

EL2320 Project Proposal

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Stratified particle filter and EKF mixture models I will implement stratified particle filter and mixture of EKF in Matlab, then test them on the datasets given by the labs. Once that is done I want to combine the approaches by allowing mixtures to alternate between EKF and particle filter depending on the variance in EKF/particles. Hopefully, this can result in faster computations.

The idea of the combined approach is that a particle filter will transform into an EKF if the distribution of particles can be modeled with an EKF, and that an EKF can turn into a particle filter when the distribution is not Gaussian (not oval enough, multimodal). Some of the immediate problems that needs to be addressed when implementing the idea are the following:

- When to switch between EKF and particle filter
- How to switch between EKF and particle filter (number of particles, mean, weights, covariances, etc.)
- Should we switch to particle filter or split into two EKF mixtures

If I have time I will implement the EKF/Particle filter with adaptive number of particles or groups/mixtures.