Introduction

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Since 1971, the Urban Data Management Society (UDMS) has organized international symposia at various locations in Europe to promote the development of information systems at the local government level. At first, the focus of these symposia was mostly on urban applications, but regional and rural issues have both grown in importance over the years. Nowadays, an important aim of UDMS is to provide a forum for people to discuss new approaches, to consider new technologies, and to share practical experiences in the field of urban data management.

After 27 successful symposia, the 28th edition of UDMS was held in Delft, the Netherlands, in September 2011. This is a city and a country that many of the organizers of UDMS have called "home" for years. This year is also special for UDMS since it celebrates its 40th anniversary, which is certainly an experience not to be found elsewhere and a valuable basis on which to form planning for the future. Consequently the theme of UDMS 2011 was "Making contributions to the future".

This book contains a selection of the best papers that were submitted for UDMS 2011. Of the 42 full papers submitted, the Scientific Committee selected the 19 papers that have the highest quality and represent different aspects of the field of urban data management. It should be noticed that each paper was reviewed by two independent reviewers.

The topics covered in this book represent the current trends in urban and regional data management. We have organized the book into four parts: (1) 3D modeling and applications; (2) Data management for local government; (3) Environmental monitoring and assessment; (4) Remote sensing for urban applications.

3D modelling and applications. The use of 3D GIS for urban and regional planning is a growing trend that can be observed by the increasing number of tools available (for example CityGML) and by the increasing number of conferences and workshops dedicated to 3D. As in previous editions of UDMS, the third dimension continues to be one of the most import topics. This volume offers six papers related to the third dimension. The first article draws the attention to a correct and unambiguous definitions of a 3D cadastral objects. Simple 2D plans to defining property rights are gradually replaced by complex 3D spatial definitions, but ambiguity in the definition of a property can lead to expensive legal disputes. The paper proposes an innovative axiomatic approach to the problem. The second paper explores the potential of Building Information Models (BIM) in urban data management. BIM models are increasingly used in construction and design and can be successfully integrated with GIS models, which offers new opportunities for urban management. The third paper presents an interesting 3D approach to represent, analyze and explore the urban rules of French local urban planning schemes. The rules (usually textual) are applied to a structured 3D geographic environment, which allows to assess their influence on the potential construction, floor area ration or to evaluate pre-process building shapes. The last three papers address different aspects of indoor navigation: extending the tagging schema of Open Street Map for indoor environments; a 3D data model to support

individual traveller routing when using public transport, and to consider specific preferences and constrains for the pedestrian part of the journey (mostly indoor); and a framework for indoor navigation of rescuers.

Data management for local government. Data management and information sharing with citizens has been always discussed during UDMS events. Although the focus might be different, e.g. public participation systems, spatial information infrastructures, e-governments or standards for exchange of information, the purpose remains the same, i.e. supporting local governments and informing citizens with the ultimate goal to ensure sustainable development. In this volume six papers address some of these issues. The first paper presents the international project Plan4all, which aims at establishing a European network of public and private organizations involved in spatial planning and regional development. The goal of the project is the definition of a data model for the INSPIRE theme "Land Use". The second paper addresses automatic generalization. The authors argue that the requirements such as to up-to-dateness may get priority over cartographic principles (but the result should remain of acceptable quality). The third paper discusses the importance of volunteers to collect geographic information and options to integrate it with spatial data infrastructures. The last three papers address issues related to improving the dialog with the citizens and engage them in the governing process by applying a systematic approach to collection, reuse and sharing of data and information. All three papers recognize the increased importance of Internet tools and community sites for exchange of information.

Environmental monitoring and assessment. This part contains four papers, which illustrate the use of urban data to monitor and analyze urban processes and phenomena. One paper focus Urban Heat Islands, which have impact on the quality of life and energy consumption in urban settlements. The paper present a methodology for data measurement and estimation to define relationships between factors that play a role in this phenomena. Other paper presents and interesting study on the effects of population growth in Athens. The research reveals that there is lack of open spaces and green areas, although the city can be considered sustainable in terms of transportation. Two papers discuss vulnerability issues. Urban forestry fire protection model is the topic of the third paper in this part. The novelty of the model is the definition of a learning schema, which is based on different factors and aspects of fire causes, including physical, social and behavioral ones. The last paper presents a more general approach of "systemic" vulnerability evaluation, which estimates the relationship between extreme events and direct&indirect consequences of this event on the territorial system.

Remote sensing for urban applications. Although UDMS concentrates mostly on data management, at each event several high quality data collection papers are presented. The papers in this part follow again the 3D trend since these techniques are used to reconstruct and visualize 3D city models. One paper discusses a point-based rendering application, which uses high-speed spatial interpolation using a point cloud to generate VR data. This application called LIDAR VR is intended for real-time visualization of point clouds from urban environments. The second paper presents an innovative incremental method for 3D reconstruction from low-altitude images. The method allows first results to be obtained within a few seconds. The images are acquired by Miniature Unmanned Aerial Vehicles equipped with digital cameras. The last paper discusses a pixel-based classification approach, which extracts urban and non-urban structures from single radar imagery. In this way a global mapping of human settlements can be performed. The study is based on the German TanDEM-X coverages for two years.

This book is intended, and suitable for, different readers, for instance city planners, academics, students, policy makers who are involved public administration and urban planning.

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