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Hyperspectral Imaging Hyperspectral Imaging in Agriculture, Food and Environment Processing and Analysis of Hyperspectral Data Advances in Hyperspectral Image Processing Techniques Processing and Analysis of Hyperspectral Data Dimensionality Reduction of Hyperspectral Imagery An Invariant Display Strategy for Hyperspectral Imagery Algorithms for Multispectral and Hyperspectral Imagery Hyperspectral Imagery Hyperspectral Image Analysis Deep Learning for Hyperspectral Image Analysis and Classification 3D Visualization of an Invariant Display Strategy for Hyperspectral Imagery Hyperspectral Remote Sensing and Spectral Signature Applications Hyperspectral imagery warfighting through a different set of eyes Hyperspectral Imaging for Fine to Medium Scale Applications in Environmental Sciences Real-Time Recursive Hyperspectral Sample and Band Processing Hyperspectral Remote Sensing Hyperspectral Remote Sensing Hyperspectral Data Compression Hyperspectral Indices and Image Classifications for Agriculture and Vegetation Hyperspectral Satellites and System Design Hyperspectral Imaging in Agriculture, Food and Environment Hyperspectral Remote Sensing Hyperspectral Data Exploitation The Future of Hyperspectral Imaging Classification of Hyperspectral Remote Sensing Images Field Guide to Hyperspectral/multispectral Image Processing Hyperspectral Imaging Analysis and Applications for Food Quality HYPERSPECTRAL REMOTE SENSING AND SPECTRAL SIGNATURE APPLICATIONS Hyperspectral Imaging and Applications Algorithms for Multispectral, Hyperspectral, and Ultraspectral Imagery Principal Components Based Techniques for Hyperspectral Image Data Hyperspectral Remote Sensing Reconstruction of Chromotomographic Imaging System Infrared Hyperspectral Scenes Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery Advanced Image Processing Techniques for Remotely Sensed Hyperspectral Data Algorithms for Multispectral and Hyperspectral Imagery V Hyperspectral Imaging Real-Time Progressive Hyperspectral Image Processing Algorithms for Multispectral and Hyperspectral Imagery

Hyperspectral Imaging *2019-09-29*

hyperspectral imaging volume 32 presents a comprehensive exploration of the different analytical methodologies applied on hyperspectral imaging and a state of the art analysis of applications in different scientific and industrial areas this book presents for the first time a comprehensive collection of the main multivariate algorithms used for hyperspectral image analysis in different fields of application the benefits drawbacks and suitability of each are fully discussed along with examples of their application users will find state of the art information on the machinery for hyperspectral image acquisition along with a critical assessment of the usage of hyperspectral imaging in diverse scientific fields provides a comprehensive roadmap of hyperspectral image analysis with benefits and considerations for each method discussed covers state of the art applications in different scientific fields discusses the implementation of hyperspectral devices in different environments

Hyperspectral Imaging in Agriculture, Food and Environment *2018-08-01*

this book is about the novel aspects and future trends of the hyperspectral imaging in agriculture food and environment the topics covered by this book are hyperspectral imaging and their applications in the nondestructive quality assessment of fruits and vegetables hyperspectral imaging for assessing quality and safety of meat multimode hyperspectral imaging for food quality and safety models fitting to pattern recognition in hyperspectral images sequential classification of hyperspectral images graph construction for hyperspectral data unmixing target visualization method to process hyperspectral image and soil contamination mapping with hyperspectral imagery this book is a general reference work for students professional engineers and readers with interest in the subject

Processing and Analysis of Hyperspectral Data 2020-01-22

hyperspectral imagery has received considerable attention in the last decade as it provides rich spectral information and allows the analysis of objects that are unidentifiable by traditional imaging techniques it has a wide range of applications including remote sensing industry sorting food analysis biomedical imaging etc however in contrast to rgb images from which information can be intuitively extracted hyperspectral data is only useful with proper processing and analysis this book covers theoretical advances of hyperspectral image processing and applications of hyperspectral processing including unmixing classification super resolution and quality estimation with classical and deep learning methods

