

Passive Mobile Positioning Data Mining Using M-Atlas

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Period: 28.04.2013 to 3.06.2013

Abstract. Passive mobile positioning (PMP) is a method for analyzing spatio-temporal data, which is stored in the form of call detail records (CDR) within the memory and log files of mobile operators. KDD Lab has developed M-Atlas (mobility atlas), which is querying and data mining system for mobility data. During the STSM M-Atlas was used to evaluate its mobility models, patterns and spatio-temporal query language suitability for knowledge extraction from PMP datasets. M-Atlas software is built for GPS data and as GPS data temporal resolution is much denser than PMP temporal resolution then the issues to be solved prior main analysis were addressed and solutions proposed. On the knowledge extraction part four different data mining analyses were carried out – finding correlation patterns, building social borders, profiling and finding multidimensional networks. Looking for correlation patterns is data mining method to search events with significant deviation from regular trend and then based on this data search consecutive patterns of these deviations geographically. Social borders approach seeks for common geographical areas for people who share same everyday mobility area using community-clustering algorithms. In this profiling analysis, self-organizing map (SOM) algorithm was used to detect tourist visiting types. Ego-networks data mining approach was applied for call graph data.

Keywords: Passive Mobile Positioning, M-Atlas, trajectory data, privacy preserving data mining