

Event Detection on Call Data Records

Katalin Hajdú-Szücs^a, Attila Kiss^b

^a Eötvös Loránd University
szucsk@caesar.elte.hu

^b Eötvös Loránd University
kiss@inf.elte.hu

Abstract

The previously unseen amount of data from mobile phones creates new possibilities to model human behaviour. Mobile communication network providers store all the data related to the phone traffic in the shape of CDR (Call Detail Record) files. The analysis of cell phone call activity by means of data mining and anomaly detection techniques makes it possible to discover underlying human behaviour and use the results to detect potentially anomalous events. The wide applicability of this concept leads to multiple research directions. One of these areas is crowd detection. Over the last decade much effort has been devoted to introduce a methodology of detecting social events in massive mobile phone data to help resource allocation of service providers and traffic management. Another area concerns the ability to follow the movements of unusual gatherings of people. This information is beneficial to raise the situational awareness of emergency and disaster managers to perform effectively during an event. A third direction involves the utilisation of cell phone data in case of incidents as part of an early warning systems. Furthermore, forensics analysis of phone networks can help to identify criminal organisations that are structurally different from common social network.

The goal of the paper is to present an overview of the applicability of anomaly detection in mobile phone data analysis. After describing the wide range of possibilities for anomaly detection in this context and presenting the state of the art, we detail the most important methods. Finally, we present our own findings in this field on CDR data covering one-month of traffic of a Hungarian mobile communication service provider.

Keywords: Mobile phone metadata, CDR, anomaly detection

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