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Urban Analytics

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Urban Analytics is a timely book that provides a comprehensive, solid, and accessible introduction to this emerging field. With the recent proliferation of new sources of data about cities and human activities, comes an increasing need for new analytical frameworks that couple methods, tools, and theories from geography, urban planning, and computer science. What particularly drives this need is to be found in the intrinsic characteristics of the new forms of urban data. Unlike conventional authoritative and administrative datasets (e.g. census and survey data) that have been the major source of information and continue to be the gold standard of urban analyses, data generated from social media, Internet-of-Things (IoT) devices, satellite and street-level imagery, among other resources, are typically not carefully designed to address the purpose of urban research. Nor are they initially produced with an intention to reflect how cities work. That is, the majority of new urban datasets are user-generated, often on a voluntary basis, containing several unstructured features (e.g. text in natural language, images, videos, etc.), which could indirectly capture the attitudes and behaviours of people, as well as document their conceptualisations of space and place. Therefore, the extraction of useful information for urban research from such datasets is not as straightforward as it used to be until the recent past, when only limited amounts of structured data were available. In making sense of new data about cities and gaining insight into urban phenomena and peoples' daily spatiotemporal activities, an updated set of methods and software tools is required that better caters to the specific characteristics of contemporary urban data streams. The authors recognize this necessity, as well as the gap in existing literature, and provide a concise overview of a new data-driven approach to urban research, while establishing links to enduring issues in quantitative spatial analysis and planning.

The book is organized around nine chapters, which broadly cover the spectrum of topics and methods that are core to urban analytics. The contents touch upon several subjects relating to the collection and storage of urban data (Chapters 1, 2 and 3), visualization methods (Chapter 4), and more advanced techniques, ranging from geodemographic analysis (Chapter 5) and urban modelling (Chapter 6) to agent-based models (Chapter 7) and network analysis (Chapter 8). The book concludes with an outlook on future directions and themes in the field (Chapter 9). The recent shift from primarily statistics-based to more computationally intensive (or geocomputational) approaches to quantitative geographical analysis, driven by new data resources and the increased computing power, is evident throughout the book. The authors make clear that this transition is neither opposed to classical approaches nor does it aim to replace them. Instead, traditional methods are revisited, so that they better adapt to the specific characteristics of new and emerging urban data, and are blended with techniques primarily from the field of computer science (e.g. machine learning). The latter are adjusted to explicitly incorporate the unique qualities that distinguish spatial from a-spatial data. Another gratifying feature of the book is the inclusion of short interviews with leading experts from both academia and industry, who represent and touch upon various aspects of urban analytics. This variety of perspectives is integral to a field, which is by definition multi and cross-disciplinary. In addition to the content of the book, the authors provide supporting online material, consisting of relevant

exercises in a reproducible code-based format alongside teaching resources, thereby reinfor-cing the educational role of the textbook. The language of the text refrains from emphasizing terminology that is specific to a particular domain, making it an accessible reading for students and professionals from across disciplines.

Given the emerging nature of urban analytics, it is also essential to look further into the future of the field and, more specifically, into topics that could enrich the contents of a next edition of the book. The recent availability of user-generated content, primarily from social media platforms and other web resources, brings a new perspective to a classical urban research theme; namely, the analysis of the sense of place. The concept of place is funda-mental to geography and urban planning. New forms of geosocial data, which often contain textual descriptions of human experiences and perceptions about places, and further link media documents (e.g. images, videos) to specific locations, could open a new frontier in the analysis of place identities. This brings new challenges to urban analytics, relating to the encoding of place-based conceptualisations in spatial databases, their visualisation, and analysis, which blends locational proximity with semantic similarity. Therefore, a welcome addition to the book would be a discussion on how urban analytics could benefit from established techniques in natural language processing, geospatial semantics, and (geo-graphic) information retrieval. Another topic, closely related to the previous subject, is the analysis of ground-level – as opposed to satellite – imagery (available in platforms, such as Google Street View and Mapillary), as well as of images and videos attached to social media posts. Current advancements in computer vision and (deep) machine learning, in combina-tion with crowdsourced annotations, could enable the extraction of insights relating to morphological, perceptual, and other latent features of the urban environment.

Urban analytics is a burgeoning field that has emerged in support of a new kind of data-driven research on cities, and this book is a much-needed gap-filler in the growing, yet currently limited, literature in this area of research. The book consistently bolsters the interdisciplinary nature of the field by blending theories and methods from geography, urban planning and computer science throughout its contents. It is an essential text in educating the next generation of urban analysts who will consist of students and profes-sionals in a range of disciplines, from urban planning, regional science, and geography to transportation engineering, architecture, and spatial econometrics.

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