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Principle and Application Progress in Location-Based Services

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Preface

This book offers a collection of peer-review front-end research articles related to Location-Based Services (LBS). The contributed articles document research activities from various fields. Therefore, this book is divided into five parts.

Part I contemplates contributions on *Positioning and Indoor Positioning*. Yang Cao, Haosheng Huang, and Georg Gartner develop “[A Signal-Loss-Based Clustering Method for Segmenting and Analyzing Mixed Indoor/Outdoor Pedestrian GPS Trajectories](#)”. They segment and analyze mixed indoor/outdoor pedestrian GPS trajectories and identify the specific pattern of either environment. Keqiang Liu, Yunjia Wang, and Jian Wang contribute a paper on “[Differential Barometric Altimetry Assists Floor Identification in WLAN Location Fingerprinting Study](#)”, which presents a differential barometric altimetry method to identify floor in consideration of features of WLAN location fingerprinting system. Yuyang Geng, Shuhang Zhang, Hangbin Wu, and Chaoyang Hu document “[Improved Indoor Positioning System Based on Wi-Fi RSSI: Design and Deployment](#)”, in which a new method added in linear fitting and least square adjustment is used to achieve better positioning results. Chenchen Zhang, Haiyong Luo, Zhaohui Li, Fang Zhao, and Li Deng provide “[A Robust Fingerprinting Localization Algorithm Against Signal Strength Attacks](#)”, in which they achieve robust wireless indoor localization when signal strength attack present on access points. Feng Wang, Haiyong Luo, Zhaohui Li, Fang Zhao, and Deng Li develop “[Activity-Based Smartphone-Oriented Landmark Identification for Localization](#)”, in which they propose an activity recognition method to identify the specific landmarks in indoor area. Wolfgang Kainz and Kristin Müllan propose the “[Navigation of Elderly People in Towns: The ASSISTANT Project](#)” in order to safeguard elder’s social and economic participation in an increasingly ageing society. Dongjin Wu, Linyuan Xia, and Esmond Mok investigate the “[Hybrid Location Estimation by Fusing WLAN Signals and Inertial Data](#)” in which they propose a hybrid location estimation method that fuses WLAN signals and inertial data to maintain the localization accuracy.

Part II investigates progress in *Spatiotemporal Data Acquisition, Processing, and Analysis*. This part includes a contribution from Yunlong Wu and Hui Li on “[Improved Pre-processing Algorithm for Satellite Gravimetry Data Using Wavelet Method](#)”. In this work, they introduced an improved pre-processing algorithm for satellite gravimetry data by calibrate the scale-factors of observations based on

certain regional terrestrial-gravity data. Jinyun Guo, Guowei Li, Qiaoli Kong, Shuyang Wang, and Gan Zong research on the “[On Site Pseudorange Multipath Effect on GPS Surveying](#)”, in which pseudorange multipath effect at the station is computed using the linear combinations of the pseudorange and carrier phase observations, and amount of pseudorange multipath effect at the station is evaluated. Harry Gaitanis and Stephan Winter investigate on “[Is a Richer Address Data Model Relevant for LBS](#)”, in which they suggest a semantically and spatially richer address data model, and study whether this model will significantly improve the accuracy of the geometric analysis in typical location-based services’ tasks. Chi Guo, Jingnan Liu, Yuan Fang, Yi Wan, and Jingsong Cui carry out “[iWISE: A Location-Based Service Cloud Computing System with Content Aggregation and Social Awareness](#)”. In the system, they emphasize on the abilities of location content aggregation and social awareness. Lianbi Yao and Bing Zhou work on the “[Development and Tests of Low Cost MMS](#)”, they develop a low-cost data collecting system consists of a laser cross-section scanner, a GPS receiver and an IMU, and the solution of time synchronization and data processing are discussed.

Part III gathers *Innovative LBS Systems and Application* Gonzalo Rojas and Víctor Muñoz develop “[Twitter-Based Geocollaboration: Geovisualization and Geotagging of Microblogging Messages](#)” which is a web-based model of geocollaboration based on geolocalized tweets. Gang Cheng, Bao Jia, Yuxiang Guo, and Xiaoping Lu investigate “[Intelligent Push Information for Location Based Service Based on Semantic Knowledge](#)”, in which they put forward a way to put information by using all context information to filter the push content, matches the user demand and potential interested information accurately. Likun Yang, Chaode Yan, Qiang Zhu, Shengli Wang, and Wang Guo propose “[A Smart Initial Map Scale Model Based on Distribution of Road Network](#)”, they develop a smart initial map scale method which connects the initial map scale to spatial distribution of road network based on the analysis of users’ map scale operations. Amin Abdalla and Andrew U. Frank develop “[Designing Spatio-Temporal PIM Tools for Prospective Memory Support](#)”, their work presents unifying semantic of various types of activities that allows for aggregation and prospective memory formalization. Min Lu and Masatoshi Arikawa investigate on “[Walking on a Guidebook with GPS: A Framework Geo-Enabling Pages with Illustrated Maps in LBS](#)”, in which they propose a framework to create geo-enabled pages to combine the advantages of positioning-enabled devices and well-designed guidebooks with considering of better user experience in the real world. XiangYu Li, Da Lv, Chen Chen, YuHua Shi, and Chun Liu work on “[Integrated Indoor Location System of QR Code and Its Application Based on Windows Phone](#)”, in which the scanning and recognition characteristics of QR code are tested on the Windows Phone operating system by taking advantage of the storage space information of QR code.

Part IV comprises papers on *Smart Mobile Phone Navigation and LBS Techniques*. Hangbin Wu, Wenchu Yao, Yayun Li, and Lianbi Yao offer a paper on “[Traffic Accident Base-Map Mapping Based on Images and Topographic Maps: Method and Its Application in LBS](#)”, they propose a method which integrates high

resolution satellite images with topographic maps. Mari-Liis Lamp, Rein Ahas, Margus Tiru, Erki Saluveer and Anto Aasa research on “[Mobile Positioning Data in Emergency Management: Measuring the Impact of Street Riots and Political Confrontation on Incoming Tourism](#)”, in which they examine how mobile positioning data can be used for measuring the impacts of short-term events and emergency situations on tourism. Wang Guo, Xiaojun Cheng and Chaode Yan investigate on “[Variable Scale Method and Map Loading Evaluation of Mobile Map](#)”, they proposed an adaptive variable-scale method of mobile map, which is chosen by the shape measurement model. Junhua Wang, Yi Li, and Shouen Fang develop “[Mobile Phone Locator Based Road Black-Spot Alarming Service System](#)”, which is based on mobile phone location data, stopping sight distance model, data smoothing, and error correction.

Part V contemplates contributions on *Data Mining and Knowledge Discovery*. Anahid Basiri, Pouria Amirian, Adam Winstanley, Terry Moore, and Chris Hill investigate on “[Spatial Uncertainty Management in Pedestrian Navigation](#)”, in which they develop a rough set theory-based navigation application, which can provide navigational instructions to users by taking spatial uncertainty into account. Lijuan Shi, and Feifei Xing research on “[Modeling Expressway Travel Time Under Rainfall Conditions Based on GPS Data](#)”, which presents an investigation of the effects of rainfalls with different levels of precipitation intensity on expressway segment travel time with the variation of traffic flow rate.

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Chun Liu

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