Advances in Hyperspectral Image Processing Techniques *2022-11-09*

advances in hyperspectral image processing techniques authoritative and comprehensive resource covering recent hyperspectral imaging techniques from theory to applications advances in hyperspectral image processing techniques is derived from recent developments of hyperspectral imaging hsi techniques along with new applications in the field covering many new ideas that have been explored and have led to various new directions in the past few years the work gathers an array of disparate research into one resource and explores its numerous applications across a wide variety of disciplinary areas in particular it includes an introductory chapter on fundamentals of hsi and a chapter on extensive use of hsi techniques in satellite on orbit and on board processing to aid readers involved in these specific fields the book s content is based on the expertise of invited scholars and is categorized into six parts part i provides general theory part ii presents various band selection techniques for hyperspectral images part iii reviews recent developments on compressive sensing for hyperspectral imaging part iv includes fusion of hyperspectral images part v covers hyperspectral data unmixing part vi offers different views on hyperspectral image classification specific sample topics covered in advances in hyperspectral image processing techniques include two fundamental principles of hyperspectral imaging constrained band selection for hyperspectral imaging and class information based band selection for hyperspectral image classification restricted entropy and spectrum properties for hyperspectral imaging and endmember finding in compressively sensed band domain hyperspectral and lidar data fusion fusion of band

selection methods for hyperspectral imaging and fusion using multi dimensional information advances in spectral unmixing of hyperspectral data and fully constrained least squares linear spectral mixture analysis sparse representation based hyperspectral image classification collaborative hyperspectral image classification class feature weighted hyperspectral image classification target detection approach to hyperspectral image classification with many applications beyond traditional remote sensing ranging from defense and intelligence to agriculture to forestry to environmental monitoring to food safety and inspection to medical imaging advances in hyperspectral image processing techniques is an essential resource on the topic for industry professionals researchers academics and graduate students working in the field

Processing and Analysis of Hyperspectral Data 2020

this book provides information about different types of dimensionality reduction dr methods and their effectiveness in hyperspectral data processing the authors first explain how hyperspectral imagery hsi plays an important role in remote sensing due to its high spectral resolution that enables better identification of different materials on the earth s surface the authors go on to describe potential challenges due to hsi being acquired in hundreds of narrow and contiguous bands represented as a 3 dimensional image cube often causing the bands to contain information redundancy they then show how processing a large number of bands adds challenges in terms of computation complexity that reduces efficiency the authors then present how dr is an essential step in hyperspectral data analysis to solve these issues overall the book helps readers understand the dr processes and its impact in effective hsi analysis

Dimensionality Reduction of Hyperspectral Imagery *2023-10-04*

remotely sensed data produced by byperspectral imagers contains hundreds of contiguous narrow spectral bands at each spatial pixel the substantial dimensionality and unique character of hyperspectral imagery requires display techniques that differ from those provided by traditional image analysis tools this study investigated techniques enabling the display of hyperspecual images without the interference of in scene characteristics that lead to biased representations depending on the content of every image under analysis utilizing the principal components analysis transformation it is possible to simplify the representation requirements while maintaining the information contained in the scene the introduction of an external eigenvector containing few spectral characteristics into the original scene data removes most of the spectral bias allowing for an accurate detection of the constituent elements the subsequent shift of the resulting data to match the respective hue directions in the dataspace allows for image color fidelity based on the true composition of the image while all the environmental influence has been removed and the final outcome is readily perceived by the human vision

An Invariant Display Strategy for Hyperspectral Imagery *2001-09*

hyperspectral imagery or hsi is a sophisticated versatile intelligence gathering technology that could potentially enable the us military to make significant strides towards improving the preparation for and execution of its missions many of the difficulties in bringing the promise of hsi to fruition have very little to do with the technology itself as will be discussed shortly hsi technology has been successfully demonstrated in a variety of diverse applications in point of fact it is the versatility of hsi that may be hindering its implementation into the mainstream of the u s military s intelligence gathering capability the objective of this paper is threefold the first goal is to introduce the reader to both the technology itself and the myriad potential applications of hyperspectral imagery the second goal is to realistically examine the challenges that hsi must overcome specifically in the areas of how hsi fits into the world of joint vision intelligence doctrine and the intelligence cycle finally the paper will provide a series of recommendations some focused on organizational issues and others on acquisition issues that will address the majority of the challenges faced by the intelligence community as they endeavor to incorporate an hsi capability into the u s intelligence community

