Detecting And Classifying Low Probability Of Intercept Radar

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Detection and Classification of Low Probability of Intercept Radar Signals Using Parallel Filter Arrays and Higher Order Statistics - Fernando L. Taboada 2002-09
Low probability of intercept (LPI) is that property of an emitter that because of its low power, wide bandwidth, frequency variability, or other design attributes, makes it difficult to be detected or identified by means of passive intercept devices such as radar warning, electronic support and electronic intelligence receivers, In order to detect LPI radar waveforms new signal processing techniques are required This thesis first develops a MATLAB toolbox to generate important types of LPI waveforms based on frequency and phase modulation The power spectral density and the periodic ambiguity function are examined for each waveforms These signals are then used to test a novel signal processing technique that detects the waveforms parameters and classifies the intercepted signal in various degrees of noise, The technique is based on the use of parallel filter (sub-band) arrays and higher order statistics (third- order cumulant estimator) Each sub-band signal is treated individually and is followed by the third-order estimator in order to suppress any symmetrical noise that might be present, The significance of this technique is that it separates the LPI waveforms in small frequency bands, providing a detailed time-frequency description of the unknown signal, Finally, the resulting output matrix is processed by a feature extraction routine to detect the waveforms parameters Identification of the signal is based on the modulation parameters detected,

Sensor Fusion - Ciza Thomas 2011-06-13
Sensor Fusion - Foundation and Applications comprehensively covers the foundation and applications of sensor fusion. This book provides some novel ideas, theories, and solutions related to the research areas in the field of sensor fusion. The book explores some of the latest practices and research works in the area of sensor fusion. The book contains chapters with different methods of sensor fusion for different engineering as well as non-engineering applications. Advanced applications of sensor fusion in the areas of mobile robots, automatic vehicles, airborne threats, agriculture, medical field and intrusion detection are covered in this book. Sufficient evidences and analyses have been provided in the chapter to show the effectiveness of sensor fusion in various applications. This book would serve as an invaluable reference for

professionals involved in various applications of sensor fusion.

Symmetry Measures on Complex Networks - Angel Garrido 2018-07-09

This book is a printed edition of the Special Issue "Symmetry Measures on Complex Networks" that was published in Symmetry

Interpretable Machine Learning - Christoph Molnar 2020

This book is about making machine learning models and their decisions interpretable. After exploring the concepts of interpretability, you will learn about simple, interpretable models such as decision trees, decision rules and linear regression. Later chapters focus on general model-agnostic methods for interpreting black box models like feature importance and accumulated local effects and explaining individual predictions with Shapley values and LIME. All interpretation methods are explained in depth and discussed critically. How do they work under the hood? What are their strengths and weaknesses? How can their outputs be interpreted? This book will enable you to select and correctly apply the interpretation method that is most suitable for your machine learning project.

Mathematics for Machine Learning - Marc Peter Deisenroth 2020-04-23

The fundamental mathematical tools needed to understand machine learning include linear algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on the book's web site.

International Conference on Electronics and Electrical Engineering - 2014-07-24

All papers including in this proceedings had undergone the strict peer-review by the experts before they are accepted for publications. This proceeding covers the subjects of analog circuits and digital circuits, assembly and packaging, biomedical circuits, computer architecture, computer engineering, control engineering, electric power system and automation, energy and power systems, instrumentation engineering, signal processing and other related areas. We hope this proceeding will contribute in stimulating debate and research among scholars, researchers and academicians. CEEE 2014 is to provide a forum for researchers, academicians, engineers, and government officials from all over the world to involved in the general areas of Electronics and Electrical Engineering to disseminate their latest research results and exchange views on the future research directions of these fields.This conference provides opportunities for the participants to exchange new ideas and application experiences face to face.

The R Book - Michael J. Crawley 2007-06-13

The high-level language of R is recognized as one of the mostpowerful and flexible statistical software environments, and israpidly becoming the standard setting for quantitative analysis,statistics and graphics. R provides free access to unrivalledcoverage and cutting-edge applications, enabling the user to applynumerous statistical methods ranging from simple regression to timeseries or multivariate analysis. Building on the success of the author’s bestsellingStatistics: An Introduction using R, The R Book ispacked with worked examples, providing an all inclusive guide to R,ideal for novice and more accomplished users alike. The bookassumes no background in statistics or computing and introduces theadvantages of the R environment, detailing its applications in awide range of disciplines. Provides the first comprehensive reference manual for the Rlanguage, including practical guidance and full coverage of thegraphics facilities. Introduces all the statistical models covered by R, beginningwith simple classical tests such as chi-square and t-test.

