

1. Record Nr.	UNINA9910141257503321
Autore	Okabe Atsuyuki <1945->
Titolo	Spatial analysis along networks [[electronic resource]] : statistical and computational methods // Atsuyuki Okabe, Kokichi Sugihara
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, 2012
ISBN	1-119-96776-7 1-280-77575-0 9786613686145 1-119-96710-4 1-119-96709-0
Descrizione fisica	1 online resource (308 p.)
Collana	Statistics in practice
Altri autori (Persone)	SugiharaKokichi <1948->
Disciplina	519.5/36
Soggetti	Spatial analysis (Statistics) Spatial analysis (Statistics) - Data processing Geography - Network analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Spatial Analysis along Networks: Statistical and Computational Methods; Contents; Preface; Acknowledgements; 1 Introduction; 1.1 What is network spatial analysis?; 1.1.1 Network events: events on and alongside networks; 1.1.2 Planar spatial analysis and its limitations; 1.1.3 Network spatial analysis and its salient features; 1.2 Review of studies of network events; 1.2.1 Snow's study of cholera around Broad Street; 1.2.2 Traffic accidents; 1.2.3 Roadkills; 1.2.4 Street crime; 1.2.5 Events on river networks and coastlines; 1.2.6 Other events on networks; 1.2.7 Events alongside networks 1.3 Outline of the book 1.3.1 Structure of chapters; 1.3.2 Questions solved by network spatial methods; 1.3.3 How to study this book; 2 Modeling spatial events on and alongside networks; 2.1 Modeling the real world; 2.1.1 Object-based model; 2.1.1.1 Spatial attributes; 2.1.1.2 Nonspatial attributes; 2.1.2 Field-based model; 2.1.3 Vector data model; 2.1.4 Raster data model; 2.2 Modeling networks; 2.2.1 Object-based model for networks; 2.2.1.1 Geometric networks; 2.2.1.2 Graph for a geometric network; 2.2.2 Field-based model for networks;

2.2.3 Data models for networks

2.3 Modeling entities on network space 2.3.1 Objects on and alongside networks; 2.3.2 Field functions on network space; 2.4 Stochastic processes on network space; 2.4.1 Object-based model for stochastic spatial events on network space; 2.4.2 Binomial point processes on network space; 2.4.3 Edge effects; 2.4.4 Uniform network transformation; 3 Basic computational methods for network spatial analysis; 3.1 Data structures for one-layer networks; 3.1.1 Planar networks; 3.1.2 Winged-edge data structures; 3.1.3 Efficient access and enumeration of local information
3.1.4 Attribute data representation 3.1.5 Local modifications of a network; 3.1.5.1 Inserting new nodes; 3.1.5.2 New nodes resulting from overlaying two networks; 3.1.5.3 Deleting existing nodes; 3.2 Data structures for nonplanar networks; 3.2.1 Multiple-layer networks; 3.2.2 General nonplanar networks; 3.3 Basic geometric computations; 3.3.1 Computational methods for line segments; 3.3.1.1 Right-turn test; 3.3.1.2 Intersection test for two line segments; 3.3.1.3 Enumeration of line segment intersections; 3.3.2 Time complexity as a measure of efficiency; 3.3.3 Computational methods for polygons
3.3.3.1 Area of a polygon 3.3.3.2 Center of gravity of a polygon; 3.3.3.3 Inclusion test of a point with respect to a polygon; 3.3.3.4 Polygon-line intersection; 3.3.3.5 Polygon intersection test; 3.3.3.6 Extraction of a subnetwork inside a polygon; 3.3.3.7 Set-theoretic computations; 3.3.3.8 Nearest point on the edges of a polygon from a point in the polygon; 3.3.3.9 Frontage interval; 3.4 Basic computational methods on networks; 3.4.1 Single-source shortest paths; 3.4.1.1 Network connectivity test; 3.4.1.2 Shortest-path tree on a network; 3.4.1.3 Extended shortest-path tree on a network
3.4.1.4 All nodes within a prespecified distance

Sommario/riassunto

In the real world, there are numerous and various events that occur on and alongside networks, including the occurrence of traffic accidents on highways, the location of stores alongside roads, the incidence of crime on streets and the contamination along rivers. In order to carry out analyses of those events, the researcher needs to be familiar with a range of specific techniques. Spatial Analysis Along Networks provides a practical guide to the necessary statistical techniques and their computational implementation. Each chapter illustrates a specific technique, from Stochastic Point Process