Algorithms for Multispectral and Hyperspectral Imagery *1999*

this book reviews the state of the art in algorithmic approaches addressing the practical challenges that arise with hyperspectral image analysis tasks with a focus on emerging trends in machine learning and image

processing understanding it presents advances in deep learning multiple instance learning sparse representation based learning low dimensional manifold models anomalous change detection target recognition sensor fusion and super resolution for robust multispectral and hyperspectral image understanding it presents research from leading international experts who have made foundational contributions in these areas the book covers a diverse array of applications of multispectral hyperspectral imagery in the context of these algorithms including remote sensing face recognition and biomedicine this book would be particularly beneficial to graduate students and researchers who are taking advanced courses in or are working in the areas of image analysis machine learning and remote sensing with multi channel optical imagery researchers and professionals in academia and industry working in areas such as electrical engineering civil and environmental engineering geosciences and biomedical image processing who work with multi channel optical data will find this book useful

Hyperspectral Imagery 2002

this book focuses on deep learning based methods for hyperspectral image hsi analysis unsupervised spectral spatial adaptive band noise factor based formulation is devised for hsi noise detection and band categorization the method to characterize the bands along with the noise estimation of hsis will benefit subsequent remote sensing techniques significantly this book develops on two fronts on the one hand it is aimed at domain professionals who want to have an updated overview of how hyperspectral acquisition techniques can combine with deep learning architectures to solve specific tasks in different application fields on the other hand the authors want to target the machine learning and computer vision experts by giving them a picture of how deep learning technologies are applied to hyperspectral data from a multidisciplinary perspective the presence of these two viewpoints and the inclusion of application fields of remote sensing by deep learning are the original contributions of this review which also highlights some potentialities and critical issues related to the observed development trends

Hyperspectral Image Analysis *2020-04-27*

spectral imagery provides multi dimensional data which are difficult to display in standard three color image formats tyo et al 2001 propose an invariant display strategy to address this problem this approach is to mimic the dynamics of human perception the dimensionality of the data are reduced by using a principal component pc transformation and then displayed by making used of a hue saturation and value hsv display transform this study addresses the pc transformation strategy looks for a global eigenvector via visualization of hsv color space information and examines the suggested algorithm to provide the most intuitive display the user interface created in this thesis is capable of computing the necessarily implementation of the proposed strategy viewing selected region of interest roi in hsv color space model in 3d and viewing the 2d resultant image

Deep Learning for Hyperspectral Image Analysis and Classification *2021-02-20*

contributed papers presented at the national seminar on hyperspectral remote sensing and spectral signature databse management system held on february 14 15 2008 at annamalai university

3D Visualization of an Invariant Display Strategy for Hyperspectral Imagery 2002-12

hyperspectral imagery or hsi is a sophisticated versatile intelligence gathering technology that could potentially enable the us military to make significant strides towards improving the preparation for and execution of its missions many of the difficulties in bringing the promise of hsi to fruition have very little to do with the technology itself as will be discussed shortly hsi technology has been successfully demonstrated in a variety of diverse applications in point of fact it is the versatility of hsi that may be hindering its implementation into the mainstream of the u s military s intelligence gathering capability the objective of this paper is threefold the first goal is to introduce the reader to both the technology itself and the myriad potential applications of hyperspectral imagery the second goal is to realistically examine the challenges that hsi must overcome specifically in the areas of how hsi fits into the world of joint vision intelligence doctrine and the intelligence

cycle finally the paper will provide a series of recommendations some focused on organizational issues and others on acquisition issues that will address the majority of the challenges faced by the intelligence community as they endeavor to incorporate an hsi capability into the u s intelligence community

