

physical fundamentals of remote sensing

[#remote sensing physics](#) [#physical principles remote sensing](#) [#electromagnetic spectrum remote sensing](#) [#remote sensing fundamentals](#) [#spectral signatures](#)

This resource delves into the physical fundamentals of remote sensing, exploring the core remote sensing physics that govern how data is acquired and interpreted. Understand the electromagnetic spectrum's role in remote sensing applications, decipher spectral signatures, and grasp the physical principles remote sensing technologies rely on, providing a solid foundation in remote sensing fundamentals.

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Physical Fundamentals of Remote Sensing

Ten years ago the author, together with eight co-authors, edited a textbook Remote Sensing for Environmental Sciences within the series on Ecological Studies of Springer-Verlag. At that time there were not yet many books available on remote sensing. The decade that has elapsed was marked by a spectacular development in this field. This development took place in many directions: by widening the areas of application, by improvements of the methods and the sensors, by the introduction of new versatile platforms, but also by deepening the knowledge of the theoretical foundations. This evolution improved the ability to explain the interaction between electromagnetic radiation and natural objects, which, in its turn, allowed for better modelization and for the creation of refined mathematical tools in the processing of remotely sensed data and in the determination of the physical status of remote objects. The community of research workers engaged in development and use of remote sensing methods changed accordingly from a modest group of scientists in the early 1970's to a considerable branch of specialized and interdisciplinary activity. The training of students had to be adapted to cope with the increasing number of people entering this new field and with the increasing quality of the material to be presented.

Physical Principles of Remote Sensing

Fully updated and containing significant new material on photography, laser profiling and image processing, the third edition of this popular textbook covers a broad range of remote sensing applications and techniques across the Earth, environmental and planetary sciences. It focuses on physical principles, giving students a deeper understanding of remote sensing systems and their possibilities, while remaining accessible to those with less mathematical training by providing a step-by-step approach to

quantitative topics. Boxed examples, additional photos and numerous colour images engage students and show them how the theory relates to the many real-world applications. Chapter summaries, review questions and additional problems allow students to check their understanding of key concepts and practise handling real data for themselves. Supplementary online material includes links to freely available software, animations, computer programs, colour images and other web-based resources of interest.

Fundamentals of Remote Sensing

This book presents the fundamental concepts covering various stages of remote sensing from data collection to end utilization, so that it can be appreciated irrespective of the discipline in which the reader has graduated. The physical principles on which remote sensing are based has been explained without getting into complicated mathematical equations.

Physical Principles of Remote Sensing

Revised and expanded second edition introduction to remote sensing for students and researchers.

Physical Principles of Remote Sensing

An introduction to the physical principles underlying Earth remote sensing. The development of space-borne remote sensing technology has led to a new understanding of the complexity of our planet by allowing us to observe Earth and its environments on spatial and temporal scales that are unavailable to terrestrial sensors. Remote Sensing Physics: An Introduction to Observing Earth from Space is a graduate-level text that examines the underlying physical principles and techniques used to make remote measurements, along with the algorithms used to extract geophysical information from those measurements. Volume highlights include: Basis for Earth remote sensing including ocean, land, and atmosphere Description of satellite orbits relevant for Earth observations Physics of passive sensing, including infrared, optical and microwave imagers Physics of active sensing, including radars and lidars Overview of current and future Earth observation missions Compendium of resources including an extensive bibliography Sample problem sets and answers available to instructors The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity. Its publications disseminate scientific knowledge and provide resources for researchers, students, and professionals.

Remote Sensing Physics

Remote Sensing plays a key role in monitoring the various manifestations of global climate change. It is used routinely in the assessment and mapping of biodiversity over large areas, in the monitoring of changes to the physical environment, in assessing threats to various components of natural systems, and in the identification of priority areas for conservation. This book presents the fundamentals of remote sensing technology, but rather than containing lengthy explanations of sensor specifications and operation, it concentrates instead on the application of the technology to key environmental systems. Each system forms the basis of a separate chapter, and each is illustrated by real world case studies and examples. Readership The book is intended for advanced undergraduate and graduate students in earth science, environmental science, or physical geography taking a course in environmental remote sensing. It will also be an invaluable reference for environmental scientists and managers who require an overview of the use of remote sensing in monitoring and mapping environmental change at regional and global scales. Additional resources for this book can be found at: <http://www.wiley.com/go/purkis/remote>.