Proceeds to examine more advance methods, from regression andanalysis of variance, through to generalized linear models,generalized mixed models, time series, spatial statistics,multivariate statistics and much more. The R Book is aimed at undergraduates, postgraduates andprofessionals in science, engineering and medicine. It is alsoideal for students and professionals in statistics, economics,geography and the social sciences.

Detecting and Classifying Low Probability of Intercept Radar - Phillip E. Pace 2008-12-31

"The world's most authoritative resource on LPI emitter design and counter-LPI techniques is now updated with the latest developments in the field, complete with 360 task-clarifying illustrations and ready-to-use MATLAB simulations for every LPI modulation in the book. This revised and expanded second edition brings you to the cutting edge with new chapters on LPI radar design, including over-the-horizon radar, random noise radar, and netted LPI radar. You also discover critical LPI detection techniques, parameter extraction signal processing techniques, and anti-radiation missile design strategies to counter LPI radar.

The Handbook of Medical Image Perception and Techniques - Ehsan Samei 2018-12-13

A state-of-the-art review of key topics in medical image perception science and practice, including associated techniques, illustrations and examples. This second edition contains extensive updates and substantial new content. Written by key figures in the field, it covers a wide range of topics including signal detection, image interpretation and advanced image analysis (e.g. deep learning) techniques for interpretive and computational perception. It provides an overview of the key techniques of medical image perception and observer performance research, and includes examples and applications across clinical disciplines including radiology, pathology and oncology. A final chapter discusses the future prospects of medical image perception and assesses upcoming challenges and possibilities, enabling readers to identify new areas for research. Written for both newcomers to the field and experienced researchers and clinicians, this book provides a comprehensive reference for those interested in medical image perception as means to advance knowledge and improve human health.

Bayesian Data Analysis, Third Edition - Andrew Gelman 2013-11-01

Now in its third edition, this classic book is widely considered the leading text on Bayesian methods, lauded for its accessible, practical approach to analyzing data and solving research problems. Bayesian Data Analysis, Third Edition continues to take an applied approach to analysis using up-to-date Bayesian methods. The authors—all leaders in the statistics community—introduce basic concepts from a data-analytic perspective before presenting advanced methods. Throughout the text, numerous worked examples drawn from real applications and research emphasize the use of Bayesian inference in practice. New to the Third Edition Four new chapters on nonparametric modeling Coverage of weakly informative priors and boundary-avoiding priors Updated discussion of cross-validation and predictive information criteria Improved convergence monitoring and effective sample size calculations for iterative simulation Presentations of Hamiltonian Monte Carlo, variational Bayes, and expectation propagation New and revised software code The book can be used in three different ways. For undergraduate students, it introduces Bayesian inference starting from first principles. For graduate students, the text presents effective current approaches to Bayesian modeling and computation in statistics and related fields. For researchers, it provides an assortment of Bayesian methods in applied statistics. Additional materials, including data sets used in the examples, solutions to selected exercises, and software instructions, are available on the book’s web page.

Introduction to RF Equipment and System Design - Pekka Eskelinen 2004

An excellent resource for engineers and technicians alike, this practical design guide offers a comprehensive and easy-to-understand overview of the most important aspects and components of radio frequency equipment and systems. The book applies theoretical fundamentals to real-world issues, heavily relying on examples from recent design projects. Key discussions include system design schemes, circuits and

components for system evaluations and design, RF measurement instrumentation, antennas and associated hardware, and guidelines for purchasing test equipment. The book also serves as a valuable on-the-job training resources for sales engineers and a graduate-level text for courses in this area.

