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Emitter Localization and Compressed Sensing Nullspace MUSIC and Improved Radio Frequency Emitter Geolocation from a Mobile Antenna Array Multipath Exploitation for Emitter Localization using Ray-Tracing Fingerprints and Machine Learning Emitter Detection and Geolocation for Electronic Warfare Idaho Training Range, Draft Plan Amendment Applications of Evolutionary Computation Mountain Home Air Force Base (AFB), Proposals for the Air Force in Idaho Airport Passenger Screening Using Millimeter Wave Machines A Model for C2n (optical Turbulence) Profiles Using Radiosonde Data 2003 Assessment of the Office of Naval Research's Marine Corps Science and Technology Program Radio Frequency Interference Game Theory for Next Generation Wireless and Communication Networks Machine Learning and Big Data Analytics Paradigms: Analysis, Applications and Challenges An Apparatus for High Power Processing of Field Emitters in Superconducting RF Cavities Electromagnetic Interference Impact of the Proposed Emitters for the High Frequency Active Auroral Research Program (HAARP) Advances in Cooperative Control and Optimization Manual of Regulations and Procedures for Federal Radio Frequency Management Army Science And Technology Master Plan 2001, Volume 2 Annexes, January 2001 Army Science and Technology Master Plan Ambient Backscatter Communication Networks Federal Register Investigations on rf breakdown phenomenon in high gradient accelerating structures

Bioenvironmental Engineering Technician Advances in Signal Processing and Communication Engineering Game Theory for Networks Application of Visible Light Wireless Communication in Underground Mine Biological Effects of Electromagnetic Waves Medical Service Digest Radiation Health and Safety Data Compression Trade-Offs for TDOA/FDOA Geo-Location Systems Radiation Data and Reports Weapon Systems Manuals Combined: NAVY SAFETY AND OCCUPATIONAL HEALTH PROGRAM MANUAL & MARINE CORPS OCCUPATIONAL SAFETY AND HEALTH (OSH) PROGRAM MANUAL Manuals Combined: Nondestructive Testing (NDT) And Inspection (NDI) Microwave Mixer Technology and Applications Radio Frequency Transistors Brh/dep (reports). Manuals Combined: EOD, UXO, IED, DEMOLITION MATERIALS, LAND MINE WARFARE, MINE/COUNTERMINE OPERATIONS AND PHYSICAL SECURITY OF ARMS, AMMUNITION, AND EXPLOSIVES Biological Effects of Electric and Magnetic Fields Environmental Research Papers

This work advances state-of-the-art Radio Frequency (RF) emitter geolocation from an airborne or spaceborne antenna array. With an antenna array, geolocation is based on Direction of Arrival (DOA) estimation algorithms such as MUSIC. The MUSIC algorithm applies to arbitrary arrays of polarization sensitive antennas and yields high resolution. However, MUSIC fails to obtain its theoretical resolution for simultaneous, closely spaced, co-frequency signals. We propose the novel Nullspace MUSIC algorithm, which outperforms MUSIC and its existing modifications while maintaining MUSIC's fundamental orthogonality test. Nullspace MUSIC applies a divide-and-conquer approach and estimates a single DOA at a time. Additionally, an antenna array on an aircraft cannot be perfectly calibrated. RF waves are blocked, reflected, and scattered in a time-varying fashion by the platform around the antenna array. Consequently, full-wave electromagnetics simulations or demanding

measurements of the entire platform cannot eliminate the mismatch between the true, in-situ antenna patterns and the antenna patterns that are available for DOA estimation (the antenna array manifold). Platform-induced manifold mismatch severely degrades MUSIC's resolution and accuracy. We show that Nullspace MUSIC improves DOA accuracy for well separated signals that are incident on an airborne antenna array. Conventionally, geolocation from a mobile platform draws Lines of Bearing (LOB) from the antenna array along the DOAs to find the locations where the DOAs intersect with the ground. However, averaging the LOBs in the global coordinate system yields large errors due to geometric dilution of precision. Since averaging positions fails, a single emitter is typically located by finding the position on the ground that yields the Minimum Apparent Angular Error (MAAE) for the DOA estimates over a flight. We extend the MAAE approach to cluster LOBs from multiple emitters. MAAE clustering geolocates multiple simultaneous and co-frequency emitters in spite of highly erratic DOA estimates. We also mitigate manifold mismatch by applying the Direct Mapping Method (DMM). DMM averages DOA spectra on the earth's surface and estimates the emitter locations directly from the composite spectrum. In the example results presented, our goal is to geolocate four diversely polarized emitters with a seven-element antenna array. This is too challenging for MAAE and DMM. We fuse Nullspace MUSIC and DMM into the novel Nullspace DMM algorithm and demonstrate that Nullspace DMM locates all emitters. Finally, we apply the proposed geolocation algorithms to real-world experimental data. A six-element antenna array and Data Collection System (DCS) were installed on a small aircraft. The DCS recorded signals from four live transmitters during a three-hour flight over Columbus, Ohio. The four emitters were geolocated from various segments of the flight. As expected, individual DOA estimates were erratic and widespread due to the airplane's perturbations of the measured