Remote Sensing and Global Environmental Change

Fundamentals of Satellite Remote Sensing: An Environmental Approach, Second Edition is a definitive guide to remote sensing systems that focuses on satellite-based remote sensing tools and methods for space-based Earth observation (EO). It presents the advantages of using remote sensing data for studying and monitoring the planet, and emphasizes co

Fundamentals of Satellite Remote Sensing

Taking a detailed, non-mathematical approach to the principles on which remote sensing is based, this book progresses from the physical principles to the application of remote sensing.

Introduction to Environmental Remote Sensing

The most comprehensive description of the physical foundations of methods and instruments in the fields of passive remote sensing applied to investigations of the Earth, Solar system bodies and space. Emphasis is placed on the physical aspects necessary to judge the possibilities and limitations of passive remote sensing methods in specific observation cases. Numerous practical applications and illustrations are given referring to airspace up-to-date experiments. Due to the lack in traditional separation on methods and instruments of remote sensing of the Earth and outerterrestrial space this book aims to supply more information in this field.

Passive Microwave Remote Sensing of the Earth

This book presents a comprehensive selection of applications employed in environmental remote sensing using optical and thermal infrared satellite-sensors aiming to map natural resources, crops, groundwater, surface water, aquatic ecosystem, land degradation, air quality, renewable energy, regional resources, and climate-related geophysical processes. The technologies presented in this book also include satellite images, space-borne radar sensors focusing on the most versatile one, data from synthetic aperture radar (SAR), scatterometers and radar altimeters in Egypt. This volume also presents a thorough explanation of the remote sensing role showing physical fundamentals of the climate change phenomenon including gas emissions, and the impact on resources concerning the sustainable development of Egypt. Besides, the book includes an analysis of oil pollution in both Mediterranean and Red Seas This book is intended for environmental policymakers working in Egypt as well as scientists working with remote sensing technologies in highly populated arid regions.

Environmental Remote Sensing in Egypt

Theoretical foundations of atmospheric remote sensing are electromagnetic theory, radiative transfer and inversion theory. This book provides an overview of these topics in a common context, compile the results of recent research, as well as fill the gaps, where needed. The following aspects are covered: principles of remote sensing, the atmospheric physics, foundations of the radiative transfer theory, electromagnetic absorption, scattering and propagation, review of computational techniques in radiative transfer, retrieval techniques as well as regularization principles of inversion theory. As such, the book provides a valuable resource for those who work with remote sensing data and want to get a broad view of theoretical foundations of atmospheric remote sensing. The book will be also useful for students and researchers working in such diverse fields like inverse problems, atmospheric physics, electromagnetic theory, and radiative transfer.

Foundations of Atmospheric Remote Sensing

Addressing the need for updated information in remote sensing, Introduction to Remote Sensing, Second Edition provides a full and authoritative introduction for scientists who need to know the scope, potential, and limitations in the field. The authors discuss the physical principles of common remote sensing systems and examine the processin

Introduction to Remote Sensing

Remote Sensing of Landscapes with Spectral Images describes how to process and interpret spectral images using physical models to bridge the gap between the engineering and theoretical sides of remote-sensing and the world that we encounter when we venture outdoors. The emphasis is on the practical use of images rather than on theory and mathematical derivations. Examples are drawn from a variety of landscapes and interpretations are tested against the reality seen on the ground. The reader is led through analysis of real images (using figures and explanations); the examples are chosen to illustrate important aspects of the analytic framework. This textbook will form a valuable reference for graduate students and professionals in a variety of disciplines including ecology, forestry, geology, geography, urban planning, archaeology and civil engineering. It is supplemented by a

website hosting digital colour versions of figures in the book as well as ancillary images: www.cambridge.org/9780521662214.