Hyperspectral Remote Sensing and Spectral Signature Applications 2009

the aim of the special issue hyperspectral imaging for fine to medium scale applications in environmental sciences was to present a selection of innovative studies using hyperspectral imaging hsi in different thematic fields this intention reflects the technical developments in the last three decades which have brought the capacity of hsi to provide spectrally spatially and temporally detailed data favoured by e g hyperspectral snapshot technologies miniaturized hyperspectral sensors and hyperspectral microscopy imaging the present book comprises a suite of papers in various fields of environmental sciences geology mineral exploration digital soil mapping mapping and characterization of vegetation and sensing of water bodies including under ice and underwater applications in addition there are two rather methodically technically oriented contributions dealing with the optimized processing of uav data and on the design and test of a multi channel optical receiver for ground based applications all in all this compilation documents that hsi is a multi faceted research topic and will remain so in the future

Hyperspectral imagery warfighting through a different set of eyes *2002*

this book explores recursive architectures in designing progressive hyperspectral imaging algorithms in particular it makes progressive imaging algorithms recursive by introducing the concept of kalman filtering in algorithm design so that hyperspectral imagery can be processed not only progressively sample by sample or band by band but also recursively via recursive equations this book can be considered a companion book of author s books real time progressive hyperspectral image processing published by springer in 2016

Hyperspectral Imaging for Fine to Medium Scale Applications in Environmental Sciences *2021-05-14*

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

Real-Time Recursive Hyperspectral Sample and Band Processing *2017-04-23*

hyperspectral remote sensing theory and applications offers the latest information on the techniques advances and wide ranging applications of hyperspectral remote sensing such as forestry agriculture water resources soil and geology among others the book also presents hyperspectral data integration with other sources such as lidar multi spectral data and other remote sensing techniques researchers who use this resource will be able to understand and implement the technology and data in their respective fields as such it is a valuable reference for researchers and data analysts in remote sensing and earth observation fields and those in ecology agriculture hydrology and geology includes the theory of hyperspectral remote sensing along with techniques and applications across a variety of disciplines presents the processing methods and techniques utilized for hyperspectral remote sensing and in situ data collection provides an overview of the state of the art including algorithms techniques and case studies

Hyperspectral Remote Sensing *2017-08-16*

hyperspectral data compression provides a survey of recent results in the field of compression of remote sensed 3d data with a particular interest in hyperspectral imagery chapter 1 addresses compression architecture and reviews and compares compression methods chapters 2 through 4 focus on lossless compression where the decompressed image must be bit for bit identical to the original chapter 5 contributed by the editors describes a lossless algorithm based on vector quantization with extensions to near lossless and possibly lossy compression for efficient browning and pure pixel classification chapter 6 deals with near lossless compression while chapter 7 considers lossy techniques constrained by almost perfect classification chapters 8 through 12 address lossy compression of hyperspectral imagery where there is a tradeoff between compression achieved and the quality of the decompressed image chapter 13 examines artifacts that can arise from lossy compression

Hyperspectral Remote Sensing *2020-08-05*

evaluating the performance of various types of hyperspectral vegetation indices in characterizing agricultural crops this volume discusses non invasive quantification of foliar pigments leaf nitrogen concentration of cereal crop the estimation of nitrogen content in crops and pastures forest leaf chlorophyll content among others each chapter reviews existing state of art knowledge highlights the advances made and provides guidance for appropriate use of hyperspectral images in study of vegetation the concluding chapter provides readers with the editor s view and guidance on the highlights and the essence of the volume 2 and the editor s perspective

Hyperspectral Data Compression *2006-06-03*

hyperspectral satellites and system design is the first book on this subject it provides a systematic analysis and detailed design of the entire development process of hyperspectral satellites derived from the author s 25 year firsthand experience as a technical lead of space missions at the canadian space agency the book offers engineers scientists and decision makers detailed knowledge and guidelines on hyperspectral satellite system design trade offs performance modeling and simulation optimization from component to system level subsystem design and implementation strategies this information will help reduce the risk shorten the development period and lower the cost of hyperspectral satellite missions this book is a must have reference for professionals in developing hyperspectral satellites and data applications it is also an excellent introductory book for early practitioners and students who want to learn more about hyperspectral satellites and their applications