Classifying Low Probability of Intercept Radar Using Fuzzy Artmap - Pieter Frederick Potgieter 2012

Financial Signal Processing and Machine Learning - Ali N. Akansu 2016-04-20

The modern financial industry has been required to deal with large and diverse portfolios in a variety of asset classes often with limited market data available. Financial Signal Processing and Machine Learning unifies a number of recent advances made in signal processing and machine learning for the design and management of investment portfolios and financial engineering. This book bridges the gap between these disciplines, offering the latest information on key topics including characterizing statistical dependence and correlation in high dimensions, constructing effective and robust risk measures, and their use in portfolio optimization and rebalancing. The book focuses on signal processing approaches to model return, momentum, and mean reversion, addressing theoretical and implementation aspects. It highlights the connections between portfolio theory, sparse learning and compressed sensing, sparse eigen-portfolios, robust optimization, non-Gaussian data-driven risk measures, graphical models, causal analysis through temporal-causal modeling, and large-scale copula-based approaches. Key features: Highlights signal processing and machine learning as key approaches to quantitative finance. Offers advanced mathematical tools for high-dimensional portfolio construction, monitoring, and post-trade analysis problems. Presents portfolio theory, sparse learning and compressed sensing, sparsity methods for investment portfolios. including eigen-portfolios, model return, momentum, mean reversion and non-Gaussian data-driven risk measures with real-world applications of these techniques. Includes contributions from leading researchers and practitioners in both the signal and information processing communities, and the quantitative finance community.

An Introduction to Statistical Learning - Gareth James 2013-06-24

An Introduction to Statistical Learning provides an accessible overview of the field of statistical learning, an essential toolset for making sense of the vast and complex data sets that have emerged in fields ranging from biology to finance to marketing to astrophysics in the past twenty years. This book presents some of the most important modeling and prediction techniques, along with relevant applications. Topics include linear regression, classification, resampling methods, shrinkage approaches, tree-based methods, support vector machines, clustering, and more. Color graphics and real-world examples are used to illustrate the methods presented. Since the goal of this textbook is to facilitate the use of these statistical learning techniques by practitioners in science, industry, and other fields, each chapter contains a tutorial on implementing the analyses and methods presented in R, an extremely popular open source statistical software platform. Two of the authors co-wrote The Elements of Statistical Learning (Hastie, Tibshirani and Friedman, 2nd edition 2009), a popular reference book for statistics and machine learning researchers. An Introduction to Statistical Learning covers many of the same topics, but at a level accessible to a much broader audience. This book is targeted at statisticians and non-statisticians alike who wish to use cutting-edge statistical learning techniques to analyze their data. The text assumes only a previous course in linear regression and no knowledge of matrix algebra.

The Evolution of Untethered Communications - National Research Council 1998-01-01

In response to a request from the Defense Advanced Research Projects Agency, the committee studied a range of issues to help identify what strategies the Department of Defense might follow to meet its need for flexible, rapidly deployable communications systems. Taking into account the military's particular requirements for security, interoperability, and other capabilities as well as the extent to which commercial technology development can be expected to support these and related needs, the

book recommends systems and component research as well as organizational changes to help the DOD field state-of-the-art, cost-effective untethered communications systems. In addition to advising DARPA on where its investment in information technology for mobile wireless communications systems can have the greatest impact, the book explores the evolution of wireless technology, the often fruitful synergy between commercial and military research and development efforts, and the technical challenges still to be overcome in making the dream of "anytime, anywhere" communications a reality.

Radar Signals - Nadav Levanon 2004-09-21

A text and general reference on the design and analysis of radar signals As radar technology evolves to encompass a growing spectrum of applications in military, aerospace, automotive, and other sectors, innovations in digital signal processing have risen to meet the demand. Presenting a long overdue, up-to-date, dedicated resource on radar signals, the authors fill a critical gap in radar technology literature. Radar Signals features in-depth coverage of the most prevalent classical and modern radar signals used today, as well as new signal concepts developed in recent years. Inclusion of key MATLAB software codes throughout the book demonstrates how they dramatically simplify the process of describing and analyzing complex signals. Topics covered include: * Matched filter and ambiguity function concepts * Basic radar signals, with both analytical and numerical analysis * Frequency modulated and phase-coded pulses * Complete discussion of band-limiting schemes * Coherent LFM pulse trains-the most popular radar signal * Diversity in pulse trains, including stepped frequency pulses * Continuous-wave signals * Multicarrier phase-coded signals Combining lucid explanation, preferred signal tables, MATLAB codes, and problem sets in each chapter, Radar Signals is an essential reference for professionals-and a systematic tutorial for any seeking to broaden their knowledge base in this dynamic field.

