A Spatial Analysis Of Population Growth And Urbanization

Currently, spatial analysis is becoming more important than ever because enormous volumes of spatial data are available from different sources, such as GPS, Remote Sensing, and others. This book deals with spatial analysis and modelling. It provides a comprehensive discussion of spatial analysis, methods, and approaches related to human settlements and associated environment. Key contributions with empirical case studies from Iran, Philippines, Vietnam, Thailand, Nepal, and Japan that apply spatial analysis including autocorrelation, fuzzy, voronoi, cellular automata, analytic hierarchy process, artificial neural network, spatial metrics, spatial statistics, regression, and remote sensing mapping techniques are compiled comprehensively. The core value of this book is a wide variety of results with state of the art discussion including empirical case studies. It provides a milestone reference to students, researchers, planners, and other practitioners dealing the spatial problems on urban and regional issues. We are pleased to announce that this book has been presented with the 2011 publishing award from the GIS Association of Japan. We would like to congratulate the authors!

Generate and Analyze Multi-Level Data Spatial microsimulation involves the generation, analysis, and modeling of individual-level data allocated to geographical zones. Spatial Microsimulation with R is the first practical book to illustrate this approach in a modern statistical programming language. Get Insight into Complex Behaviors The book progresses from the principles underlying population synthesis toward more complex issues such as household allocation and using the results of spatial microsimulation for agent-based modeling. This equips you with the skills needed to apply the techniques to real-world situations. The book demonstrates methods for population synthesis by combining individual and geographically aggregated datasets using the recent R packages ipfp and mipfp. This approach represents the "best of both worlds" in terms of spatial resolution and person-level detail, overcoming issues of data confidentiality and reproducibility. Implement the Methods on Your Own Data Full of reproducible examples using code and data, the book is suitable for students and applied researchers in health, economics, transport, geography, and other fields that require individual-level data allocated to small geographic zones. By explaining how to use tools for modeling phenomena that vary over space, the book enhances your knowledge of complex systems and empowers you to provide evidence-based policy guidance.

Many theories in the social sciences predict spatial dependence or the similarity of behaviors at neighboring locations. Spatial Analysis for the Social Sciences demonstrates how researchers can diagnose and model this spatial dependence and draw more valid inferences as a result. The book is structured around the well-known Galton's problem and presents a step-by-step guide to the application of spatial analysis. The book examines a variety of spatial diagnostics and models through a series of applied examples drawn from the social sciences. These include spatial lag models that capture behavioral diffusion between actors, spatial error models that account for spatial dependence in errors, and models that incorporate spatial heterogeneity in the effects of covariates. Spatial Analysis for the Social Sciences also examines advanced spatial models for time-series cross-sectional data,

categorical and limited dependent variables, count data, and survival data.

Geographers have largely overlooked surnames (family names), and their geographic concentrations, as a valuable source of data to indicate the spatial structure of populations. This thesis seeks to provide a substantive contribution to the geographical literature by demonstrating how quantitative spatial analysis of surname data can be used as an aid to understanding population structure at a range of scales from the regional to the continental. The primary purpose of this research is not to develop detailed case studies or to investigate specific examples of population characteristics considered interesting for their novelty: rather, the core concern is to focus on the identification or confirmation of generalised trends. Much of the current research that uses surnames (for example in population genetics) contains a geographical element, yet stops short of exploiting and accommodating the effect of scale, shape and size of spatial units. The application of computationally intensive spatial analysis techniques to a comprehensive and innovative dataset (see worldnames.publicprofiler.org) makes it possible to address these issues for the first time. The thesis develops and applies a robust analytical and methodological framework for the analysis of surnames as a primary data source. Applications of the research are used to demonstrate the utility of surnames in studies of population genetics, in migration research, as well as in the spatial analysis of large datasets more generally.

