High Resolution Images Of Space

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Space Exploration Springer Science & Business Media
High spatial resolution remote sensing is an area of considerable current interest and builds on developments in object-based image analysis, commercial high-resolution satellite sensors, and UAVs. It captures more details through high and very high resolution images (10 to 100 cm/pixel). This unprecedented level of detail offers the potential extraction of a range of multi-resource management information, such as precision farming, invasive and endangered vegetative species delineation, forest gap sizes and distribution, locations of highly valued habitats, or sub-canopy topographic information. Information extracted in high spatial remote sensing data right after a devastating earthquake can help assess the damage to roads and buildings and aid in emergency planning for contact and evacuation. To effectively utilize information contained in high spatial resolution imagery, High Spatial Resolution Remote Sensing: Data, Analysis, and Applications addresses some key questions: What are the challenges of using new sensors and new platforms? What are the cutting-edge methods for fine-level information extraction from high spatial resolution images? How can high spatial

resolution data improve the quantification and characterization of physical-environmental or human patterns and processes? The answers are built in three separate parts: (1) data acquisition and preprocessing, (2) algorithms and techniques, and (3) case studies and applications. They discuss the opportunities and challenges of using new sensors and platforms and high spatial resolution remote sensing data and recent developments with a focus on UAVs. This work addresses the issues related to high spatial image processing and introduces cutting-edge methods, summarizes state-of-the-art high spatial resolution applications, and demonstrates how high spatial resolution remote sensing can support the extraction of detailed information needed in different systems. Using various high spatial resolution data, the third part of this book covers a range of unique applications, from grasslands to wetlands, karst areas, and cherry orchard trees.

Transfer Learning through Embedding Spaces John Wiley & Sons

Developments in Surface Contamination and Cleaning: Methods for Assessment and Verification of Cleanliness of Surfaces and Characterization of Surface Contaminants, Volume Twelve, the latest release in the Developments in Surface Contamination and Cleaning series, provides best practices on determining surface cleanliness. Chapters include an introduction to the nature and size of particles, a discussion of cleanliness levels, detailed coverage of measurement methods, characterization methods and analytical methods for evaluating surfaces, and an overview of analysis methods for various contaminants. As a whole, the series creates a unique and comprehensive knowledge base for those in research and development in a variety of industries. Manufacturing, quality control and procurement specification professionals in the aerospace, automotive, biomedical, defense, energy, manufacturing, microelectronics, optics and xerography industries will find this book to be very helpful. In addition, researchers in an academic setting will also find these volumes excellent source books. Includes an extensive listing, with a description of available methods for the assessment of surface cleanliness Provides a single source of information on methods for verification of surface cleanliness Serves as a guide to the selection, assessment and verification of methods for specific applications

The Superpower Space Race Independently Published

The two volume set, consisting of LNCS 7728 and 7729, contains the carefully reviewed and selected papers presented at the nine workshops that were held in conjunction with the 11th Asian Conference on Computer Vision, ACCV 2012, in Daejeon, South Korea, in November 2012. From a total of 310 papers submitted, 78 were selected for presentation. LNCS 7728 contains the papers selected for the International Workshop on Computer Vision with Local Binary Pattern Variants, the Workshop on Computational Photography and Low-Level Vision, the Workshop on Developer-Centered Computer Vision, and the Workshop on Background Models Challenge. LNCS 7729 contains the papers selected for the Workshop on e-Heritage, the Workshop on Color Depth Fusion in Computer Vision, the Workshop on Face Analysis, the Workshop on Detection and Tracking in Challenging Environments, and the International Workshop on Intelligent Mobile Vision.