Remote Sensing of Landscapes with Spectral Images

An accessible yet rigorous introduction to remote sensing and its application to the study of vegetation for advanced undergraduate and graduate students. The underlying physical and mathematical principles of the techniques discussed are explained in a way readily understood by those without a strong mathematical background.

Remote Sensing of Vegetation

This popular book introduces the fundamentals of remote sensing from an earth resource (versus engineering) perspective. The author emphasizes the use of remote sensing data for useful spatial biophysical or socio-economic information that can be used to make decisions. Provides two new chapters on LIDAR Remote Sensing (Ch. 10) and In situ Spectral Reflectance Measurement (Ch. 15). Offers a thorough review of the nature of electromagnetic radiation, examining how the reflected or emitted energy in the visible, near-infrared, middle-infrared, thermal infrared, and microwave portions of the spectrum can be collected by a variety of sensor systems and analyzed. Employs a visually stimulating, clear format: a large (8.5" x 11") format with 48 pages in full color facilitates image interpretation; hundreds of specially designed illustrations communicate principles in an easily understood manner. A useful reference for agriculture, wetland, and/or forestry professionals, along with geographers, urban planners, and transportation engineers.

Remote Sensing of the Environment

Focusing on land objects, this textbook for an advanced undergraduate or graduate course describes both the fundamentals of the theory of remote sensing as well as the application of this technique to the fields of agriculture, forestry, land use, land evaluation, agrohydrology, irrigation, nature conservation, and environmental pollution control. An updated translation of the 1990 Dutch edition. Annotation copyright by Book News, Inc., Portland, OR

Land Observation by Remote Sensing

Fundamentals of Satellite Remote Sensing: An Environmental Approach, Third Edition, is a definitive guide to remote sensing systems that focuses on satellite-based remote sensing tools and methods for space-based Earth observation (EO). It presents the advantages of using remote sensing data for studying and monitoring the planet, and emphasizes concepts that make the best use of satellite data. The book begins with an introduction to the basic processes that ensure the acquisition of space-borne imagery, and provides an overview of the main satellite observation systems. It then describes visual and digital image analysis, highlights various interpretation techniques, and outlines their applications to science and management. The latter part of the book covers the integration of remote sensing with Geographic Information System (GIS) for environmental analysis. This latest edition has been written to reflect a global audience and covers the most recent advances incorporated since the publication of the previous book, relating to the acquisition and interpretation of remotely sensed data. New in the Third Edition: Includes additional illustrations in full color. Uses sample images acquired from different ecosystems at different spatial resolutions to illustrate different interpretation techniques. Includes updated EO missions, such as the third generations of geostationary meteorological satellites, the new polar orbiting platforms (Suomi), the ESA Sentinels program, and high-resolution commercial systems. Includes extended coverage of radar and LIDAR processing methods. Includes all new information on near-ground missions, including unmanned aerial vehicles (UAVs). Covers new ground sensors, as well as machine-learning approaches to classification. Adds more focus on land surface characterization, time series, change detection, and ecosystem processes. Extends the interactions of EO data and GIS that cover different environmental problems, with particular relevance to global observation. Fundamentals of Satellite Remote Sensing: An Environmental Approach, Third Edition, details the tools that provide global, recurrent, and comprehensive views of the processes affecting the Earth. As one of CRC's Essential titles, this book stands out as one of the best in its field and is a must-have for researchers, academics, students, and professionals involved in the field of environmental science, as well as for libraries developing collections on the forefront of this industry.

Fundamentals of Satellite Remote Sensing

Introduction to Remote Sensing: Digital Image Processing and Applications presents a unique text-book/downloadable resources package. It explains how digital images can be processed and offers practical hands-on experience of image processing. This package, which is ideal for student self-study, institutional or library purchase, shows how digital images can be processed to maximize information output and discusses a range of environmental monitoring techniques. A range of case studies are explored, drawn from a variety of disciplines and from across the world. The book also includes a practical manual of image processing instruction and detailed practical exercises to support the unique downloadable resources which accompanies the book. The downloadable resources contain fully functioning image processing software - a limited edition of DRAGON software developed specifically for readers of Introductory Remote Sensing - and over 70 satellite digital datasets for 9 scenes across America, Ireland, China, Sudan, Peru, Western Europe and the UK.