array manifold. MAAE and DMM locate at most three of the four emitters. On the other hand, Nullspace DMM yields unambiguous estimates for every emitter in every flight segment. The successful experimental trials show that Nullspace DMM could significantly enhance airborne emitter geolocation in missions such as RF spectrum enforcement, locating unknown transmitters for defense, and search and rescue operations. The research results focus on new data compression insights and methods that can enable the sharing of data for enhanced geo-location of RF emitters. The work was focused in four areas: (1) New Theoretical Results: Data compression ideas were applied to the issue of how to select and configure a set of available sensors for location processing. This proved to be a challenging task. (2) Refine & Extend Previous Results: The short-time Fourier transform (STFT) was integrated into the data compression algorithm and was shown to properly operate. (3) Integrate Into a Matlab-based Test-Bed: Matlab routines for data compression were developed and integrated into a single Matlab application. (4) General Location Studies: It was shown that there are issues in using previous results that were developed explicitly for sonar signal cases when the signal was modeled as wide-sense stationary Gaussian process. Results are provided for signal models suitable for the communication signal case. The two volumes LNCS 10199 and 10200 constitute the refereed conference proceedings of the 20th European Conference on the Applications of Evolutionary Computation, EvoApplications 2017, held in Amsterdam, The Netherlands, in April 2017, colocated with the Evo* 2016 events EuroGP, EvoCOP, and EvoMUSART. The 46 revised full papers presented together with 26 poster papers were carefully reviewed and selected from 108 submissions. EvoApplications 2016 consisted of the following 13 tracks: EvoBAFIN (natural computing methods in business analytics and finance), EvoBIO (evolutionary computation, machine learning and data mining in computational biology), EvoCOMNET (nature-inspired techniques

for telecommunication networks and other parallel and distributed systems), EvoCOMPLEX (evolutionary algorithms and complex systems), EvoENERGY (evolutionary computation in energy applications), EvoGAMES (bio-inspired algorithms in games), EvoIASP (evolutionary computation in image analysis, signal processing, and pattern recognition), EvoINDUSTRY (nature-inspired techniques in industrial settings), EvoKNOW (knowledge incorporation in evolutionary computation), EvoNUM (bio-inspired algorithms for continuous parameter optimization), EvoPAR (parallel implementation of evolutionary algorithms), EvoROBOT (evolutionary robotics), EvoSET (nature-inspired algorithms in software engineering and testing), and EvoSTOC (evolutionary algorithms in stochastic and dynamic environments). Across the globe, the past several years have seen a tremendous increase in the role of cooperative autonomous systems. The field of cooperative control and optimization has established itself as a part of many different scientific disciplines. The contents of this hugely important volume, which adds much to the debate on the subject, are culled from papers presented at the Seventh Annual International Conference on Cooperative Control and Optimization, held in Gainesville, Florida, in January 2007. The precise localization of radio frequency (RF) transmitters in outdoor environments has been an important research topic in various fields for several years. Nowadays, the functionalities of many electronic devices are based on the position data of a radiofrequency transmitter using a Wireless Sensor Network (WSN). Spatially separated sensor scan measure the signal from the transmitter and estimate its location using parameters such as Time Of Arrival (ToA), Time Difference Of Arrival (TDOA), Received Signal Strength (RSS) or Direction Of Arrival (DOA). However, certain obstacles in the environment can cause reflection, diffraction, or scattering of the signal. This so called multipath effect affects the measurements for the precise location of the transmitter. Previous studies have discarded

