Towards Parallel Detection of Moving Flock Patterns in Large Spatio-temporal Datasets

Final report

Andres Calderon

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1 Introduction

In this section I plan to discuss background information and motivation about the topic. Importance of trajectory datasets and complex motion patterns will be discussed. I would like to introduce the notion of moving flock patterns and the challenges to find the set of disks together with some basic definitions.

Spatio-temporal data is ubiquitous nowadays. Thanks to new technologies and location devices (such as Internet of Things, Remote Sensing, Smart phones, GPS, RFID, etc.), the collection of huge amount of spatio-temporal data is now possible. With the appearance of this datasets also appears the need of new techniques which allow the analysis and detection of useful patterns.

Applications for this kind of information are diverse and interesting, in particular if they come in the way of trajectory datasets. Case of studies range from transportation system management (Di Lorenzo et al. [2016]; Johansson and others [2015]) to Ecology (Johnston et al. [2015]; La Sorte et al. [2016]). For instance, Turdukulov et al. [2014] explore the finding of complex motion patterns to discover similarities between tropical cyclone paths. Similarly, Amor et al. [2016] use eye trajectories to understand which strategies people use during a visual search. Also, Holland et al. [1999] track the behavior of tiger sharks in the coasts of Hawaii in order to understand their migration patters.

2 Related Work

Some work about spatio-temporal patterns will be revisited in order to introduce some seminal work about moving flock patterns. BFE algorithm must be presented in this section. Similarly, I would like to discuss some advances in spatial data analysis tools in distributed platforms (in particular Simba).

3 Parallelizing Flock Detection

I plan to explain the details of the algorithm implemented in Simba and how some spatial predicates introduced by it can leverage the finding of disks.

4 Experiments

The setup and details about the datasets I plan to use will be discussed in this section. It will show some figures comparing the implementation with a sequential version of the algorithm.

5 Conclusions and Future Work

I will share the lessons learned during the project and some future ideas to continue with the research.

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