Scott Fortmann-Roe
UC Berkeley
e-mail: scottfr@berkeley.edu
Orr Spiegel
Hebrew University of Jerusalem
Roi Harel
Hebrew University of Jerusalem
Wayne Getz
UC Berkeley
Ran Nathan
Hebrew University of Jerusalem

Automatic Classification of Vulture Behavior using Machine Learning Algorithms Applied to Accelerometer Data

Accelerometer data has been shown to be an effective tool for identifying certain animal behaviors. In this talk, I present the use of tri-axial accelerometer data as a predictor of seven ground-truthed Griffon vulture (Gyps fulvus) behaviors: active flight, eating, laying down, passive flight, preening, running, and standing. Five different machine learning algorithms were trained and validated on subsets of over nine-hundred observations, each 16 to 25 seconds in length. Prior to classification, summary statistics for the accelerometer data were calculated and used as inputs into the machine learning algorithms. The algorithms tested were Linear Discriminate Analysis, Classification and Regression Trees, Random Forests, Artificial Neural Networks, and Support Vector Machines. Of these methods, the Random Forest predictors were found to be the most accurate while Linear Discriminate Analysis predictors were the least accurate. Classification accuracies for all predictors were in the 80% to 90% range. Using results of the machine learning algorithms we determined the importance of the different summary statistics for the classification effort. Generally, measures of variance were found to be more important than measures of central tendency or correlation.