Hyperspectral Indices and Image Classifications for Agriculture and Vegetation *2018-12-06*

this book is about the novel aspects and future trends of the hyperspectral imaging in agriculture food and environment the topics covered by this book are hyperspectral imaging and their applications in the nondestructive quality assessment of fruits and vegetables hyperspectral imaging for assessing quality and safety of meat multimode hyperspectral imaging for food quality and safety models fitting to pattern recognition in hyperspectral images sequential classification of hyperspectral images graph construction for hyperspectral data unmixing target visualization method to process hyperspectral image and soil contamination mapping with hyperspectral imagery this book is a general reference work for students professional engineers and readers with interest in the subject

Hyperspectral Satellites and System Design *2020-04-22*

hyperspectral remote sensing is an emerging multidisciplinary field with diverse applications that builds on the principles of material spectroscopy radiative transfer imaging spectrometry and hyperspectral data processing while there are many resources that suitably cover these areas individually and focus on specific aspects of the hyperspectral remote sensing field this book provides a holistic treatment that captures its multidisciplinary nature the content is oriented toward the physical principles of hyperspectral remote sensing as opposed to applications of hyperspectral technology readers can expect to finish the book armed with the required

knowledge to understand the immense literature available in this technology area and apply their knowledge to the understanding of material spectral properties the design of hyperspectral systems the analysis of hyperspectral imagery and the application of the technology to specific problems

Hyperspectral Imaging in Agriculture, Food and Environment *2018*

authored by a panel of experts in the field this book focuses on hyperspectral image analysis systems and applications with discussion of application based projects and case studies this professional reference will bring you up to date on this pervasive technology wether you are working in the military and defense fields or in remote sensing technology geoscience or agriculture

Hyperspectral Remote Sensing 2012

this book includes some very recent applications and the newest emerging trends of hyper spectral imaging hsi hsi is a very recent and strange beast a sort of a melting pot of previous techniques and scientific interests merging and concentrating the efforts of physicists chemists botanists biologists and physicians to mention just a few as well as experts in data crunching and statistical elaboration for almost a century scientific observation from looking to planets and stars down to our own cells and below could be divided into two main categories analyzing objects on the basis of their physical dimension recording size position weight etc and their variations or on how the object emits reflects or absorbs part of the electromagnetic spectrum i e spectroscopy while the two aspects have been obviously entangled instruments and skills have always been clearly distinct from each other with hsi now available this is no longer the case this instrument can return specimen dimensionalities and spectroscopic properties to any single pixel of your specimen in a single set of data hsi modality is ubiquitous and scale invariant enough to be used to mark terrestrial resources on the basis of a land map obtained from satellite observation actually the oldest application of this type or to understand if the cell you are looking at is cancerous or perfectly healthy for all these reasons hsi represents one of the most exciting methodologies of the new millennium

Hyperspectral Data Exploitation *2007-06-11*

recent advances in hyperspectral remote sensor technology allow the simultaneous acquisition of hundreds of spectral wavelengths for each image pixel hyperspectral imaging systems can acquire numerous contiguous spectral bands throughout the electromagnetic spectrum therefore hyperspectral imaging techniques are widely used for many applications including environmental monitoring mineralogy astronomy surveillance and defense nevertheless the high dimensionality of the pixels undesirable noise high spectral redundancy and spectral and spatial variabilities in conjunction with limited ground truth data present challenges for the analysis of hyperspectral imagery the classification technology is currently the predominate method for analyzing hyperspectral images and has received much attention over the past decades numerous pixel wise classification methods which only use spectral information have been proposed to classify remote sensing images recent advances in spectral spatial classification of hyperspectral images are presented in this book several techniques are investigated for combining both spatial and spectral information the book highlights the importance of spectral spatial strategies for the accurate classification of hyperspectral images and validates the proposed methods spectral spatial classification of hyperspectral remote sensing images presents insight into numerous important challenges when performing hyperspectral image classification related to the imbalance between high dimensionality and limited availability of training samples or the presence of mixed pixels in the data the book also demonstrates the reader how to integrate spatial and spectral information in order to take advantage of the benefits that both sources of information provide

