DSS Statistics Seminar
October 8, 2021, 12:00
https://uniroma1.zoom.us/j/86881977368?pwd=SWRFcVFjMDZTa0lXZk05TE1zNm5adz09
Passcode: 432940

The modeling of multiple animals that share behavioral features

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GPS technology is currently easily accessible to researchers, and many animal movement datasets are available. Two of the main features that a model which describes an animal's path can possess are directional persistence and attraction to a point in space.

In this work, we propose a model that can be used to infer the behavior of multiple animals. Our proposal is defined as a set of hidden Markov models that are based on the sticky hierarchical Dirichlet process, with a shared base-measure, and a new emission distribution called STAP which has both directional persistence and attraction to a point in space. The latent classifications of the HMMs are representative of the behavior assumed by the animals, which is described by the STAP parameters.

As a result of the way we formalize the distribution over the STAP parameters, the animals may share, in different behaviors, the set or a subset of the parameters, thereby allowing us to investigate the similarities between them. The hidden Markov models, based on the Dirichlet process, allow us to estimate the number of latent behaviors for each animal, as a model parameter.

This proposal is motivated by a real data problem, where the GPS coordinates of six Maremma Sheepdogs have been observed. Among the other results, we show that four dogs share most of the behavior characteristics, while two have specific behaviors.

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