Introduction to Information Retrieval - Christopher D. Manning 2008-07-07

Class-tested and coherent, this textbook teaches classical and web information retrieval, including web search and the related areas of text classification and text clustering from basic concepts. It gives an up-to-date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents; methods for evaluating systems; and an introduction to the use of machine learning methods on text collections. All the important ideas are explained using examples and figures, making it perfect for introductory courses in information retrieval for advanced undergraduates and graduate students in computer science. Based on feedback from extensive classroom experience, the book has been carefully structured in order to make teaching more natural and effective. Slides and additional exercises (with solutions for lecturers) are also available through the book's supporting website to help course instructors prepare their lectures.

Data Science for Business - Foster Provost 2013-07-27

Written by renowned data science experts Foster Provost and Tom Fawcett, Data Science for Business introduces the fundamental principles of data science, and walks you through the "data-analytic thinking" necessary for extracting useful knowledge and business value from the data you collect. This guide also helps you understand the many data-mining techniques in use today. Based on an MBA course Provost has taught at New York University over the past ten years, Data Science for Business provides examples of real-world business problems to illustrate these principles. You'll not only learn how to improve communication between business stakeholders and data scientists, but also how participate intelligently in your company's data science projects. You'll also discover how to think data-analytically, and fully appreciate how data science methods can support business decision-making. Understand how data science fits in your organization—and how you can use it for competitive advantage Treat data as a business asset that requires careful investment if you're to gain real value Approach business problems data-analytically, using the data-mining process to gather good data in the most appropriate way Learn general concepts for actually extracting knowledge from data Apply data science principles

when interviewing data science job candidates

Software-Defined Radio for Engineers - Alexander M. Wyglinski 2018-04-30

Based on the popular Artech House classic, Digital Communication Systems Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly prototype wireless designs using SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques such as OFDM, LTE, WLA, and hardware targeting. Readers will gain an understanding of the core concepts behind wireless hardware, such as the radio frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies. Moreover, this volume includes chapters on timing estimation, matched filtering, frame synchronization message decoding, and source coding. The orthogonal frequency division multiplexing is explained and details about HDL code generation and deployment are provided. The book concludes with coverage of the WLAN toolbox with OFDM beacon reception and the LTE toolbox with downlink reception. Multiple case studies are provided throughout the book. Both MATLAB and Simulink source code are included to assist readers with their projects in the field.

Practical Statistics for Data Scientists - Peter Bruce 2017-05-10

Statistical methods are a key part of of data science, yet very few data scientists have any formal statistics training. Courses and books on basic statistics rarely cover the topic from a data science perspective. This practical guide explains how to apply various statistical methods to data science, tells you how to avoid their misuse, and gives you advice on what's important and what's not. Many data science resources incorporate statistical methods but lack a deeper statistical perspective. If you’re familiar with the R programming language, and have some exposure to statistics, this quick reference bridges the gap in an accessible, readable format. With this book, you’ll learn: Why exploratory data analysis is a key preliminary step in data science How random sampling can reduce bias and yield a higher quality dataset, even with big data How the principles of experimental design yield definitive answers to questions How to use regression to estimate outcomes and detect anomalies Key classification techniques for predicting which categories a record belongs to Statistical machine learning methods that “learn” from data Unsupervised learning methods for extracting meaning from unlabeled data