The Future of Hyperspectral Imaging 2019-11-20

hyper multispectral imagery in optical remote sensing is an extension of color rgb pictures the utilized wavelength range is beyond the visible up to the reflective shortwave infrared hyperspectral imaging offers higher spectral resolution leading to many wavebands the spectral profiles recorded reveal reflected solar radiation from the earth surface materials when the sensor is mounted on an airborne or spaceborne platform an inverse process using machine learning approaches is conducted for target detection material identification

and associated environmental applications which is the main purpose of remote sensing this field guide covers three areas the fundamentals of remote sensing imaging for image understanding image processing for correction and quality improvement and image analysis for information extraction at subpixel pixel superpixel and image levels including feature mining and reduction basic concepts and fundamental understanding are emphasized to prepare the reader for exploring advanced methods

Classification of Hyperspectral Remote Sensing Images *2018-05*

in processing food hyperspectral imaging combined with intelligent software enables digital sorters or optical sorters to identify and remove defects and foreign material that are invisible to traditional camera and laser sorters hyperspectral imaging analysis and applications for food quality explores the theoretical and practical issues associated with the development analysis and application of essential image processing algorithms in order to exploit hyperspectral imaging for food quality evaluations it outlines strategies and essential image processing routines that are necessary for making the appropriate decision during detection classification identification quantification and or prediction processes features covers practical issues associated with the development analysis and application of essential image processing for food quality applications surveys the breadth of different image processing approaches adopted over the years in attempting to implement hyperspectral imaging for food quality monitoring explains the working principles of hyperspectral systems as well as the basic concept and structure of hyperspectral data describes the different approaches used during image acquisition data collection and visualization the book is divided into three sections section i discusses the fundamentals of imaging systems how can hyperspectral image cube acquisition be optimized also two chapters deal with image segmentation data extraction and treatment seven chapters comprise section ii which deals with chemometrics one explains the fundamentals of multivariate analysis and techniques while in six other chapters the reader will find information on and applications of a number of chemometric techniques principal component analysis partial least squares analysis linear discriminant model support vector machines decision trees and artificial neural networks in the last section applications numerous examples are given of applications of hyperspectral imaging systems in fish meat fruits vegetables medicinal herbs dairy products beverages and food additives

Field Guide to Hyperspectral/multispectral Image Processing *2022*

due to advent of sensor technology hyperspectral imaging has become an emerging technology in remote sensing many problems which cannot be resolved by multispectral imaging can now be solved by hyperspectral imaging the aim of this special issue hyperspectral imaging and applications is to publish new ideas and technologies to facilitate the utility of hyperspectral imaging in data exploitation and to further explore its potential in different applications this special issue has accepted and published 25 papers in various areas which can be organized into 7 categories with the number of papers published in every category included in its open parenthesis 1 data unmixing 2 papers 2 spectral variability 2 papers 3 target detection 3 papers 4 hyperspectral image classification 6 papers 5 band selection 2 papers 6 data fusion 2 papers 7 applications 8 papers under every category each paper is briefly summarized by a short description so that readers can quickly grab its content to find what they are interested in