Optical Payloads for Space Missions Springer Nature

Image Restoration: Fundamentals and Advances responds to the need to update most existing references on the subject, many of which were published decades ago. Providing a broad overview of image restoration, this book explores breakthroughs in related algorithm development and their role in supporting real-world applications associated with various scientific and engineering fields. These include astronomical imaging, photo editing, and medical imaging, to name just a few. The book examines how such advances can also lead to novel insights into the fundamental properties of image sources. Addressing the many advances in imaging, computing, and communications technologies, this reference strikes just the right balance of coverage between core fundamental principles and the latest developments in this area. Its content was designed based on the idea that the reproducibility of published works on algorithms makes it easier for researchers to build on each other's work, which often benefits the vitality of the technical community as a whole. For that reason, this book is as experimentally reproducible as possible. Topics covered include: Image denoising and deblurring Different image restoration methods and recent advances such as nonlocality and sparsity Blind restoration under space-varying blur Super-resolution restoration Learning-based methods Multi-spectral and color image restoration New possibilities using hybrid imaging systems Many existing references are scattered throughout the literature, and there is a significant gap between the cutting edge in image restoration and what we can learn from standard image processing textbooks. To fill that need but avoid a rehash of the many fine existing books on this subject, this reference focuses on algorithms rather than theories or applications. Giving readers access to a large amount of downloadable source code, the book illustrates fundamental techniques, key ideas developed over the years, and the state of the art in image restoration. It is a valuable resource for readers at all levels of understanding.

Space Science ABC-CLIO

The Use of High-resolution Space Survey ImagesQuasars and Black Holes

Earth Science and Applications from Space University of Alaska Press This is a comprehensive tutorial on the emerging technology of free-space laser communications (FSLC). The book offers an all-inclusive source of information on the basics of FSLC, and a review of state-of-the-art technologies. Coverage includes atmospheric effects for laser propagation and FSLC systems performance and design. Free-Space Laser Communications is a valuable resource for engineers, scientists and students interested in laser communication systems designed for the atmospheric optical channel.

Remote Sensing from Space The Use of High-resolution Space Survey ImagesQuasars and Black Holes"An introduction to quasars and black holes with information about their formation and characteristics. Includes

diagrams, fun facts, a glossary, a resource list, and an index"--Provided by publisher.Coloring the Universe

Natural and human-induced changes in Earth's interior, land surface, biosphere, atmosphere, and oceans affect all aspects of life. Understanding these changes requires a range of observations acquired from land-, sea-, air-, and space-based platforms. To assist NASA, NOAA, and USGS in developing these tools, the NRC was asked to carry out a "decadal strategy" survey of Earth science and applications from space that would develop the key scientific questions on which to focus Earth and environmental observations in the period 2005-2015 and beyond, and present a prioritized list of space programs, missions, and supporting activities to address these questions. This report presents a vision for the Earth science program; an analysis of the existing Earth Observing System and recommendations to help restore its capabilities; an assessment of and recommendations for new observations and missions for the next decade; an examination of and recommendations for effective application of those observations; and an analysis of how best to sustain that observation and applications system.

NASA Tech Briefs Springer Science & Business Media
This book constitutes the refereed proceedings of the Third International Conference on Scale-Space and Morphology in Computer Vision, Scale-Space 2001, held in Vancouver, Canada in July 2001. The 18 revised full papers presented together with 23 posters were carefully reviewed and selected from 60 submissions. The book addresses all current aspects of scale-space and morphology in the context of computer vision, in particular, vector distance functions, optic flow, image registration, curve evolution, morphological segmentation, scalar images, vector images, automatic scale selection, geometric diffusion, diffusion filtering, image filtering, inverse problems, active contours, etc.

Earth Observation Data Policy and Europe Springer Science & Business Media

When the U.S.S.R. launched the first satellite into Earth orbit on October 4, 1957, a wave of fear and awe shook the world. In the heart of the Cold War, this first satellite was a threatening show of power and the decisive event that led to the infamous space rivalry between the U.S.S.R. and the United States. Launching missile after missile skyward, each superpower goaded its rival with impressive feats in space, each determined to prove to the world its technological superiority. As this engrossing work so clearly shows, it was in this pressure cooker of competition that each country achieved undreamed-of advances, stretching the boundaries of humankind's domain and giving us the first thrilling close-ups of the heavenly bodies in our solar system. The Space Age proved to be a rare instance in history, an era when two nations managed to call on their best and brightest to work single-mindedly toward a goal. Funded by millions of dollars and employing the talents of the top scientists and engineers from universities, the military, and, in the United States, the private sector, the space programs on each side of the Iron Curtain worked with determination and genius to build the incredible craft that would take us to the Moon and beyond. Robert Reeves, a respected historian of the Space Age and contributor to Astronomy, Amateur Astronomy, and Deep Sky Journal, describes the massive power and capabilities of these spaceships. Designed to overcome staggering obstacles, our spaceships accomplished what was once deemed impossible. Both the Soviets and the Americans succeeded in landing craft with amazing precision on the nearly airless surface of the Moon. American space probes touched down on the rocky surface of Mars, while the Soviets succeeded in building probes that could withstand the hellish heat and deadly pressure of the Venusian surface, transmitting photographs and readings that were inaccessible from Earth. Scientists today are still analyzing this invaluable information, deducing the story of our solar system by studying the craters on the Moon, the mysterious channels on Mars, and the nightmarish surface of Venus.