Introductory Remote Sensing Principles and Concepts

Remote sensing has been defined as the detection, recognition or evolution of objects by means of distant sensing or recording devices. Historically, it developed quickly from technology of aerial photo-interpretation science. In recent decades, remote sensing technology has emerged to support data collection and analysis methods of potential interest. Besides, it holds importance for forest management and many other fields. Remote Sensing and Geographical Information Systems (GIS) deal with mapping technology, concepts of maps and all relevant terminology, which are necessary for the beginners to develop their skills in this new and upcoming technology. This book provides basic principles and techniques of remote sensing, microwave remote sensing, remote sensing platforms and sensors and data analysis techniques. Further, the book also covers GIS data quality issues, GIS data analyses and modelling, attributes of data management, GIS data input and editing, integration and linkage of remote sensing and GIS. The subject matter of the book has been divided into 23 chapters to provide focused attention to each aspect of remote sensing from fundamental considerations and processes to electromagnetic radiations, their properties and applications to observation satellites and hydrospheric sciences. An exclusive chapter has been devoted to natural hazards. All natural hazards are amenable in some degree to study by remote sensing because nearly all geologic, hydraulic and atmospheric phenomena that create hazardous situations are recurring events or processes that leave evidence of their previous occurrence. This evidence can be recorded, analysed and integrated into the planning process. All the topics have been covered in a cogent and lucid style to help the reader grasp the information quickly and easily. Glossary and Index have been provided at the end for quick reference. Diagrams, figures and tables supplement the text. The book is essential reading for all students and teachers of geology, earthquake engineering, life sciences, biotechnologies, bioinformatics, environment science, and research scholars in remote sensing and allied fields.

Fundamentals of Remote Sensing

Aims to present remote sensing as it applies to environmental monitoring. It features mineral and petroleum remote-sensing. There is a focus on multispectral applications and digital photogrammetry. Ratio codes and brightness codes are included in an appendix. This has reduced the spectra of minerals to simple, one-digit-per-band codes, helping the user select the best bands or ratios to highlight a mineral. Imaging gases, especially methane, have been included. With the book, students can perform elevation extraction from digitized stereo pairs. Case studies appear throughout the text, allowing students to see how remote-sensing is used in petroleum and mining companies.

Fundamentals of Geological and Environmental Remote Sensing

This book is a completely updated, greatly expanded version of the previously successful volume by the author. The Second Edition includes new results and data, and discusses a unified framework and rationale for designing and evaluating image processing algorithms. Written from the viewpoint that image processing supports remote sensing science, this book describes physical models for remote sensing phenomenology and sensors and how they contribute to models for remote-sensing data. The text then presents image processing techniques and interprets them in terms of these models. Spectral, spatial, and geometric models are used to introduce advanced image processing techniques such as hyperspectral image analysis, fusion of multisensor images, and digital elevation model extraction from stereo imagery. The material is suited for graduate level engineering, physical and natural science courses, or practicing remote sensing scientists. Each chapter is enhanced by student exercises

designed to stimulate an understanding of the material. Over 300 figures are produced specifically for this book, and numerous tables provide a rich bibliography of the research literature.

Remote Sensing

This book focuses on the mathematical and physical foundations of remote sensing digital image processing and introduces key algorithms utilized in this area. The book fully introduces the basic mathematical and physical process of digital imaging, the basic theory and algorithm of pixel image processing, and the higher-order image processing algorithm and its application. This book skillfully and closely integrates theory, algorithms, and applications, making it simple for readers to understand and use. Researchers and students working in the fields of remote sensing, computer vision, geographic information science, electronic information, etc., can profit from this book. For their work and research in digital image processing, they can master the fundamentals of imaging and image processing techniques.