Applied Spatial Data Analysis with R, second edition, is divided into two basic parts, the first presenting R packages, functions, classes and methods for handling spatial data. This part is of interest to users who need to access and visualise spatial data. Data import and export for many file formats for spatial data are covered in detail, as is the interface between R and the open source GRASS GIS and the handling of spatio-temporal data. The second part showcases more specialised kinds of spatial data analysis, including spatial point pattern analysis, interpolation and geostatistics, areal data analysis and disease mapping. The coverage of methods of spatial data analysis ranges from standard techniques to new developments, and the examples used are largely taken from the spatial statistics literature. All the examples can be run using R contributed packages available from the CRAN website, with code and additional data sets from the book's own website. Compared to the first edition, the second edition covers the more systematic approach towards handling spatial data in R, as well as a number of important and widely used CRAN packages that have appeared since the first edition. This book will be of interest to researchers who intend to use R to handle, visualise, and analyse spatial data. It will also be of interest to spatial data analysts who do not use R, but who are interested in practical aspects of implementing software for spatial data analysis. It is a suitable companion book for introductory spatial statistics courses and for applied methods courses in a wide range of subjects using spatial data, including human and physical geography, geographical information science and geoinformatics, the environmental sciences, ecology, public health and disease control, economics, public administration and political science. The book has a website where complete code examples, data sets, and other support material may be found: http://www.asdar-book.org. The authors have taken part in writing and maintaining software for spatial data handling and analysis with R in concert since 2003.

Space is increasingly recognized as a legitimate factor that influences many processes and conceptual frameworks, including

notions of spatial coherence and spatial heterogeneity that have been demonstrated to provide substance to both theory and explanation. The potential and relevance of spatial analysis is increasingly understood by an expanding sphere of cogent disciplines that have adopted the tools of spatial analysis. This book brings together major new developments in spatial analysis techniques, including spatial statistics, econometrics, and spatial visualization, and applications to fields such as regional studies, transportation and land use, political and economic geography, population and health. Establishing connections to existing and emerging lines of research, the book also serves as a survey of the field of spatial analysis and its links with related areas.

Providing a practical, comprehensive and up-to-date overview of the use of spatial statistics in epidemiology, this book examines spatial analytical methods in conjunction with GIS and remotely sensed data to provide insights into the patterns and processes that underlie disease transmission.

This is a hands-on book about ArcGIS that you work with as much as read. By the end, using Learn ArcGIS lessons, you'll be able to say you made a story map, conducted geographic analysis, edited geographic data, worked in a 3D web scene, built a 3D model of Venice, and more.

This thesis is designed to test the spatial relationship of atmospheric particulate matter (PM2.5) pollution with neighborhood level socioeconomic characteristics in Los Angeles County, California.

An introductory text for the next generation of geospatial analysts and data scientists, Spatial Analysis: Statistics, Visualization, and Computational Methods focuses on the fundamentals of spatial analysis using traditional, contemporary, and computational methods. Outlining both non-spatial and spatial statistical concepts, the authors present practical applications of geospatial data tools, techniques, and strategies in geographic studies. They offer a problem-based learning (PBL) approach to spatial analysis—containing hands-on problem-sets that can be worked out in MS Excel or ArcGIS—as well as detailed illustrations and numerous case studies. The book enables readers to: Identify types and characterize non-spatial and spatial data Demonstrate their competence to explore, visualize, summarize, analyze, optimize, and clearly present statistical data and results Construct testable hypotheses that require inferential statistical analysis Process spatial data, extract explanatory variables, conduct statistical tests, and explain results Understand and interpret spatial data summaries and statistical tests Spatial Analysis: Statistics, Visualization, and Computational Methods incorporates traditional statistical methods, spatial statistics, visualization, and computational methods and algorithms to provide a concept-based problem-solving learning approach to mastering practical spatial analysis. Topics covered include: spatial descriptive methods, hypothesis testing, spatial regression, hot spot analysis, geostatistics, spatial modeling, and data science.

Scholars have established that our geographic environments—including infrastructure for walking and food availability—contribute to the current obesity epidemic in the United States. However, the relationship between food, walkability, and obesity has largely only been investigated in large urban areas. Further, many studies have not taken an in-depth look at the spatial fabric of walkability, food, and obesity. The purpose of this study was twofold: 1) to explore reliable methods, using sociodemographic census data, for estimating obesity at the neighborhood level in one region of the U.S. made up of rural areas and small towns—southern Illinois; and 2) to investigate the ways that the food environment and walkability correlate with obesity across neighborhoods with different geographies, population densities, and socio-demographic characteristics. This study uses spatial analysis techniques and GIS, chiefly geographically weighted multivariate linear regression and cluster analysis, to estimate obesity at the census block group level. Walkability and the food environment are investigated in

depth before the relationship between obesity and the built environment is analyzed using GIS and spatial analysis. The study finds that the influence of various food and walkability measures on obesity is spatially varied and significantly mediated by socio-demographic factors. The study concludes that the relationship between obesity and the built environment can be studied quantitatively in study areas of any size or population density but an open-minded approach toward measures must be taken and geographic variation cannot be ignored. This work is timely and important because of the dearth of small area obesity data, as well an absence of research on obesogenic physical environments outside of large urban areas.