Bayes Rules! - Alicia A. Johnson 2022-03-03

Praise for Bayes Rules!: An Introduction to Applied Bayesian Modeling “A thoughtful and entertaining book, and a great way to get started with Bayesian analysis.” Andrew Gelman, Columbia University “The examples are modern, and even many frequentist intro books ignore important topics (like the great p-value debate) that the authors address. The focus on simulation for understanding is excellent.” Amy Herring, Duke University “I sincerely believe that a generation of students will cite this book as inspiration for their use of – and love for – Bayesian statistics. The narrative holds the reader’s attention and flows naturally – almost conversationally. Put simply, this is perhaps the most engaging introductory statistics textbook I have ever read. [It] is a natural choice for an introductory undergraduate course in applied Bayesian statistics." Yue Jiang, Duke University “This is by far the best book I’ve seen on how to (and how to teach students to) do Bayesian modeling and understand the underlying mathematics and computation. The authors build intuition and scaffold ideas expertly, using interesting real case studies, insightful graphics, and clear explanations. The scope of this book is vast – from basic building blocks to hierarchical modeling, but the authors’ thoughtful organization allows the reader to navigate this journey smoothly. And impressively, by the end of the book, one can run sophisticated Bayesian models and actually understand the whys, whats, and hows.” Paul Roback, St. Olaf College “The authors provide a compelling, integrated, accessible, and non-religious introduction to statistical modeling using a Bayesian approach. They outline a principled approach that features computational implementations and model assessment with ethical implications interwoven throughout. Students

and instructors will find the conceptual and computational exercises to be fresh and engaging." Nicholas Horton, Amherst College An engaging, sophisticated, and fun introduction to the field of Bayesian statistics, Bayes Rules!: An Introduction to Applied Bayesian Modeling brings the power of modern Bayesian thinking, modeling, and computing to a broad audience. In particular, the book is an ideal resource for advanced undergraduate statistics students and practitioners with comparable experience. Bayes Rules! empowers readers to weave Bayesian approaches into their everyday practice. Discussions and applications are data driven. A natural progression from fundamental to multivariable, hierarchical models emphasizes a practical and generalizable model building process. The evaluation of these Bayesian models reflects the fact that a data analysis does not exist in a vacuum. Features • Utilizes data-driven examples and exercises. • Emphasizes the iterative model building and evaluation process. • Surveys an interconnected range of multivariable regression and classification models. • Presents fundamental Markov chain Monte Carlo simulation. • Integrates R code, including RStan modeling tools and the bayesrules package. • Encourages readers to tap into their intuition and learn by doing. • Provides a friendly and inclusive introduction to technical Bayesian concepts. • Supports Bayesian applications with foundational Bayesian theory.

Electronic Warfare Signal Processing - James Genova 2018-01-31

Written by a prominent expert in the field, this authoritative new resource presents anti-ship missile (ASM) electronic protection (EP) techniques designed to enhance accurate target classification currently being developed by personnel from the People's Republic of China and other nations. This book provides a comprehensive introduction to modern electronic warfare (EW) in an era of information warfare (IW). It explores the capabilities of coherent radar and digital signal processing to rapidly and accurately classify targets. Both naval and air electronic EW are covered in this resource. This book gives insight into modern EW as an information battle and includes guidance on properly testing the effectiveness of electronic attack (EA) systems. Pulsed Doppler radar basics including, electromagnetic pulse, dynamic range, gain control, and Doppler effects are presented. A summary of the ASM sensor and EA model is provided and readers find coverage of the radar range equation, burn through, and the range Doppler map and imaging. Special topic-extended target classifications including, false, decoys, and chaff are explained. Special topic ASM EP waveforms and multiple receiver EP are also covered. This book explores features of algorithms to optimize combining multiple parameters and systems. Moreover, it explains several algorithms proposed by PRC personnel to implement optimal two-channel processing that mitigates cover noise EA.

Statistical Methods in Water Resources - D.R. Helsel 1993-03-03

Data on water quality and other environmental issues are being collected at an ever-increasing rate. In the past, however, the techniques used by scientists to interpret this data have not progressed as quickly. This is a book of modern statistical methods for analysis of practical problems in water quality and water resources. The last fifteen years have seen major advances in the fields of exploratory data analysis (EDA) and robust statistical methods. The 'real-life' characteristics of environmental data tend to drive analysis towards the use of these methods. These advances are presented in a practical and relevant format. Alternate methods are compared, highlighting the strengths and weaknesses of each as applied to environmental data. Techniques for trend analysis and dealing with water below the detection limit are topics covered, which are of great interest to consultants in water-quality and hydrology, scientists in state, provincial and federal water resources, and geological survey agencies. The practising water resources scientist will find the worked examples using actual field data from case studies of environmental problems, of real value. Exercises at the end of each chapter enable the mechanics of the methodological process to be fully understood, with data sets included on diskette for easy use. The result is a book that is both up-to-date and immediately relevant to ongoing work in the environmental and water sciences.