Math Physics Foundation of Advanced Remote Sensing Digital Image Processing

The public's serious concern about the uncertainties and dangers of the consequences of human activities on environmental quality demands policies to control the situation and to prevent its deterioration. But far-reaching decisions on the environmental policy are impaired or even made impossible as long as the relevant ecological relations are not sufficiently understood and large-scale quantitative information on the most important parameters is not available in sufficient quality and quantity. The techniques of remote sensing offer new ways of procuring data on natural phenomena with three main advantages - the large distance between sensor and object prevents interference with the environmental conditions to be measured, - the potentiality for large-scale and even global surveys yields a new dimension for the investigations of the environmental parameters, - the extremely wide, spectral range covered by the whole diversity of sensors discloses many properties of the environmental media not detectable within a single wave band (as e.g. the visible). These significant additions to the conventional methods of environmental studies and the particular qualification of several remote sensing methods for quantitative determination of the natural parameters makes this new investigation technique an important tool both to the scientists studying the ecological relationship and the administration in charge of the environmental planning and protection.

Remote Sensing for Environmental Sciences

This textbook is one of the first to explain the fundamentals and applications of remote sensing at both undergraduate and graduate levels. Topics include definitions and a brief history of payloads and platforms, data acquisition and specifications, image processing techniques, data integration and spatial modeling, and a range of applications covering terrestrial, atmospheric, oceanographic and planetary disciplines. The policy and law issues of remote sensing and the future trends on the horizon are also covered. Remote sensing is an exciting, dynamic technology that is transforming the Earth sciences – terrestrial, atmospheric, and marine – as well as the practices of agriculture, disaster response, engineering, natural resources, providing evidence in legal cases and documented humanitarian crises, and many other fields. Increasingly, understanding of these techniques will be central to a number of disciplines, particularly as the technology advances.

Remote Sensing : Principles and Interpretation

Computer Processing of Remotely-Sensed Images A thorough introduction to computer processing of remotely-sensed images, processing methods, and applications Remote sensing is a crucial form of measurement that allows for the gauging of an object or space without direct physical contact, allowing for the assessment and recording of a target under conditions which would normally render access difficult or impossible. This is done through the analysis and interpretation of electromagnetic radiation (EMR) that is reflected or emitted by an object, surveyed and recorded by an observer or instrument that is not in contact with the target. This methodology is particularly of importance in Earth observation by remote sensing, wherein airborne or satellite-borne instruments of EMR provide data on the planet's land, seas, ice, and atmosphere. This permits scientists to establish relationships between the measurements and the nature and distribution of phenomena on the Earth's surface or within the atmosphere. Still relying on a visual and conceptual approach to the material, the fifth edition of this successful textbook provides students with methods of computer processing of remotely sensed data and introduces them to environmental applications which make use of remotely-sensed images.

The new edition's content has been rearranged to be more clearly focused on image processing methods and applications in remote sensing with new examples, including material on the Copernicus missions, microsatellites and recently launched SAR satellites, as well as time series analysis methods. The fifth edition of Computer Processing of Remotely-Sensed Images also contains: A cohesive presentation of the fundamental components of Earth observation remote sensing that is easy to understand and highly digestible. Largely non-technical language providing insights into more advanced topics that may be too difficult for a non-mathematician to understand. Illustrations and example boxes throughout the book to illustrate concepts, as well as revised examples that reflect the latest information. References and links to the most up-to-date online and open access sources used by students. Computer Processing of Remotely-Sensed Images is a highly insightful textbook for advanced undergraduates and postgraduate students taking courses in remote sensing and GIS in Geography, Geology, and Earth & Environmental Science departments.

Principles of Applied Remote Sensing

This book is an informative reference, or working textbook, on the mathematics, and general physical and chemical processes behind remote sensor measurements.

Computer Processing of Remotely-Sensed Images

You never had a science teacher like this! Max Axiom is a super-cool super-scientist. Using powers he acquired in a freak accident. Max demonstrates and explains science in ways never before seen in the classroom. Whether shrinking down to size of an

Mathematical Principles of Remote Sensing

The quantitative approach: concept and rationale. Radiation and instrumentation in remote sensing. Fundamentals of pattern recognition in remote sensing. Data processing methods and systems. Biological and physical considerations in applying computer-aided analysis techniques to remote sensor data. Applying the quantitative approach. Useful information from multispectral image data: another look.