Reeves illuminates the brilliant achievements and bitter tragedies of conquering the inner solar system. Fueled by pride and national honor, funded by politicians, and designed by the leading engineers of the world, each hard-earned mission was at once a political triumph for each nation and a scientific triumph for humankind. Reeves traces this most exciting history from its extraordinary genesis to the present and looks toward future cooperative ventures which will, with funding, luck, and united effort, yield knowledge and adventure beyond our wildest dreams.

How We Get Pictures from Space National Academies Press
IMAGE (Imager for Magnetopause-to-Aurora Global Exploration) is the first NASA MIDEX mission and the first mission dedicated to imaging the Earth's magnetosphere. This volume offers detailed descriptions of the IMAGE instrumentation and of the image inversion techniques used to interpret the data. Also included are chapters on the IMAGE science objectives, the spacecraft design and capabilities, science and mission operations, and the processing and distribution of IMAGE's nonproprietary data products.

The James Webb Space Telescope Nova Publishers
On April 24, 1990, the Space Shuttle Discovery lifted off from Kennedy Space Center on the Space Shuttle Program's 35th mission, but this was no ordinary mission. In its payload bay, Discovery was carrying the Hubble Space Telescope, with the objective of putting the telescope into orbit. Despite the costs and initial defects, the Hubble telescope has been a remarkably successful project, furthering astronomers' understanding of the universe more than any other telescope or instrument in history. During its decades in orbit, the versatile telescope has taken high resolution images of objects billions of light years away, giving astronomers a look at the early universe. Along the way it has also taken the most detailed pictures of the solar system, captured the most striking images of star creation and supernovae, and uncovered evidence of phenomena like gamma-ray bursts and dark energy. What made Hubble so crucial is that by escaping Earth's atmosphere, the telescope's views eliminated limitations and interruptions that are a natural part of land-based telescopes. Land-based telescopes are larger, cheaper, and easier to maintain. They are also not vulnerable to the risk of colliding with space junk or fast-moving small meteoric materials. However, even at 11,000 feet, ground-based installations have historically faced atmospheric distortion. The atmosphere blurs the light when a picture is taken through it, and since the 1960s, science has increasingly leaned toward space-based instruments, at first attaching them to balloons and sending them aloft to "carry them above Earth's lower atmosphere." The atmospheric distortion problem with ground telescopes has been largely ameliorated in recent years by the development of "adaptive optics."[1] A ground-based facility can now produce an image as sharp as that of a space telescope. This makes the division of labor between the two a bit clearer. The space instrument provides a wider field of view in addition to fine optical resolution, and it is no longer necessary to use "visual to near-visual"[2] telescopes operating in space. In fact, optical telescope photos are available in high quality for the general public based on NASA technology. Boston Micromachines claims to provide "clearer pictures of celestial objects in deep space than ever before...with 'deformable' mirrors that compensate for atmospheric disturbances and instrument misalignments."[3] Still, scientists need to build space telescopes, not just for high resolution pictures but also to work in wavelengths one cannot observe from Earth. From space, telescopes that work in parts of the non-visual wavelengths provide the only means of viewing x-rays, gamma rays, and extreme ultraviolet rays. Most importantly, they provide "excellent platforms for observing in the far-infrared"[4] spectrum. The Hubble telescope, working in space less than 400 miles above the Earth's surface, produced photos of galaxies previously unseen as they existed only 500 million years before the "Big Bang." It was fortuitous that Hubble outlived its anticipated lifespan by many years, because the launch of its successor, the James Webb Space Telescope, was delayed by 15 years. A launch date of 2007 for the James Webb Space Telescope was the original agenda, but two years prior a "major redesign"[5] became necessary. In another instance, "a ripped sunshield during a practice deployment"[6] set the project back, followed by a series of significant cost overruns.