multipath information and have not considered it valuable for locating the transmitter. Some studies used ray tracing (RT) to create position fingerprints, without reference measurements, in a simulated scenario. Others tested this concept with real measurement data, but this proved to be a more cumbersome method due to practical problems in the outdoor environment. This thesis exploits the concept of Channel Impulse Response (CIR) to address the problem of precision in outdoor localization environments affected by multipath. The study aims to fill the research gap by combining multipath information from simulation with real measurements in a machine learning framework. The research question was whether the localization could be improved by combining real measurements with simulations. We propose a method that uses the multipath fingerprint information from RT simulation with reference transmitters to improve the location estimation. To validate the effectiveness of the proposed method, we implemented a TDoA location system enhanced with multipath fingerprints in an outdoor scenario. This thesis investigated suburban and rural areas using well-defined reflective components to characterize the localization multipath pattern. The results confirm the possibility of using multipath effects with real measurements to enhance the localization in outdoor situations. Instead of rejecting the multipath information, we can use them as an additional source of information. The Office of Naval Research (ONR) funds research across a broad range of scientific and engineering disciplines in support of the Navy and Marine Corps. To ensure that its investments are serving those ends and are of high quality, ONR requires each of its departments to undergo annual review. Since 1999, the Naval Expeditionary Warfare Department of ONR has requested that the NRC conduct these reviews. This report presents the results of the second review of the Marine Corps Science and Technology program. The first review was conducted in 2000. The 2003 assessment examines the overall Marine Corps S&T program, the

littoral combat future naval capability, the core thrusts of the program, and basic research activities. This newly revised edition adds two entirely new chapters, one of LDMOS high power RF transistors and how they differ from bipolars, and TMOS FETs, etc. as well as another chapter on designing high power RF amplifiers using LDMOS. This book provides a chronological literature review of optical wireless communication, followed by a detailed blueprint of a visible light communication (VLC) setup with the key characteristics of LEDs and photodetectors. Next, the optical channel impulse response and its description for different possible topologies is presented together with a description of the optical and electrical setup for both optical transmitters (oTx) and optical receivers (oRx). Different single carrier and multi-carrier modulations particularly applied in visible light communication setups are also presented. Both the optical and electrical modules of oTx and oRx are simulated and then prototyped and tested as embedded devices in an underground positioning and monitoring system for a continuous real time identification of the personnel on the main underground galleries where the illumination network is already installed. Presents a comprehensive look at visible light communication technology, both in description and application; Shows where and how VLC has been launched on the market as an alternative or partner technology to the existing wireless communication technologies based on radio frequency; Includes special focus on underground positioning and monitoring with embedded VLC. A unified treatment of the latest game theoretic approaches for designing, modeling, and optimizing emerging wireless communication networks. Covering theory, analytical tools, and applications, it is ideal for researchers and graduate students in academia and industry designing efficient, scalable and robust protocols for future wireless networks. This book comprises select proceedings of the International Conference on Advances in Signal Processing and Communication Engineering (ICASPACE

2021). The book covers several theoretical and mathematical approaches addressing day-to-day challenges in signal, image, and speech processing and advanced communication systems. It primarily focuses on effective mathematical methods, algorithms, and models that enhance the performance of existing systems. The topics covered in the book are advances in signal processing (radar and biomedical), image processing, speech processing, technical and environmental challenges in 5G technology, and strategies for optimal utilization of resources to improve the efficacy of the communication systems in terms of bandwidth and radiating power, etc. The works published in the book will remarkably be helpful to prospective scholars, academicians, and students seeking knowledge in signal processing and communication engineering. This book mainly focuses on the experimental research of rf breakdown and field emission with novel methods, including triggering rf breakdown with high intensity laser and pin-shaped cathodes as well as locating field emitters with a high resolution in-situ imaging system. With these methods, this book has analyzed the power flow between cells during rf breakdown, observed the evolution of field emission during rf conditioning and the dependence of field emission on stored energy, and studied the field emitter distribution and origination. The research findings greatly expand the understanding of rf breakdown and field emission, which will in turn benefit future study into electron sources, particle accelerators, and high gradient rf devices in general. Over 3,700 total pages ... The Manuals and Publications included: IMPROVISED EXPLOSIVE DEVICE (IED) W3H0005XQ STUDENT HANDOUT IMPROVISED EXPLOSIVE DEVICE (IED) B3L0487XQ-DM STUDENT HANDOUT MOTORIZED CONVOY OPERATIONS B4P0573XQ-DM STUDENT HANDOUT TECHNICAL MANUAL ARMY AMMUNITION DATA SHEETS FOR DEMOLITION MATERIALS TECHNICAL MANUAL OPERATORS AND ORGANIZATIONAL MAINTENANCE MANUAL (INCLUDING

