An Investigation of the Efficacy of Current Machine Learning Techniques for the Analysis of Mouse Ultrasonic Vocalizations

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The student researchers will work to analyze the efficacy of several machine learning based codes for the detection and analysis of mouse ultrasonic vocalizations (USVs) using upwards of four Terabytes of sound data collected by Dr. Schenk and her collaborators over the last 10 years. USVs in these data, called calls, have been detected using detection and analysis code that Dr. Schenk's lab has written. The detection and analysis of these USVs have been verified using the gold-standard "by-eye" method in which an expert looks through a frequency versus time plot (spectrogram) looking for mistakes in detection. These verified USVs will serve as the test bed for several, machine learning based call detection code bases: the Mouse Ultrasonic Profile ExTraction (MUPET) code, which uses an unsupervised learning algorithm to detect calls, an algorithm based on supervised learning, and DeepSqueak, which is a neural network based method.