Machine Learning - Kevin P. Murphy 2012-08-24

A comprehensive introduction to machine learning that uses probabilistic

models and inference as a unifying approach. Today's Web-enabled deluge of electronic data calls for automated methods of data analysis. Machine learning provides these, developing methods that can automatically detect patterns in data and then use the uncovered patterns to predict future data. This textbook offers a comprehensive and self-contained introduction to the field of machine learning, based on a unified, probabilistic approach. The coverage combines breadth and depth, offering necessary background material on such topics as probability, optimization, and linear algebra as well as discussion of recent developments in the field, including conditional random fields, L1 regularization, and deep learning. The book is written in an informal, accessible style, complete with pseudo-code for the most important algorithms. All topics are copiously illustrated with color images and worked examples drawn from such application domains as biology, text processing, computer vision, and robotics. Rather than providing a cookbook of different heuristic methods, the book stresses a principled model-based approach, often using the language of graphical models to specify models in a concise and intuitive way. Almost all the models described have been implemented in a MATLAB software package—PMTK (probabilistic modeling toolkit)—that is freely available online. The book is suitable for upper-level undergraduates with an introductory-level college math background and beginning graduate students.

Ew 103 - David L. Adamy 2008

The third book in the bestselling Artech House EW 100 series is dedicated entirely to the practical aspects of electronic warfare against enemy communication. From communications math (mainly simple dB formulas), receiving systems, and signals, to communications emitter location, interecept, and jamming, this comprehensive volume covers all the key topics in the field.

Classification and Analysis of Low Probability of Intercept Radar Signals Using Image Processing - Christer Persson 2003-09-01

The characteristic of low probability of intercept (LPI) radar makes it difficult to intercept with conventional signal intelligence methods so new interception methods need to be developed. This thesis initially describes a simulation of a polytime phase-coded LPI signal. The thesis then introduces a method for classification of LPI radar signals. The method utilizes a parallel tree structure with three separate 'branches' to exploit the image representation formed by three separate detection methods. Each detection method output is pre-processed and features are extracted using image processing. After processing the images, they are each fed into three separate neural networks to be classified. The classification output of each neural network is then combined and fed into a fourth neural network performing the final classification. The outcome of testing shows only 53%, which might be the result of the image representation of the detection methods not being distinct enough, the pre - processing/feature extraction not being able to extract relevant information or the neural networks not being properly trained. The thesis concludes with a brief discussion about a suitable method for image processing to extract significant parameters from a LPI signal.

Emitter Detection and Geolocation for Electronic Warfare - Nicholas O'Donoughue 2019-10-31

This comprehensive resource provides theoretical formulation for detecting and geolocating non-cooperative emitters. Implementation of geolocation algorithms are discussed, as well as performance prediction of a hypothetical passive location system for systems analysis or vulnerability calculation. Comparison of novel direction finding and geolocation algorithms to classical forms are also included. Rooted in statistical signal processing and array processing theory, this book also provides an overview of the application of novel detection and estimation algorithms to real world problems in EW. The book is divided into three parts: detection, angle of arrival estimation, and geolocation. Each section begins with an introductory chapter covering the relevant signal processing theory (either detection or estimation), then provides a series of chapters covering specific methods to achieve the desired end-product. MATLAB® code is provided to assist readers with relevant probability and statistics, RF propagation, atmospheric absorption, and noise, giving readers an understanding of the implementation of the

algorithms in the book, as well as developing new approaches to solving problems. Packed with problem sets and examples, this book strikes a balance between introductory texts and reference manuals, making it useful for novice as well as advanced practitioners.