Space Exploration and Humanity: A Historical Encyclopedia [2 volumes]

Springer

With a fleet of telescopes in space and giant observatories on the ground, professional astronomers produce hundreds of spectacular images of space every year. These colorful pictures have become infused into popular culture; we find them on billboards, in commercials, and on our computers. But they also invite questions: Is this what outer space really looks like? Are the colors real? How are these images made? "Coloring the Universe" uses accessible language to describe how these giant telescopes work, what scientists learn with them, and how they are used to make color images. Both informative and beautiful, this book is filled with brilliant images of deep space as well as an insider s perspective by the people who make them."

Images of the Earth from Space Chronicle Books

Recent progress in artificial intelligence (AI) has revolutionized our everyday life. Many AI algorithms have reached human-level performance and AI agents are replacing humans in most professions. It is predicted that this trend will continue and 30% of work activities in 60% of current occupations will be automated. This success, however, is conditioned on availability of huge annotated datasets to training AI models. Data annotation is a time-consuming and expensive task which still is being performed by human workers. Learning efficiently from less data is a next step for making AI more similar to natural intelligence. Transfer learning has been suggested a remedy to relax the need for data annotation. The core idea in transfer learning is to transfer knowledge across similar tasks and use similarities and previously learned knowledge to learn more efficiently. In this book, we provide a brief background on transfer learning and then focus on the idea of transferring knowledge through intermediate embedding spaces. The idea is to couple and relate different learning through embedding spaces that encode task-level relations and similarities. We cover various machine learning scenarios and demonstrate that this idea can be used to overcome challenges of zero-shot learning, few-shot learning, domain adaptation, continual learning

lifelong learning, and collaborative learning.

The Proceedings of a Symposium Held by Goddard Space Flight Center at New Carrollton, Maryland on March 5-9, 1973: Technical presentations, Section A-B. 2 v CRC Press

The Hubble Space Telescope (HST) has operated continuously since 1990. During that time, four space shuttle-based service missions were launched, three of which added major observational capabilities. A fifth â€" SM-4 â€" was intended to replace key telescope systems and install two new instruments. The loss of the space shuttle Columbia, however, resulted in a decision by NASA not to pursue the SM-4 mission leading to a likely end of Hubble's useful life in 2007-2008. This situation resulted in an unprecedented outcry from scientists and the public. As a result, NASA began to explore and develop a robotic servicing mission; and Congress directed NASA to request a study from the National Research Council (NRC) of the robotic and shuttle servicing options for extending the life of Hubble. This report presents an assessment of those two options. It provides an examination of the contributions made by Hubble and those likely as the result of a servicing mission, and a comparative analysis of the potential risk of the two options for servicing Hubble. The study concludes that the Shuttle option would be the most effective one for prolonging Hubble's productive life.

Quasars and Black Holes CRC Press

The three-volume set LNCS 6891, 6892 and 6893 constitutes the refereed proceedings of the 14th International Conference on Medical Image Computing and Computer-Assisted Intervention, MICCAI 2011, held in Toronto, Canada, in September 2011. Based on rigorous peer reviews, the program committee carefully selected 251 revised papers from 819

submissions for presentation in three volumes. The first volume includes 86 papers organized in topical sections on robotics, localization and tracking and visualization, planning and image guidance, physical modeling and simulation, motion modeling and compensation, and segmentation and tracking in biological images.

Computer Vision - ACCV 2012 Workshops Springer

" [A] glorious, pictorial tour of the universe . . . beginning with photos depicting Earth from space and progressing through . . . the individual planets." —School Library Journal Preface by Bill Nye Take a tour of the universe with this breathtaking collection of photographs from the archives of NASA. Astonishing images of Earth from above, the phenomena of our solar system, and the celestial bodies of deep space will captivate readers and photography lovers with an interest in science, astronomy, and the great beyond. Each extraordinary photograph from the legendary space agency is paired with explanatory text that contextualizes its place in the cosmic ballet of planets, stars, dust, and matter—from Earth's limb to solar flares, the Jellyfish Nebula to Pandora's Cluster. Featuring a preface by Bill Nye, this engaging ebook offers up-close views of our remarkable cosmos, and sparks wonder at the marvels of Earth and space. " Delve into the great beyond with these awe-inspiring photos from NASA's archive." —Entertainment Weekly " Puts some of our most magnificent space imagery in context, and it's enough to make anyone feel like just the tiniest little speck of stardust." —BuzzFeed

