000 images was collected from 13 distinct sites and manually categorized (diurnal: 4,499 fog, 12,382 clear, nocturnal: 1,910 fog, 5,262 clear). General models were tested using a leave-one-out approach, training models on all sites except the target site, then evaluating their performance. Site-specific models were trained only on data from one site and tested and held out images from that site. To the right there is first a bar chart of



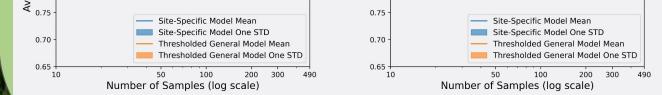
#### Diurnal Trend in Accuracy When Using More Samples Nocturnal Trend in Accuracy When Using More Samples

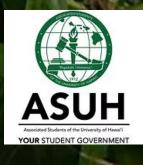






performance for the general and site-specific models for nocturnal/diurnal imagery below this is a chart of performance trends when training with more images.





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