Hyperspectral Imaging Analysis and Applications for Food Quality 2018-11-16

pc and mnf transforms are two widely used methods that are utilized for various applications such as dimensionality reduction data compression and noise reduction in this thesis an in depth study of these two methods is conducted in order to estimate their performance in hyperspectral imagery first the pca and mnf methods are examined for their effectiveness in image enhancement also the various methods are studied to evaluate their ability to determine the intrinsic dimension of the data results indicate that in most cases the scree test gives the best measure of the number of retained components as compared to the cumulative variance the kaiser and the csd methods then the applicability of pca and mnf for image restoration are considered using two types of noise gaussian and periodic hyperspectral images are corrupted by noise using a combination of envi and matlab software while the performance metrics used for evaluation of the retrieval algorithms are visual interpretation rms correlation coefficient spectral comparison and classification in

gaussian noise the retrieved images using inverse transforms indicate that the basic pc and mnf transform perform comparably in periodic noise the mnf transform shows less sensitivity to variations in the number of lines and the gain factor

HYPERSPECTRAL REMOTE SENSING AND SPECTRAL SIGNATURE APPLICATIONS *2009*

land management issues such as mapping tree species recognizing invasive plants and identifying key geologic features require an understanding of complex technical issues before the best decisions can be made hyperspectral remote sensing is one the technologies that can help with reliable detection and identification presenting the fundamenta

Hyperspectral Imaging and Applications 2022-07-05

hyperspectral imagery providing both spatial and spectral information has diverse applications in remote sensing and scientific imaging scenarios the development of the chromotomographic imaging system ctis allows simultaneous collection of both spatial and spectral data by a two dimensional 2d focal plane detector array post processing of the 2d detector data reconstructs the three dimensional 3d hyperspectral content of the imaged scene this thesis develops estimation theory based algorithms for reconstructing the hyperspectral scene data the initial algorithm developed reconstructs the 3d hyperspectral scene data cube an additional algorithm reconstructs a matrix comprised of one spectral dimension and one compound spatial dimension this spatial dimension consists of a vector sum along one spatial dimension of the 3d hyperspectral data cube methods for including the effects of atmospheric attenuation on the light over the propagation path are also included the algorithms are evaluated using test cases consisting of blackbody point sources monochromatic extended sources and blackbody extended sources the results show good performance for reconstructing the absolute radiometry and spatial features of a hyperspectral scene data cube these algorithms also do not significantly degrade in the presence of noisy detector data the vector algorithm also exhibits stable performance behaviour when reconstructing a temporally evolving hyperspectral scene

Algorithms for Multispectral, Hyperspectral, and Ultraspectral Imagery *2001*

the first of its kind this book reviews image processing tools and techniques including independent component analysis mutual information markov random field models and support vector machines the book also explores a number of experimental examples based on a variety of remote sensors the book will be useful to people involved in hyperspectral imaging research as well as by remote sensing data like geologists hydrologists environmental scientists civil engineers and computer scientists

Principal Components Based Techniques for Hyperspectral Image Data 2004-12

explores the application of statistical signal processing to hyperspectral imaging and further develops non literal spectral techniques for subpixel detection and mixed pixel classification this text is the first of its kind on the topic anc can be considered a recipe book offering various techniques for hyperspectral data exploitation

Hyperspectral Remote Sensing *2007-12-13*

the book covers the most crucial parts of real time hyperspectral image processing causality and real time capability recently two new concepts of real time hyperspectral image processing progressive hyperspectral imaging phsi and recursive hyperspectral imaging rhsi both of these can be used to design algorithms and also form an integral part of real time hyperpsectral image processing this book focuses on progressive nature in algorithms on their real time and causal processing implementation in two major applications endmember finding and anomaly detection both of which are fundamental tasks in hyperspectral imaging but generally not encountered in multispectral imaging this book is written to particularly address phsi in real time processing

while a book recursive hyperspectral sample and band processing algorithm architecture and implementation springer 2016 can be considered as its companion book

Reconstruction of Chromotomographic Imaging System Infrared Hyperspectral Scenes 2005-03-01

Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery 2007

Advanced Image Processing Techniques for Remotely Sensed Hyperspectral Data *2010-11-30*

Algorithms for Multispectral and Hyperspectral Imagery V *1999*

Hyperspectral Imaging 2003-07-31

Real-Time Progressive Hyperspectral Image Processing *2016-03-22*

Algorithms for Multispectral and Hyperspectral Imagery *1998*

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