Preface

Sustainability is just one word and yet there exists over 300 definitions. The term was originally used in 1987 by the World Commission on Environment and Development, which coined what has become the most often-quoted definition of sustainable development as “forms of progress that meet the needs of the present without compromising the ability of future generations to meet their needs.” In particular, sustainable mobility refers to the needs of society to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological requirements today or in the future (Mobility Project 2030, World Business Council for Sustainable Development). This can only be achieved by establishing a set of principles that provide a framework for policy goals that will change over time, in response to the priorities in the economy (e.g. access to jobs and economic resiliency), social/equity (e.g. mobility choices, health societies, and community legacy) and environment (e.g. climate change, pollution, energy use, landscape, and resource efficiency). The strategies derived from these principles would not only be about the modes people are using, nor only about transportation. They will evolve from the knowledge about the collective movement patterns that are evidence of the human behaviour at different scales.

The proliferation of mobile technologies for “everywhere, anytime” services and applications is already helping in the fulfilment of some of these strategies in travel behaviour, nature preservation, and health monitoring. Recently, Gartner Inc. has identified eight mobile technologies that will evolve significantly through 2010, and will have an impact on short-term sustainable mobility strategies and policies. They are Bluetooth 3.0, Mobile User Interfaces (UIs), Location Sensing, 802.11n, Display Technologies, Mobile Web and Widgets, Cellular Broadband, and Near Field Communication. This book focuses on the use of location sensing technology and its wider applicability in supporting sustainable mobility. Each chapter of the book presents current research on developing innovative approaches for gathering, representing, storing and analysing movement data sets being generated from location sensing technology today.

This book also introduces the latest findings on movement analysis that will open up tremendous opportunities for new movement-aware applications of public utility and large societal and economic impact. Examples of these applications are described in this book and they are strongly related to sustainable mobility, such as health, transportation and spatial planning. They also show the important global trends in location sensing technology, as well as the fostering of cross-disciplinary research on Geographic Information Science. Therefore, we have put together an interdisciplinary and cross-border book with highly qualified authors in Geography, Geomatics, Spatial Planning, Law, Transport Management Mathematics, and Computational Sciences. Specifically, this book offers a unique opportunity for learning about how different techniques are being used to develop new movement-aware applications based on different perspectives from data providers, scientists, application developers, and users.
The inspiration for this book came from the new insights that have emerged from the synergy of the outcomes of two workshops that I have organised within a two-year period. The first workshop was on the Knowledge Discovery for Sustainable Mobility: Challenges and repercussions of discovering behavioural patterns from people in motion, hosted by the Waag Society in Amsterdam, The Netherlands, on September 11th and 12th, 2006. This workshop aimed at getting a community input and feedback on the issues and repercussions of discovering behavioural patterns from people in motion using privacy preserving data mining, spatio-temporal ontologies, and visualisation techniques that could enable innovative movement-aware applications. Specifically, the workshop provided a forum for discussion based on different perspectives from data providers, scientists, application developers, and users. The second workshop was on Mobility Issues in Spatial Data Infrastructures, organised in conjunction with the GEOIDE Annual Conference on June 9th 2007, Halifax, Canada. The aim of this workshop was to address the methodological and technological issues on the gathering and analysis of movement data sets, and its involvement into infrastructures. It provided a basis on which to compare their applicability in a specific context and case studies of how location information is being used in spatial data infrastructure settings.

This book was written to provide a single reference for movement dynamics. The possible range of topics to cover is nearly limitless, therefore we have tried to cover the most important ones, moving from mobile technologies, innovative approaches, new applications and privacy issues. This will be an opportunity for students, researchers and practitioners to acquire new concepts in the production, awareness and sharing (use) of sensors, data, and information products for supporting sustainable mobility.

ORGANISATION OF THIS BOOK

This book is organised into four parts, each devoted to a particular aspect of movement-aware applications for sustainable mobility. Section 1 covers the state-of-art in location sensing technology for tracking and sensing the movement of people with interesting examples on transportation management and health monitoring. Section 2 explores innovative methods developed so far for analysing the human and animal movements. Section 3 is devoted to the implementation of movement-aware services, and the related issues of measuring different levels of anonymity. The main focus is on addressing both technical and legal implications of location sensing technology. Section 4 contains some additional selected readings. Each section of the book consists of four chapters, which one covering relevant background information and some advanced topics, giving full proofs, methodological procedures, and application results in order to help the reader appreciate the utility of the work published in this book. Authors of the chapters have tried as much as possible to introduce the technical background necessary for readers with no expertise in location sensing technology and movement-aware applications.

Monica Wachowicz
Wageningen University and Research Centre, The Netherlands