

A new aspect of congestion detection over a large amount of real-time information

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Abstract

In these decades, we started to use such devices as mobile phones or GPS navigators, which are capable of recording geographical trajectories. However the available amount of information is usually far too large to analyze them with traditional algorithms, these kinds of data sources can hold a lot of useful information over the observed area. That is why we should use an efficient method or protocol to store and to process this kind of geographical information. The detection of congestions can help to optimize a traffic system by multiple ways. For example, this is the most straightforward way to detect over- and under loaded points in a system or to calibrate the traffic light to ease their load. By distinguishing specific patterns and tracking the movements of patterns, it is possible to discover the underlying reasons for congestion at certain points of traffic system. For instance, several minor congestions can lead to a major or multiple ones at different points in the system. The cause might be easier to eliminate than to break up the several or more complex congestions. By generalizing the definition of the congestion, the behavior of each object group takes shape. By analyzing these shapes and movement patterns -with the help of a specialist- a system could propose various investments' project to decrease the load on a heavily loaded traffic subsystem or simply to make the people live more comfortable. Such a system could be used by professionals at urban management and the system ultimately – with the support of a proper semantic database – can be fully automatized and integrated into the control system of a smart city solution. We adopted a simple clustering algorithm (DBScan) and a method (AFOPT), which mines various patterns from FCI data (GetMove) to detect such events. This paper presents a new model to compress and to process large amount of geographical information and architecture to detect typical traffic events (like congestions). It also proposes a method to understand trends in the behavior of objects by simplifying the data and using the aforementioned existing tools.

Keywords: data mining, pattern mining, congestions, human behavior

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