

Enabling Smart Urban Services with GPS Trajectory Data

With the proliferation of GPS devices in daily life, trajectory data that records where and when people move is now readily available on a large scale. As one of the most typical representatives, it has now become widely recognized that taxi trajectory data provides rich opportunities to enable promising smart urban services. Yet, a considerable gap still exists between the raw data available, and the extraction of actionable intelligence. This gap poses fundamental challenges on how we can achieve such intelligence. These challenges include inaccuracy issues, large data volumes to process, and sparse GPS data, to name but a few. Moreover, the movements of taxis and the leaving trajectory data are the result of a complex interplay between several parties, including drivers, passengers, travellers, urban planners, etc.

In this book, we present our latest findings on mining taxi GPS trajectory data to enable a number of smart urban services, and to bring us one step closer to the vision of smart mobility. Firstly, we focus on some fundamental issues in trajectory data mining and analytics, including data map-matching, data compression, and data protection. Secondly, driven by the real needs and the most common concerns of each party involved, we formulate each problem mathematically and propose novel data mining or machine learning methods to solve it. Extensive evaluations with real-world datasets are also provided, to demonstrate the effectiveness and efficiency of using trajectory data.

Unlike other books, which deal with people and goods transportation separately, this book also extends smart urban services to goods transportation by introducing the idea of crowdshipping, i.e., recruiting taxis to make package deliveries on the basis of real-time information. Since people and goods are two essential components of smart cities, we feel this extension is both logical and essential. Lastly, we discuss the most important scientific problems and open issues in mining GPS trajectory data.

With the proliferation of GPS devices in daily life, trajectory data that records where and when people move is now readily available on a large scale. As one of the most typical representatives, it has now become widely recognized that taxi trajectory data provides rich opportunities to enable promising smart urban services. Yet, a considerable gap still exists between the raw data available, and the extraction of actionable intelligence. This gap poses fundamental challenges on how we can achieve such intelligence. These challenges include inaccuracy issues, large data volumes to process, and sparse GPS data, to name but a few. Moreover, the movements of taxis and the leaving trajectory data are the result of a complex interplay between several parties, including drivers, passengers, travellers, urban planners, etc. In this book, we present our latest findings on mining taxi GPS trajectory data to enable a number of smart urban services, and to bring us one step closer to the vision of smart mobility. Firstly, we focus on some fundamental issues in trajectory data mining and analytics, including data map-matching, data compression, and data protection. Secondly, driven by the real needs and the most common concerns of each party involved, we formulate each problem mathematically and propose novel data mining or machine learning methods to solve it. Extensive evaluations with real-world datasets are also provided, to demonstrate the effectiveness and efficiency of using trajectory data. Unlike other books, which deal with people and goods transportation separately, this book also extends smart urban services to goods transportation by introducing the idea of crowdshipping, i.e., recruiting taxis to make package deliveries on the basis of real-time information. Since people and goods are two essential components of smart cities, we feel this extension is both logical and essential. Lastly, we discuss the most important scientific problems and open issues in mining GPS trajectory data.

Chao Chen
Daping Zhang
Yasha Wang
Hongyu Huang

Enabling Smart Urban Services with GPS Trajectory Data

 Springer

181,89 €

169,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9789811601774

Medium: Buch

ISBN: 978-981-16-0177-4

Verlag: Springer

Erscheinungstermin: 02.04.2021

Sprache(n): Englisch

Auflage: 1. Auflage 2021

Produktform: Gebunden

Gewicht: 717 g

Seiten: 347

Format (B x H): 160 x 241 mm

