Interactive Trajectory Modification and Generation with FPCA

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Abstract— Moving object analysis is a constantly growing field with numerous concrete applications in terms of traffic understanding, prediction and simulation. While many algorithms and analytic processes exist, there are still areas of investigation with novel trajectory analysis methods. As such, the geometric information analyses data with respect to its statistical distribution along extracted dimensions. This opens new ways of gaining a better understanding of large and complex trajectory data sets while providing flexible data manipulations. In this paper, we report our investigations with the development of an interactive methodology based on the geometric information analytic process where users can analyze trajectories sets, cluster and deform them maintaining the actual statistical properties of the investigated trajectories. As a contribution, this paper shows how geometric information can provide novel support for trajectory analyses taking into account the statistical properties of the investigated clusters. We also provide recommendations of good usage of such techniques with actual examples validated by a a domain expert of air traffic flow analysis.