REPAIR PARTS AND SPECIAL TOOLS LIST) DEMOLITION MATERIALS IMPROVISED EXPLOSIVE DEVICE (IED) DEFEAT LAND-MINE WARFARE OPERATOR'S AND UNIT MAINTENANCE MANUAL FOR LAND MINES TECHNICAL MANUAL DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL FOR LAND MINES TECHNICAL MANUAL OPERATOR'S MANUAL FOR BODY ARMOR SET, INDIVIDUAL COUNTERMINE (BASIC) OPERATOR'S MANUAL MINE FIELD MARKING SET HAND EMPLACEABLE M133 ORDNANCE AND EXPLOSIVES RESPONSE MULTISERVICE PROCEDURES FOR UNEXPLODED ORDNANCE OPERATIONS EOD - MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES FOR EXPLOSIVE ORDNANCE DISPOSAL IN A JOINT ENVIRONMENT Physical Security of Arms, Ammunition, and Explosives DOD AMMUNITION AND EXPLOSIVES SAFETY STANDARDS INDIVIDUAL TRAINING STANDARDS (ITS) SYSTEM FOR AMMUNITION AND EXPLOSIVE ORDNANCE DISPOSAL OCCUPATIONAL FIELD (OCCFLD) 23 EXPLOSIVE ORDNANCE DISPOSAL (EOD) PROGRAM LIST OF STORAGE AND OUTLOADING DRAWINGS AND AMMUNITION Ammunition and Explosives Safety Standards DOE Explosives Safety Manual Individual Tasks, EQT (Explosives Hazards) Ammunition Handbook: Tactics, Techniques, and Procedures for Munitions Handlers Mine/Countermine Operations Munitions Handling During Deployed Operations – 101 Although microwave mixers play a critical role in wireless communication and other microwave applications employing frequency conversion circuits, engineers find that most books on this subject emphasize theoretical aspects, rather than practical applications. That's about to change with the forthcoming release of Microwave Mixer Technology and Applications. Based on a review of over one thousand patents on mixers and frequency conversion, authors Bert Henderson and Edmar Camargo have written a comprehensive book for mixer designers who want solid ideas for

solving their own design challenges. Many of the important and most interesting patents and related circuits are discussed in the several application oriented chapters. In addition, important contributions from the technical literature are included to provide a solid theoretical foundation. This book contains both introductory and advanced material about active and passive mixers that use bipolar transistor, FET, or diode switching devices. Theory and design details are presented for dozens of important mixer designs, with practical application information derived from the authors' decades of experience. Research has been conducted to determine the location of uncooperative radio-frequency (RF) emitters, using low cost sensors employing broadband, low directivity antennas. Comparably lowered accuracy and longer response time may be appropriate trade-offs for size, weight, and power (SWAP). These sensors can then be deployed on numerous testbeds, and algorithms may take advantage of the reconfigurable, distributive network of sensors to precisely determine the location. To conduct this research, a network of three reconfigurable sensors, equipped for emitting and receiving RF signals, was designed based on Universal Software Radio Peripheral (USRPTM) technology. This thesis details the experiments conducted and the results obtained to develop accurate models of the receiving sensors and to validate the emitter location algorithm. Understand fundamental principles of ambient backscatter technology and their diverse potential applications with this authoritative review. Over 8,300 pages .... Just a SAMPLE of the CONTENTS: NONDESTRUCTIVE INSPECTION METHODS. Published by the Departments of the Army, Navy and Air Force on 1 March 2000 - 771 pages and June 2005 - 762 pages; Metallic Materials and Elements for Aerospace Vehicle Structures 1,733 pages Designing and Developing Maintainable Products and Systems - Revision A 719 pages Sampling Procedures and Tables for Inspection by Attributes 75 pages Nondestructive Testing Acceptance Criteria 88 pages