Fundamentals of Remote Sensing and Airphoto Interpretation

Taking a detailed, non mathematical approach to two broad areas of principles and applications, this book progresses from the physical principles on which remote sensing is based - equipment, techniques and data analysis -through to the application of remote sensing to both physical phenomena and events, and to human activities and man-made landscapes.

Remote Sensing

1 Introduction.- 2 Remote Sensing: An Overview of Physical Fundamentals.- 3 Obtaining Remote-sensing Data.- 3.1 Satellite-based Methods.- 3.2 Aircraft-based Methods.- 3.2.1 Aerial Photographs.- 3.2.2 Nonphotographic Imaging Sensors.- 4 The Use of Remote Sensing in Waste Disposal Site Investigation.- 4.1 Investigative Objectives and Interpretative Criteria.- 4.2 Case Studies.- 4.2.1 Characterization of a Waste Disposal Site.- 4.2.2 Exploring the Immediate Vicinity Around a Waste Disposal Site.- 4.2.3 Subsurface Characteristics of a Waste Disposal Site.- 4.2.4 The Search for New Waste Disposal Sites.- 5 Verification of Remotely Sensed Data.- 5.1 Introduction.- 5.2 Virtual Versus In-Situ Verification.- 5.3 Verification of Vegetation Data.- 6 Case Studies.- 6.1 Introduction.- 6.2 Archival Aerial Photographs Used to Evaluate the Subsurface of Waste Disposal Sites (Arnstadt, Germany).- 6.2.1 Introduction and Problem Description.- 6.2.2 Geophysical Investigations.- 6.2.3 Interpretation of Aerial Photographs.- 6.2.4 Summary.- 6.3 Airborne Remote Sensing to Characterize Waste Disposal Sites (Schoeneiche, Germany).- 6.3.1 Introduction and Problem Description.- 6.3.2 Interpretation of Aerial Photographs and Scanner Images.- 6.3.3 Summary.- 6.4 Thermal Remote Sensing to Detect Buried Waste Material (Oak Ridge, U.S.A.).- 6.4.1 Introduction.- 6.4.2 Background.- 6.4.3 Imagery Analysis.- 6.4.4 Ground Data.- 6.4.5 Conclusions.- 6.5 Remote Sensing for Monitoring the Effects of Mining in Sudbury, Canada.- 6.5.1 Introduction.- 6.5.2 Sudbury Case Study.- 6.5.3 Summary.- 6.6 Multispectral Remote Sensing to Characterize Mine Waste (Cripple Creek and Goldfield, U.S.A.).- 6.6.1 Introduction.- 6.6.2 Investigation Methodology.- 6.6.3 Case Studies.- 6.6.4 Prioritizing Waste Site Investigations Based on Remote Sensing.- 6.6.5 Summary.- 6.7 Applications of Imaging Spectroscopy Data: A Case Study at Summitville, Colorado.- 6.7.1 Introduction.- 6.7.2 Imaging Spectrometer Data.- 6.7.3 Data Analysis.-

6.7.4 Verification of Imaging Spectrometer Data and Results.- 6.7.5 Mapping Minerals.- 6.7.6 Mapping Vegetation.- 6.7.7 Senescence/Stress Mapping.- 6.7.8 Conclusions.- Epilogue.- Acknowledgements.- Sources of Maps, Photos, and Images.- Glossary of Frequently Used Abbreviations.- References.- Additional References.

Introduction to Environmental Remote Sensing

A volume in the three-volume Remote Sensing Handbook series, Remote Sensing of Water Resources, Disasters, and Urban Studies documents the scientific and methodological advances that have taken place during the last 50 years. The other two volumes in the series are Remotely Sensed Data Characterization, Classification, and Accuracies, and Land Reso