A Decade of Hubble Space Telescope Science Cambridge University Press Space Image Processing covers the design and coding of PC software for processing and manipulating imagery obtained by satellites and other spacecraft. Although the contents relate to several scientific and technological fields, it serves as a programming book, providing readers with essential technical information for developing PC applications. The material focuses on images of the planet and other celestial bodies obtained by orbiting and non-orbiting spacecraft. This book is not about raster graphics in general, but about raster graphics processing as it applies to space imagery. Three parts divide the text: 1. Science - background at an introductory level - scientific principles underlying space imagery and its processing - topics related to space and remote sensing. 2. Technology - topics related to space imagery - geodesy, cartography, image data formats, image processing. 3. Programming - code examples for DOS and Windows programming on the PC - consideration of low-level and C++ code - routines with a tutorial and demonstrative purpose.

Developments in Surface Contamination and Cleaning: Volume 12 Chronicle Books

" Might be just the book to bring out your inner astronomer . . . over 250 pages of breathtaking images from the past 50 years of NASA's space exploration." —Parade Preface by Bill Nye This magnificent volume offers a rich visual tour of the planets in our solar system. More than two-hundred breathtaking photographs from the archives of NASA are paired with extended captions detailing the science behind some of our cosmic neighborhood's most extraordinary phenomena. Images of newly discovered areas of Jupiter, fiery volcanoes on Venus, and many more reveal the astronomical marvels of space in engrossing detail. Anyone with an interest in science, astronomy, and the mysteries of the universe will delight in this awe-inspiring guide to the wonders of the solar system. " As you turn through the pages, you're hit with true moments of awe, photos that remind you the power of nature extends beyond our own planet." —Houston Chronicle " Breathtaking pictures show the otherworldly magic of the solar system . . . The images are at once humbling and uplifting: Here in the black void of space is

Saturn's frozen moon, Mimas, white and pitted like a galactic golf ball; here is the tiny golden orb called Io, casting a shadow in a perfect inky circle on the marbled surface of Jupiter; here is the great sun, flames spurting from its surface like plumes." —The Wall Street Journal "[A] gorgeous photographic tour of space . . . The collection is a remarkable reminder of how much has been learned about the planets over the past few decades, solving many mysteries yet introducing many more." —Publishers Weekly

Earth and Space National Academies Press

This book constitutes the refereed proceedings of the 22nd Australasian Joint Conference on Artificial Intelligence, AI 2009, held in Melbourne, Australia, in December 2009. The 68 revised full papers presented were carefully reviewed and selected from 174 submissions. The papers are organized in topical sections on agents; AI applications; computer vision and image processing; data mining and statistical learning; evolutionary computing; game playing; knowledge representation and reasoning; natural language and speech processing; soft computing; and user modelling.

The Use of High-resolution Space Survey Images Elsevier

Geology of the terrestrial planets with implications to astrobiology and mission design /Dirk Schulze-Makuch [und weitere] --Solar dynamics and solar-terrestrial influences /Katya Georgieva --Thedynamics of the plasmasphere /Viviane Pierrard --Flute and balloning modes in the inner magnetosphere of the earth : stability and influence of the ionospheric conductivity /O. K. Cheremnykh, A.S. Parnowski --Paleoshorelines and the evolution of the lithosphere of Mars /Javier Ruiz [und weitere] --Thermal properties and temperature variations in Martian soil analogues /F. Gori, S. Corasaniti --Dealing with potentially hazardous asteroids /Eric W. Elst --Effect of electromagnetic radiation on dynamics of cosmic dust particles /J. Klacka, M. Kocifaj --Magnetic reconnection in the earth's magnetotail : reconstruction method and data analysis /T. Penz [und weitere] --Research on aerodynamics of large bolides /V. P. Stulov --Space weather /Juhani Huovelin.