Environmental Stress Screening Process for Electronic Equipment 49 pages Handbook for Reliability Test Methods, Plans, and Environments for Engineering, Development, Qualification, and Production - Revision A 411 pages Human Engineering - Revision F 219 pages Sampling Procedures and Tables for Life and Reliability Testing (Based on Exponential Distribution) 77 pages Test Method Standard: Electronic and Electrical Component Parts 191 pages Reliability Testing for Engineering Development, Qualification and Production - Revision D 47 pages Electroexplosive Subsystem Safety Requirements and Test Methods for Space Systems (150 pages, 8.64 MB) Reliability Prediction of Electronic Equipment- Notice F 205 pages Reliability Program for Systems and Equipment Development and Production - Revision B 88 pages Electronic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices) - Revision B 171 pages Electrical Grounding for Aircraft Safety 290 pages Fuze and Fuze Components, Environmental and Performance Tests for - Revision C 295 pages Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment - Revision E 253 pages Maintainability Verification/Demonstration/Evaluation - Revision A 64 pages Failure Rate Sampling Plans and Procedures - Revision C 41 pages Maintainability Prediction 176 pages Definition of Terms for Reliability and Maintainability - Revision C 18 pages Semiconductor Devices 730 pages Reliability Modeling and Prediction - Revision B 85 pages Established Reliability and High Reliability Qualified Products List (QPL) Systems For Electrical, Electronic, and Fiber Optic Parts Specifications - Revision F 17 pages Environmental Test Methods and Engineering Guidelines 416 pages) Test Methods for Electrical Connectors - Revision A 129 pages Environmental Engineering Considerations and Laboratory Tests - Revision F 539 pages System Safety Program Requirements 117 pages Test Method

Standard Microcircuits - Revision E 705 pages Test Method Standard Microcircuits - Revision F 708 pages Procedures for Performing a Failure Mode Effects and Criticality Analysis - Revision A 54 pages This book constitutes the thoroughly refereed post-conference proceedings of the Third International Conference on Game Theory for Networks (GameNets 2012) held in Vancouver, Canada, May 24-26, 2012. The 13 revised full papers were carefully selected from 24 submissions and are presented together with 7 invited papers. The papers focus on topics such as mechanism design, physical layer games, network mechanisms, stochastic and dynamic games, game-theoretic network models, cooperative games in networks, security games, spectrum sharing games, P2P and social networks and economics of network QoS. 1. Purpose. To implement policy changes recommended by the Naval Inspector General (NAVINSGEN) to Office of the Chief of Naval Operations Special Assistant for Safety Matters (OPNAV (N09F)) and to define and outline the conduct and reporting of the self-assessment process for safety and occupational health (SOH) programs. 1. PURPOSE. The Marine Corps Occupational Safety and Health (OSH) Program Manual promulgates the requirements and establishes procedures to implement the reference. 2. INFORMATION. This Manual and all references provide the requirements and guidance for commanders and Marine Corps OSH Program professionals to identify and manage risk, maintain safe and healthful operational environments, and meet the Mission Essential Task List (METL) requirements. 3. SCOPE. This Manual is applicable to all Marine Corps activities, including nonappropriated fund activities and operations that are under the sponsorship of the Marine Corps Community Services (MCCS) Director or unit MCCS officers for the purposes of morale, welfare and recreation. This Manual shall also apply to activities that are involved in the acquisition, operation, sponsorship or maintenance of all facilities, activities, and programs. CMC (SD) will provide guidance, upon request, for

program responsibilities on contractors, e.g., public-private venture, etc. 4. EFFECTIVE DATE. This Manual is effective the date signed. Prior to implementation of this Manual, activities must, where applicable, discharge their labor relation's obligations. Assistance and guidance may be obtained from CMC (MPC). DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited. This book is intended to present the state of the art in research on machine learning and big data analytics. The accepted chapters covered many themes including artificial intelligence and data mining applications, machine learning and applications, deep learning technology for big data analytics, and modeling, simulation, and security with big data. It is a valuable resource for researchers in the area of big data analytics and its applications. 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. The Transportation Security Administration requested a study by the National Research Council (NRC) to establish the Committee on Airport Passenger Screening: Millimeter Wave Machines to evaluate two models of active millimeter wave scanners: the L3 ProVision 1 and L3 ProVision 2. Airport Passenger Screening Using Millimeter Wave Machines provides findings and recommendations on compliance with applicable health and safety guidelines and appropriateness of system design and procedures for preventing over exposure. This study addresses the issue of whether millimeter wave machines used at airports comply with existing guidelines and whether it would be possible for anything to go wrong with the machines so that, by mistake, it exposes a person to more than 10 W/m2. Recent concerns over the possible hazards of electrical and magnetic fields in the home and workplace are comprehensively addressed within this book. The chapters contain detailed research on the biological effects of electric and magnetic fields, and evidence for and against any interaction of electromagnetic fields (EMFs) and biological systems. The relative risk of exposure to EMFs Putative behavioral and neural effects of EMFs EMF effects on cells

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