Introduction to Modern EW Systems, Second Edition - Andrea De Martino 2018-06-30

In answer to great demand, Artech House is proud to bring professionals a newly revised and updated edition of the bestselling book Introduction to Modern EW Systems. The Second Edition has been greatly expanded to include a wealth of new material, from remote piloted airborne systems, directed energy weapons, and non-cooperative air surveillance...to EW radar band sensor next generation architectures, real-time data links, and smart jamming. This authoritative resource provides engineers and students with the latest electronic warfare (EW) techniques and technologies related to on-board military platforms. Practitioners gain expert design guidance on technologies and equipment used to detect and identify emitter threats, offering an advantage in the never-ending chess game between sensor guided weapons and EW systems. This unique book provides deeper insight into EW systems principles of operation and their mathematical descriptions, arming professionals with better knowledge for their specific design applications. Moreover, readers get practical information on how to counter modern communications data links which provide connectivity and command flow among the armed forces in the battlefield. Taking a sufficiently broad perspective, this comprehensive volume offers a panoramic view of the various physical domains RF, Infrared, and electronics that are present in modern electronic warfare systems. This in-depth book is supported with over 340 illustrations and more than 450 equations.

□□□□□ □□□ - Seligmann Baer 1895

Adaptive Radar Detection: Model-Based, Data-Driven and Hybrid Approaches - Angelo Coluccia 2022-11-30

This book shows you how to adopt data-driven techniques for the problem of radar detection, both per se and in combination with model-based approaches. In particular, the focus is on space-time adaptive target detection against a background of interference consisting of clutter, possible jammers, and noise. It is a handy, concise reference for many classic (model-based) adaptive radar detection schemes as well as the most popular machine learning techniques (including deep neural networks) and helps you identify suitable data-driven approaches for radar detection and the main related issues. You'll learn how data-driven tools relate to, and can be coupled or hybridized with, traditional adaptive detection statistics; understand fundamental concepts, schemes, and algorithms from statistical learning, classification, and neural networks domains. The book also walks you through how these concepts and schemes have been adapted for the problem of radar detection in the literature and provides you with a methodological guide for the design, illustrating different possible strategies. You'll be equipped to develop a unified view, under which you can exploit the new possibilities of the data-driven approach even using simulated data. This book is an excellent resource for Radar professionals and industrial researchers, postgraduate students in electrical engineering and the academic community.

Detecting and Classifying Low Probability of Intercept Radar - Phillip E. Pace 2009

This revised and expanded second edition brings you to the cutting edge with new chapters on LPI radar design, including over-the-horizon radar, random noise radar, and netted LPI radar. You also discover critical LPI detection techniques, parameter extraction signal processing techniques, and anti-radiation missile design strategies to counter LPI radar.

Target Detection by Marine Radar - John N. Briggs 2004-12-03

Radar is a legal necessity for the safe navigation of merchant ships, and within vessel traffic services is indispensable to the operation of major ports and harbours. Target Detection by Marine Radar concentrates solely on civil marine operations and explains how marine surveillance radars detect their targets. The book is fully illustrated and contains worked examples to help the reader understand the principles

underlying radar operation and to quantify the importance of factors such as the technical features of specific equipment, the weather, target reflection properties, and the ability of the operator. The precision with which targets are positioned on the radar screen and with which their progress is tracked or predicted depends on how definitely they have been detected, therefore a whole chapter has been devoted to the issue of accuracy. The various international regulations governing marine radar are examined, a brief historical background is given to modern day practice and the book doses with a discussion of the ways in which marine radar may develop to meet future challenges.

Information Technology - Yi Wan 2015-09-07

These proceedings of the symposium ISIT 2014 aim to be a platform for international exchange of the state-of-the-art research and practice in information technology. The contributions cover a wide variety of topics, ranging from theoretical and analytical studies to various applications.

Communications Networks to Support Integrated Intelligence, Surveillance, and Reconnaissance Strike Operations - Elham Ghashghai 2004

The focus of the study is on combat systems operating at medium and low altitudes, which pose challenges different from intelligence, surveillance, and reconnaissance (ISR) platforms operating at high altitude. Medium- and low-altitude platforms are closer to jammers and signals intelligence receivers, so an adversary might more readily intercept or jam signals. The platforms' low observability can be compromised if they transmit large amounts of data, increasing their chance of detection. After discussing data requirements and threats and examining the current communications programs and shortfalls, the analysis finds that there is no one solution for all situations and platforms. A combination of options will be needed to ensure a reliable and robust communications link. These options will vary depending on altitude, range, data rate, and threat. Although communications does not appear to be a limiting factor for future ISR forces, programmatic action will be required to develop the necessary systems and the costs could be high.

