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Stochastic geometric models for image analysis

In this paper I will present two image analysis applications inspired by work of Eva's and her co-authors.

The first application, inspired by Hahn et al. (2003), concerns the problem of tracking a variable number of moving objects through video frames with a view towards depth calculation. We propose a regression model based on a sequential object process to quantify goodness of fit augmented by regularization terms to control within and between frame object interactions. To find the optimal tracks and the associated depth map, a Markov chain Monte Carlo method is developed.

In the second application, inspired by Jónsdóttir and Jensen (2005), we propose a spectral mean for closed sets described by sample points on their boundaries subject to mis-alignment and noise. We derive maximum likelihood estimators for the model and noise parameters in the Fourier domain. We estimate the unknown mean boundary curve by back-transformation and derive the distribution of the integrated squared error. Mis-alignment is dealt with by means of a shifted parametric diffeomorphism.

References

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