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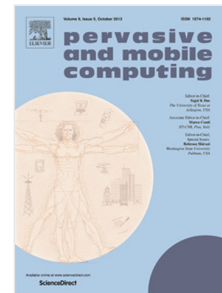
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On the Regularity of Human Mobility

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Abstract

Understanding human mobility patterns is crucial to fields such as urban mobility and mobile network planning. For this purpose, we make use of large-scale datasets recording individuals spatio-temporal locations, from eight major world cities: Beijing, Tokyo, New York, Paris, San Francisco, London, Moscow and Mexico City. Our contributions are two-fold: first, we show significant similarities in people's mobility habits regardless of the city and nature of the dataset. Second, we unveil three persistent traits present in an individual's urban mobility: repetitiveness, preference for shortest-paths, and confinement. These characteristics uncover people's tendency to revisit few favourite venues using the shortest-path available.

Keywords: human mobility, mobility, dataset, analysis

1. Introduction

The expansion of metropolitan areas increased the possibility of moving around [1]. This fact together with the increase of smartphone usage brings a very rich opportunity to collect and to investigate human mobility.

5 People habitually behave as semi-rational entities, routinely moving and interacting within a reduced and predictable geographic landscape, yet unexpected situations can interfere with their preferred direction of motion [2] thus altering their preferred mobility patterns, e.g.: an individual may have to alter his daily commute to work due to a traffic jam or problems with the public transportation. When choosing an itinerary, people try to follow the shortest-path to their
10 destination, this path is also known as the “*desire line*” [3], that is, individuals try to follow the available path closest to the “*desire line*”. Furthermore, people's habitual set of itineraries is characterized by its *confinement*, i. e., people roam close to their main physical address [4].

Datasets are of enormous importance to the analysis of human mobility. They provide the convenience of a non real-time analysis, that is, one can analyze mobility after its parameters (e.g.,
15 timestamp, geographic coordinates) have been collected and logged. In the context of large-scale mobility and networks, where real-time analysis is arduous due to the enormous amount of individuals and parameters, logged datasets are widely used as primary source of information.

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