Trajectory Clustering of Inbound Aircraft based on Feature Representation and Selection

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Abstract— Trajectory clustering is an efficient way to identify the prevailing inbound patterns, which could help to improve both individual flight and system-level efficiency. Most of the existing trajectory clustering methods mainly relied on the framework of partition-and-group or the hierarchical clustering strategy. In this paper, we proposed a new trajectory clustering method that focused on the feature representation and selection for the inbound trajectories. Firstly, the representative features of the inbound trajectory were extracted. Secondly, the irrelevant and redundant features were eliminated based on Laplacian Scores and Spearman's correlation coefficients. Thirdly, since each trajectory can be represented as a sample with the same size of features, various standard clustering algorithms could be applied for identifying the prevailing patterns. Furthermore, we carried out case studies by using the trajectories of inbound flight landing on Shanghai Pudong International Airport. The results indicated that the proposed method could not only distinguish the important features for inbound trajectories but also identify the prevailing inbound patterns effectively and efficiently.