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Research Methods in Remote Sensing

 Springer

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Dedicated to research and researchers

Preface

In the early days of remote sensing, concerns of research were primarily ranged over contemporary physical and biological (biophysical) space and their arrangements as they could be documented. The methods that were used to explain, model, and predict different biophysical aspects became progressively more quantitative. Further, the new technologies and theoretical perspectives that emerged in the past few decades helped to redefine the objects of inquiry and extend the methods in use for collecting and analyzing remote sensing data and evaluating researches.

Being a blend of science, art, and technology, and being multidisciplinary in nature, remote sensing generally associates complex nonlinear research methods. Remote sensing has many different sensors and a wide variety of application areas. As a result, the research methods in this emerging field became more complicated and diverse. With the advent of new generation sensors and computer-based techniques for image analysis, remote sensing imageries are now being used more and more in several new folds of scientific researches. Because of its vastness, often, remote sensing becomes a distinct field of study rather than being utilized as a tool in a scientific field. As a result, new researchers in this field often get confused and overlook several issues important to be considered.

This book is an introduction to research methods in remote sensing. A research method is a way of collecting and analyzing the data. This sounds very ‘nuts and bolts’, but there is no way to properly engage in research (or in methods) without also tackling some of the fundamental theoretical questions. These questions are philosophical in nature, e.g., ontology, epistemology, paradigm, ethics, etc. This book is to furnish the overall concepts of research methods in Remote Sensing; starting from the theoretical ontology to the documentation of research. This book, therefore, covers the theory while providing a solid basis for engaging in concrete research activities. This book is not intended to become a textbook of remote sensing; rather, it has the intention to guide a researcher in conducting their research by documenting the issues that are generally not covered by a textbook.

The book is comprised with eight chapters. [Chapter 1](#) is mainly aimed to document the definitions and overview. It begins with the definition and application areas of remote sensing of the earth’s surface, and proceeds toward the research types and research framework in the light of remote sensing. [Chapter 2](#) is intended

to discuss the entire research framework—ontology, epistemology, paradigm, methodology, methods, conclusions, and recommendations. [Chapter 3](#) is aimed to discuss the data and their collection/selection methods and related issues. First it discusses the factors influencing the selection of remote sensing data for different types of applications; and then it addresses the ground truth and other ancillary data. [Chapter 4](#) emphasizes the general discussion of remote sensing data analysis. This chapter is based on concepts rather than tools and techniques; constraints and freedoms are also addressed in context. [Chapter 5](#) deals with the research design and its parts—sampling design, observational design, analytical design, and operational design. [Chapter 6](#) helps to understand the nature of power and politics and the critical role of ethics in scientific research, especially remote sensing research. [Chapter 7](#) is aimed to discuss the methods and issues involved in documenting a research outcome. It is a guide on how to write a research paper, dissertation, and thesis.

This book will be of value for the remote sensing researchers from many disciplines. Masters and Ph.D. students of remote sensing will appreciate this book to conduct their researches. This book may help the academicians for preparing lecture notes and delivering lectures. Industry professionals may also be benefited from the discussed methods along with numerous citations. The physical baggage of this book has been kept to a minimum in order to maximize accessibility and readability by a large segment of researchers in the field of remote sensing.

Acknowledgments

I am grateful to all the authors of the numerous books and research publications mentioned in the list of references at the end of each chapter. These valuable literatures formed the foundation of this book. I express my gratitude to those teachers, researchers, and organizations for their contributions that reinforced my knowledge.

I would then like to express my profound gratitude to Prof. Rana Dattagupta, Former Director, CAD Centre, Jadavpur University, and Prof. Sivaji Bandyopadhyay, Director, CAD Centre, Jadavpur University, for extending all possible facilities to write this book.

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Basudeb Bhatta

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