Whether it is to understand the networks of individuals, the physical makeup of a household or community, or to develop strategies for finding difficult-to-reach populations such as the homeless or drug-addicted, applied researchers increasingly need to understand spatial methods. In this brief volume, the techniques of network analysis, mapping, and finding hidden populations are explained in simple, practical language. The authors describe when and how to use these techniques and offer numerous examples of how the methods have worked in community psychology, drug research, risk assessment, and network analysis, among other settings.

A Coming of Age: Geospatial Analysis and Modelling in the Early Twenty First Century Forty years ago when spatial analysis first emerged as a distinct theme within geography's quantitative revolution, the focus was largely on consistent methods for measuring spatial correlation. The concept of spatial au- correlation took pride of place, mirroring concerns in time-series analysis about similar kinds of dependence known to distort the standard probability theory used to derive appropriate statistics. Early applications of spatial correlation tended to reflect geographical patterns expressed as points. The perspective taken on such analytical thinking was founded on induction, the search for pattern in data with a view to suggesting appropriate hypotheses which could subsequently be tested. In parallel but using very different techniques came the development of a more deductive style of analysis based on modelling and thence simulation. Here the focus was on translating prior theory into forms for generating testable predictions whose outcomes could be compared with observations about some system or phenomenon of interest. In the intervening years, spatial analysis has broadened to embrace both inductive and deductive approaches, often combining both in different mixes for the variety of problems to which it is now applied.

Navigating Time and Space in Population Studies presents innovative approaches to long-standing questions about the diffusion of population and demographic behavior across space and over time. This collection utilizes newly-available historical data along with spatially and temporally explicit analytical methods to evaluate and refine core demographic theories and to pose new questions about mortality and fertility transitions, migration, urbanization, and social inequality. It adds a spatial dimension to the analysis of temporal processes and a temporal element to spatial processes. Chapters cover a broad range of geographical settings, including the United States, Europe, Latin America, and the Islamic world, and span time periods from the eighteenth to twentieth century. Contributors from a variety of disciplines reveal the complexity of factors involved in population processes that spread across space and unfold over time, and demonstrate a rich set of tools with which to explore, analyze, and test the spatial and temporal dynamics of these phenomena. The theories, methods, and substantive findings presented here provide new lenses through which to view time and space in population studies, offering useful models and valuable insights to demographers and other social scientists exploring both historical and contemporary questions about population dynamics anywhere in the world.

The spatial and temporal dimensions of ecological phenomena have always been inherent in the conceptual framework of ecology, but only recently have they been incorporated explicitly into ecological theory, sampling design, experimental design and models. Statistical

techniques for spatial analysis of ecological data are burgeoning and many ecologists are unfamiliar with what is available and how the techniques should be used correctly. This book gives an overview of the wide range of spatial statistics available to analyse ecological data, and provides advice and guidance for graduate students and practising researchers who are either about to embark on spatial analysis in ecological studies or who have started but are unsure how to proceed. Only a basic understanding of statistics is assumed and many schematic illustrations are given to complement or replace mathematical technicalities, making the book accessible to ecologists wishing to enter this important and fast-growing field for the first time.

The ArcGIS Book10 Big Ideas about Applying the Science of whereESRI Press

A description of methods for the analysis of spatial data.

With a unique focus on middle-range theory, this book details the application of spatial analysis to demographic research as a way of integrating and better understanding the different transitional components of the overall demographic transition. This book first details key concepts and measures in modern spatial demography and shows how they can be applied to middle-range theory to better understand people, places, communities and relationships throughout the world. Next, it shows middle-range theory in practice, from using spatial data as a proxy for social science statistics to examining the effect of "fracking" in Pennsylvania on the formation of new coalitions among environmental advocacy organizations. The book also traces future developments and offers some potential solutions to promoting and facilitating instruction in spatial demography. This volume is an ideal resource for advanced undergraduate and graduate students enrolled in courses involving spatial analyses in the social sciences, from sociology and political science to economics and educational research. In addition, scholars and others interested in the role that geographic context plays in relation to their research will find this book a helpful guide in further developing their work.

This is an introductory textbook on spatial analysis and spatial statistics through GIS. Each chapter presents methods and metrics, explains how to interpret results, and provides worked examples. Topics include: describing and mapping data through exploratory spatial data analysis; analyzing geographic distributions and point patterns; spatial autocorrelation; spatial clustering; geographically weighted regression and OLS regression; and spatial econometrics. The worked examples link theory to practice through a single real-world case study, with software and illustrated guidance. Exercises are solved twice: first through ArcGIS, and then GeoDa. Through a simple methodological framework the book describes the dataset, explores spatial relations and associations, and builds models. Results are critically interpreted, and the advantages and pitfalls of using various spatial analysis methods are discussed. This is a valuable resource for graduate students and researchers analyzing geospatial data through a spatial analysis lens, including those using GIS in the environmental sciences, geography, and social sciences.

