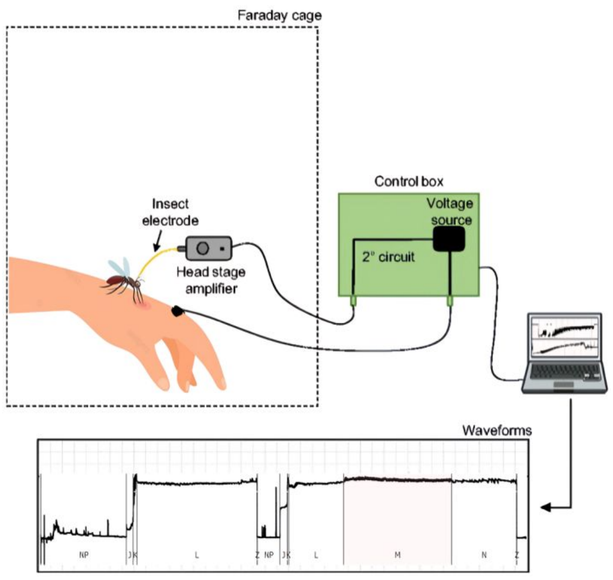
Auburn-USDA
ML for Mosquito Feeding Classification

HARVEY MUDD COLLEGE

Background and Motivation

- Agricultural production is under constant threat from pests like mosquitoes.
- Understanding mosquito feeding is crucial for protecting livestock yields.
- A powerful technique for studying insect feeding is electropenetography (EPG).
- Labeling EPG waveforms is slow, so we implemented machine learning models to automate the process and an interface to use them.

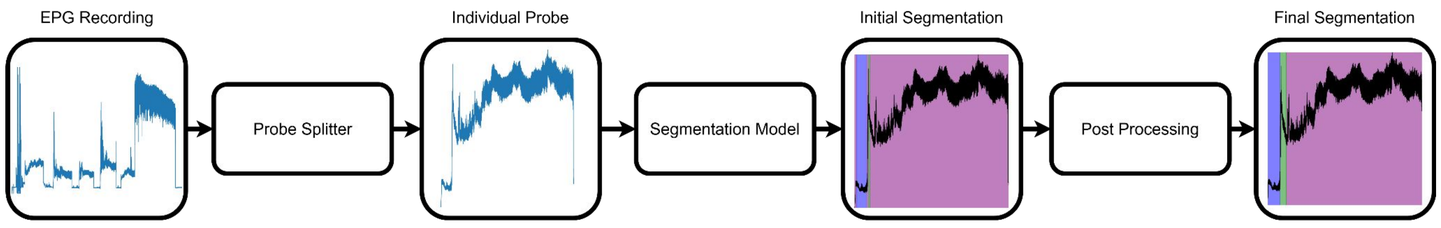
How EPG Works



SCIDO EPG Labeler

Machine Learning

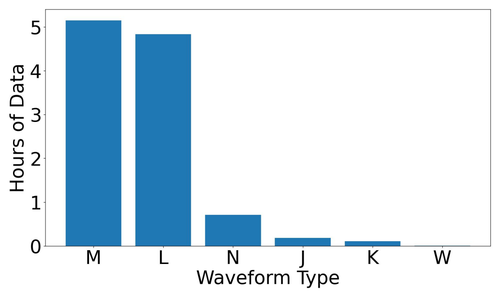
Pipeline



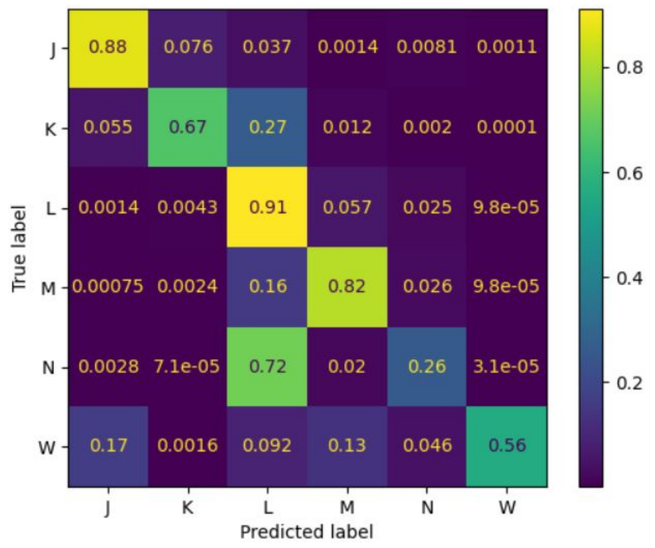
Model Results

Model	Accuracy (%)	F1
UNet	84	0.66
Random Forests	77	0.39
Fully Convolutional Network	79	0.37
Segmentation Transformer	74	0.39

Data Distribution



UNet Confusion Matrix



Next Steps

- Expand these models to other insect species
- Add the ability to train models within SCIDO
- Work will be continued by two HMC interns over the summer

Citations

Cooper, Anastasia M. W., Samuel B. Jameson, Victoria Pickens, Cameron Osborne, Elaine A. Backus, Kristopher Silver, and Dana N. Mitzel. 2024. An electropenetrography waveform library for the probing and ingestion behaviors of culex tarsalis on human hands. Insect Science 31(4):1165–1186. doi:10.1111/1744-7917.1329

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Funding: USDA (58-2034-3-445), USDA (58-3022-4-034), NSF (DBI - 2304787)