Remote Sensing for Site Characterization

Now in full color, the sixth edition of this leading text features new chapters on remote sensing platforms (including the latest satellite and unmanned aerial systems), agriculture (including agricultural analysis via satellite imagery), and forestry (including fuel type mapping and fire monitoring). The book has introduced tens of thousands of students to the fundamentals of collecting, analyzing, and interpreting remotely sensed images. It presents cutting-edge tools and practical applications to land and water use analysis, natural resource management, climate change adaptation, and more. Each concise chapter is designed as an independent unit that instructors can use in any sequence. Pedagogical features include over 400 figures, chapter-opening lists of topics, case studies, end-of-chapter review questions, and links to recommended online videos and tutorials. New to This Edition *Discussions of Landsat 8 and Sentinel-2; the growth of unmanned aerial systems; mobile data collection; current directions in climate change detection, fire monitoring, and disaster response; and other timely topics. *Additional cases, such as river erosion; the impact of Hurricane Sandy on Mantoloking, New Jersey; and Miami Beach as an exemplar of challenges in coastal communities. *Revised throughout with 60% new material, including hundreds of new full-color figures. *New chapters on remote sensing platforms, agriculture, and forestry.

Remote Sensing Handbook - Three Volume Set

Remote sensing is the acquisition of information of an object or phenomenon, by the use of either recording or real-time sensing device(s), that is not in physical or intimate contact with the object (such as by way of aircraft, spacecraft, satellite, buoy, or ship). In practice, remote sensing is the stand-off collection through the use of a variety of devices for gathering information on a given object or area. Human existence is dependent on our ability to understand, utilize, manage and maintain the environment we live in - Geoscience is the science that seeks to achieve these goals. This book is a collection of contributions from world-class scientists, engineers and educators engaged in the fields of geoscience and remote sensing.

Introduction to Remote Sensing

Filling the need for a comprehensive book that covers both theory and application, Remote Sensing of Land Use and Land Cover: Principles and Applications provides a synopsis of how remote sensing can be used for land-cover characterization, mapping, and monitoring from the local to the global scale. With contributions by leading scientists from aro

Advances in Geoscience and Remote Sensing

Advanced imaging spectral technology and hyperspectral analysis techniques for multiple applications are the key features of the book. This book will present in one volume complete solutions from concepts, fundamentals, and methods of acquisition of hyperspectral data to analyses and applications of the data in a very coherent manner. It will help readers to fully understand basic theories of HRS, how to utilize various field spectrometers and bioinstruments, the importance of radiometric correction and atmospheric correction, the use of analysis, tools and software, and determine what to do with HRS technology and data.

Remote Sensing of Land Use and Land Cover

Computer Processing of Remotely-Sensed Images An Introduction Second Edition Paul M. Mather School of Geography, The University of Nottingham, UK Remotely-sensed images of the Earth's

surface provide an invaluable source of information about the geographical distribution of natural and cultural features, as well as a record of changes in environmental conditions over decadal time-scales. The second edition of this successful book provides an accessible introduction to the processing and analysis of digital images collected by aircraft and satellite-borne sensors that operate in the visible, infrared and microwave regions of the spectrum. The book begins with a survey of the physical principles of remote sensing, and goes on to consider the nature and sources of remotely-sensed data. A short survey of those aspects of computing that are relevant to remote sensing completes the introductory section of the book. In the remaining five chapters, the author surveys those aspects of image processing and pattern recognition that are relevant to remote sensing applications, including: pre-processing, enhancement, image transforms, and filtering techniques. An extended survey of classification and related methods, including neural networks, fuzzy classifiers and spectral unmixing, forms the final chapter. A unique feature of this book is the provision of a CD-ROM containing software and image data sets. The MIPS image display program provides facilities for image display, enhancement, filtering, classification, and arithmetic. 38 additional programs are provided, covering applications including maximum likelihood classification, spectral unmixing, geometric correction, principal components analysis. All of these programs run on a standard PC using the Windows 95 operating system. In addition, more than 25 image data sets collected by the Landsat MSS and TM, SPOT HRV, NOAA AVHRR and RADARSAT SAR are contained on the CD-ROM, making this book a complete package - textbook, software and data - for advanced undergraduate and Masters courses. It can also be used by postgraduate research students as a survival guide.

Fundamentals of Remote Sensing

Remote sensing today. Electromagnetic radiation at the Earth's surface. Aerial photography. Aerial sensor imagery. Satellite sensor imagery. Image processing. Sources of data. Remote sensing journals and symposia.

Hyperspectral Remote Sensing

Computer Processing of Remotely-Sensed Images