This volume is devoted to the geographical—or spatial—aspects of population research in regional science, spanning spatial demographic methods for population composition and migration to studies of internal and international migration to investigations of the role of population in related fields such as climate change and economic growth. If spatial aspects

of economic growth and development are the flagship of the regional science discipline, population research is the anchor. People migrate, consume, produce, and demand services. People are the source and beneficiaries of national, regional, and local growth and development. Since the origins of regional science, demographic research has been at the core of the discipline. Contributions in this volume are both retrospective and prospective, offering in their ensemble an authoritative overview of demographic research within the field of regional science.

Integrating a discussion of the application of quantitative methods with practical examples, this book explains the philosophy of the new quantitative methodologies and contrasts them with the methods associated with geography's `Quantitative Revolution' of the 1960s. Key issues discussed include: the nature of modern quantitative geography; spatial data; geographical information systems; visualization; local analysis; point pattern analysis; spatial regression; and statistical inference. Concluding with a review of models used in spatial theory, the authors discuss the current challenges to spatial data analysis. Written to be accessible, to communicate the diversity and excitement of recent thinking, Quantitative Geography will be required reading for students and researchers in any discipline where quantitative methods are used to analyse spatial data. `This is a veritable tour de force of everything that is exciting about quantitative geography and GIS. It is a timely, thorough and exciting account of the state of the art and science of spatial analysis' - Paul Longley, University of Bristol `A highly innovative and up-to-date text. It is unique in its coverage of the many developments that have taken place in the field over the past few years. The book is one that is highly readable and stimulating for those with some background in the field, and its expositional style and many examples will make it stimulating to newcomers as well' - Peter Rogerson, State University of New York at Buffalo `Brings the field thoroughly up to date, integrating modern methods of GIS with a comprehensive and easy-to-read overview of the most recent and powerful techniques of spatial analysis. The book will be valuable to students and researchers in any discipline that seeks to explore or explain phenomena in geographical context, and will make excellent reading for geographers, political scientists, criminologists, anthropologists, geologists, epidemiologists, ecologists, and many others. It offers a spirited challenge to critics of a scientific approach to social science, and demonstrates the value of its subject matter through abundant examples' - Michael Goodchild, National Center for Geographic Information and Analysis, University of California, Santa Barbara `There is a view within some parts of academic geography that what used to be called "quantitative geography" is dead, having been subsumed within "geographical information systems" or else of no continuing interest. This book should correct this view. First, it shows that quantitative methods have remained an exciting area of development and, second, it shows that, if anything, they have more relevance to substantive problems of interest than they have ever had. Although not specifically about GIS, it is a book that should be read by everyone

concerned with the analysis of geographical information' - David Unwin, Birkbeck College, University of London Background: West Nile Virus (WNV) is a serious mosquito-borne disease that can potentially lead to death. The purpose of this study is to spatially examine known risk factors for WNV within Georgia at the county level. The study produces maps that relate known WNV cases to high, medium, and low risk factor areas for additional analyses. Methodology: Cartographic visualization and statistical analysis software was used to examine the relationships between: the geographical distribution of age, race, gender, urbanicity, and population density of Georgians in relation to WNV cases by county. Chi-square analysis and odds rations were calculated to determine whether or not associations of risk and the likelihood of WNV case reports were significant. Results: Gender was found to be significantly associated with the distribution of reported WNV cases. Identification of high risk areas throughout the state was determined through the use of Geographic Information System software. Conclusion: Insights into the visual distribution of WNV risk factors throughout the state of Georgia can assist policy makers and public health planners to optimize resources in WNV transmission and prevention abatement and education efforts. This exploratory study provides a critical first glimpse into the distribution of WNV risk factors throughout the state.