UAV-Based Remote Sensing Volume 2 - Felipe Gonzalez Toro 2018-04-27

This book is a printed edition of the Special Issue "UAV-Based Remote Sensing" that was published in Sensors

ELINT Signal Processing on Reconfigureable [sic] Reconfigurable Computers for Detection and Classification of LPI Emitters - 2008

This thesis documents the use of the SRC-6 Reconfigurable Computer for use in analyzing low probability of intercept (LPI) signals using the Choi-Williams distribution. The SRC-6 is a reconfigurable computer manufactured by SRC Computers, Inc. which allows the user to tailor both the software and the hardware to a specific task. This increases the speed at which the task can be accomplished making it useful for applications in electronic intelligence (ELINT). The Choi-Williams distribution is a mathematical technique that was first created using MATLAB and then converted to C code for use on the SRC-6. The purpose of this study is to investigate the feasibility of using a reconfigurable computer for ELINT applications and the timely detection and classification of LPI signals. This thesis is part of a larger study to use reconfigurable computers for the autonomous detection and classification of LPI signals.

ELINT Signal Processing Using Choi-Williams Distribution on Reconfigurable Computers for Detection and Classification of LPI Emitters - 2008

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use reconfigurable computers for the autonomous detection and classification of LPI signals.

Secondary Analysis of Electronic Health Records - MIT Critical Data 2016-09-09

This book trains the next generation of scientists representing different disciplines to leverage the data generated during routine patient care. It formulates a more complete lexicon of evidence-based recommendations and support shared, ethical decision making by doctors with their patients. Diagnostic and therapeutic technologies continue to evolve rapidly, and both individual practitioners and clinical teams face increasingly complex ethical decisions. Unfortunately, the current state of medical knowledge does not provide the guidance to make the majority of clinical decisions on the basis of evidence. The present research infrastructure is inefficient and frequently produces unreliable results that cannot be replicated. Even randomized controlled trials (RCTs), the traditional gold standards of the research reliability hierarchy, are not without limitations. They can be costly, labor intensive, and slow, and can return results that are seldom generalizable to every patient population. Furthermore, many pertinent but unresolved clinical and medical systems issues do not seem to have attracted the interest of the research enterprise, which has come to focus instead on cellular and molecular investigations and single-agent (e.g., a drug or device) effects. For clinicians, the end result is a bit of a “data desert” when it comes to making decisions. The new research infrastructure proposed in this book will help the medical profession to make ethically sound and well informed decisions for their patients.

Developing Digital RF Memories and Transceiver Technologies for Electromagnetic Warfare - Phillip E. Pace 2022-05-31

This book provides a comprehensive resource and thorough treatment in the latest development of Digital RF Memory (DRFM) technology and their key role in maintaining dominance over the electromagnetic spectrum. Part I discusses the use of advanced technology to design transceivers for spectrum sensing using unmanned systems to dominate the electromagnetic spectrum. Part II uses artificial intelligence and machine learning to enable modern spectrum sensing and detection signal processing for electronic support and electronic attack. Another key contribution is examination of counter-DRFM techniques. DRFM and transceiver design details and examples are provided along with the MATLAB software allowing the reader to construct their own embedded DRFM transceivers for unmanned systems. It examines the design trade-offs in developing multiple, structured, false target synthesis DRFM architectures and aids in developing counter-DRFM techniques and distinguish false target from real ones. Written by an expert in the field, and including MATLAB™ design software, this is the only comprehensive book written on the subject of DRFM.

Computer, Intelligent Computing and Education Technology - Hsiang-Chuan Liu 2014-03-26

This proceedings set contains selected Computer, Information and Education Technology related papers from the 2014 International Conference on Computer, Intelligent Computing and Education Technology (CICET 2014), held March 27-28, 2014 in Hong Kong. The proceedings aims to provide a platform for researchers, engineers and academics as well as industry professionals from all over the world to present their research results and development activities in Computer Science, Information Technology and Education Technology.