Spatial Analysis: Modelling in a GIS Environment Edited by PaulLongley and Michael Batty Digital data and information are usedincreasingly by academics, professionals, local authorities, andgovernment departments. Powerful new technologies, such asgeographic information systems (GIS), are being developed toanalyse such data, and GIS technologies are rapidly becoming partof the emergent world digital infrastructure. This book shows howcomputer methods of analysis and modelling, built around GIS, canbe used to identify ways in which our cities and regions might bebetter planned and understood. The contributors to this book areall actively involved in research using geographic informationsystems. This book will be valuable reading for: * Geographers, researchers, and regional analysts * Population theorists and regional economists with interests inlarge-scale demographic and employment data * Planners and policy-makers who wish to use GIS to improve theirdecision making * Business analysts who wish to explore markets using the mostrecent advances in digital spatial data technology * All those interested in geodemographics Paul Longley is Professor of Geography at the Department ofGeography, University of Bristol, United Kingdom. Michael Batty isProfessor of Spatial Analysis and Planning at the UniversityCollege London. United Kingdom.

The widespread use of Geographical Information Systems (GIS) has significantly increased the demand for knowledge about spatial analytical techniques across a range of disciplines. As growing numbers of researchers realise they are dealing with spatial data, the demand for specialised statistical and mathematical methods designed to deal with spatial data is undergoing a rapid increase. Responding to this demand, The Handbook of Spatial Analysis is a comprehensive

and authoritative discussion of issues and techniques in the field of Spatial Data Analysis. Its principal focus is on: • why the analysis of spatial data needs separate treatment • the main areas of spatial analysis • the key debates within spatial analysis • examples of the application of various spatial analytical techniques • problems in spatial analysis • areas for future research Aimed at an international audience of academics, The Handbook of Spatial Analysis will also prove essential to graduate level students and researchers in government agencies and the private sector.

GIS and the Social Sciences offers a uniquely social science approach on the theory and application of GIS with a range of modern examples. It explores how human geography can engage with a variety of important policy issues through linking together GIS and spatial analysis, and demonstrates the importance of applied GIS and spatial analysis for solving real-world problems in both the public and private sector. The book introduces basic theoretical material from a social science perspective and discusses how data are handled in GIS, what the standard commands within GIS packages are, and what they can offer in terms of spatial analysis. It covers the range of applications for which GIS has been primarily used in the social sciences, offering a global perspective of examples at a range of spatial scales. The book explores the use of GIS in crime, health, education, retail location, urban planning, transport, geodemographics, emergency planning and poverty/income inequalities. It is supplemented with practical activities and datasets that are linked to the content of each chapter and provided on an eResource page. The examples are written using ArcMap to show how the user can access data and put the theory in the textbook to applied use using proprietary GIS software. This book serves as a useful guide to a social science approach to GIS techniques and applications. It provides a range of modern applications of GIS with associated practicals to work through, and demonstrates how researcher and policy makers alike can use GIS to plan services more effectively. It will prove to be of great interest to geographers, as well as the broader social sciences, such as sociology, crime science, health, business and marketing.

Historical GIS is an emerging field that uses Geographical Information Systems (GIS) to research the geographies of the past. Ian Gregory and Paul Ell's study, first published in 2007, comprehensively defines this field, exploring all aspects of using GIS in historical research. A GIS is a form of database in which every item of data is linked to a spatial location. This technology offers unparalleled opportunities to add insight and rejuvenate historical research through the ability to identify and use the geographical characteristics of data. Historical GIS introduces the basic concepts and tools underpinning GIS technology, describing and critically assessing the visualisation, analytical and e-science methodologies that it enables and examining key scholarship where GIS has been used to enhance research debates. The result is a clear agenda charting how GIS will develop as one of the most important approaches to scholarship in historical geography.

Health service providers have raised concerns about the difficulties in meeting the needs of the increasing numbers of humanitarian arrivals across Melbourne, Victoria. This report aims to provide quantitive evidence to inform policy and planning. Drawing on several national data sets, it maps the spatial location of recent humanitarian arrivals and presents detailed information on visa categories within locations, countries of birth, languages spoken, and changes to settlement patterns over time. Qualitative information from service providers is also discussed. The report concludes with recommendations concerning key growth areas, housing and interpreter support needs, and general practitioner training. A summary report and 'postcard' version are also published.

Presenting current research on spatial epidemiology, this book covers topics such as exposure, chronic disease, infectious disease, accessibility to health care settings and new methods in Geographical Information Science and Systems. For epidemiologists, and for the management and administration of health care settings, it is critical to understand the spatial dynamics of disease. Spatial epidemiology relies increasingly on new methodologies, such as clustering algorithms, visualization and space-time modelling, the domain of Geographic Information Science. Implementation of those techniques appears at an increasing pace in commercial Geographic Information Systems, alongside more traditional techniques that are already part of such systems. This book provides the latest methods in GI Science and their use in health related problems.

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