



EI 数据库收录期刊

06期

2022年44卷

ISSN 1009-5896  
CODEN DKXUEC  
CN11-4494/TN

# 电子与信息学报

JOURNAL OF ELECTRONICS & INFORMATION TECHNOLOGY

先进水声通信与信号处理专题



科学出版社

# 电子与信息学报

DIANZI YU XINXI XUEBAO

第44卷 第6期 2022年6月

## 目 次

### 先进水声通信与信号处理专题

- 基于Kalman滤波的水声混合双向迭代信道均衡算法 ..... 杨斌斌, 鄢社锋, 章绍晨, 叶子豪 (1879)  
浅海非高斯噪声下基于变分贝叶斯推断的波达角估计 ..... 冯 晓, 周明章, 张学波, 叶 煄, 王俊峰, 孙海信 (1887)  
内孤立波环境下稳健降阶自适应匹配场定位方法研究 ..... 李杰美慧, 史 阳, 杨益新, 黄晓冬 (1897)  
基于辐射噪声干涉条纹斜率分布的声源深度分辨方法研究 ..... 安 良, 徐若珺, 曹红丽 (1906)  
基于主从式水下自主航行器移动组网的合作目标定位方法 ..... 赵婧旭, 赵 晨, 周 锋 (1919)  
面向水声传感网的自主水下航行器辅助定位动态路径规划 ..... 黄沛砾, 王易因, 关新平, 黄梦醒 (1927)  
改进的Gold码并行组合扩频水声通信 ..... 李 燕, 贾 宁, 黄建纯, 刘 彪, 郭圣明 (1937)  
基于双对数谱和卷积网络的船舶辐射噪声分类 ..... 徐源超, 蔡志明, 孔晓鹏 (1947)  
基于动态参数HMM的水声信号线谱轨迹提取方法 ..... 罗昕炜, 李 磊, 沈子涵 (1956)  
适用于水下物联网的混合地理路由协议设计 ..... 闫 磊, 何天恺, 王易因, 张榕鑫, 李鑫滨 (1966)  
基于生成对抗网络的舰船辐射噪声分类方法研究 ..... 李 理, 李向欣, 殷敬伟 (1974)  
基于多层次双向长短时记忆网络的水声多载波通信索引检测方法 .....  
..... 朱雨男, 解方彤, 张明亮, 王 彪, 葛慧林 (1984)  
一种适用于北极双轴声道的改进压缩匹配场定位算法研究 ..... 吕玉娇, 刘崇磊, 张扬帆, 黄海宁 (1991)  
基于改进自适应IMM-UKF算法的水下目标跟踪 ..... 王平波, 刘 杨 (1999)  
基于空时处理的水声扩频通信 ..... 周 锋, 张文博, 张宝胜, 聂东虎, 王 洋, 刘 兵 (2006)  
基于NS-3的声电协同网络实现及路由性能分析 ..... 江子龙, 王 炎, 钟雪峰, 陈芳炯, 官权升, 季 飞 (2014)  
一种面向水下移动通信的组合差分扩频水声通信方法 ..... 胡耀辉, 韩树平, 刘建波, 张 奇, 张延厚 (2024)  
基于数据样本方差的正交频分复用水声通信多普勒频移估计方法 .....  
..... 周成阳, 王 巍, 洪丹阳, 张春华 (2035)  
基于频移键控的仿海豚哨声水声通信技术 ..... 马天龙, 刘淞佐, 乔 钢, 浦王轶 (2045)  
移动水声异步网络自定位和时间同步联合的单向动态预测算法 ..... 高婧洁, 王 威, 陈 鹏, 申晓红 (2054)  
基于联合分布适配的水下声源测距算法研究 ..... 李 理, 孙玉林, 曹 然, 郭龙祥 (2061)  
非凸稀疏约束的多快拍压缩波束形成 ..... 丁飞龙, 迟 聘, 李 宇, 黄海宁 (2071)
- ### 电路与系统设计
- 基于忆阻的全功能巴甫洛夫联想记忆电路的设计、实现与分析 .....  
..... 董哲康, 钱智凯, 周广东, 纪晓悦, 齐冬莲, 赖俊升 (2080)  
故障扰动下振荡环型真随机数发生器安全特性及度量方法研究 .....  
..... 罗 芳, 欧庆于, 周学广, 褚滩禹, 高 飞 (2093)  
非对称忆阻诱导的吸引子非对称演化与机理研究 ..... 武花干, 周 杰, 陈胜垚, 陈 墨, 徐 权 (2101)

基于DNA域编码的余三码四位减法器的设计 .....	..... 黄 春, 郭毅飞, 张新雅, 孙军伟, 王英聪, 李盼龙, 王延峰 (2110)
<b>雷达、声呐与导航</b>	
基于标签传播算法的海面漂浮小目标检测方法 .....	..... 许述文, 茹宏涛 (2119)
基于迭代近端投影的二维欠采样合成孔径雷达成像 .....	..... 李家强, 郭桂祥, 陈金立, 朱艳萍 (2127)
基于加权最小二乘的合成孔径高度计重跟踪估计器设计与验证 .....	..... 王佳明, 许 可, 蒋茂飞 (2135)
基于周期截断数据矩阵奇异值分解的干扰抑制技术 .....	..... 戚连刚, 申振恒, 王亚妮, 国 强, Kaliuzhny Mykola (2143)
<b>无线通信与物联网</b>	
基于旋转永磁体的低频通信技术研究 .....	..... 张 锋, 孙发晓, 渠晓东, 宫兆前, 纪奕才, 方广有 (2151)
带精英集并行遗传算法的无人机干扰资源调度 .....	..... 邓 敏, 伍志高, 姚志强, 陈永其 (2158)
<b>模式识别与智能信息处理</b>	
基于深度卷积神经网络的无参考低照度图像增强 .....	..... 陈 勇, 陈 东, 刘焕淋, 黄美永, 汪 波 (2166)
基于双分支特征融合的无锚框目标检测算法 .....	..... 侯志强, 郭 浩, 马素刚, 程环环, 白 玉, 范九伦 (2175)
基于双曲图注意力网络的知识图谱链路预测方法 .....	..... 吴 锋, 陈鸿昶, 张建朋 (2184)
一种基于欧氏距离的种群规模动态控制方法 .....	..... 季伟东, 倪婉璐 (2195)
多尺度超像素纹理特征保持与融合的高光谱图像分类 .....	..... 涂 兵, 朱 禹, 周承乐, 陈思源, 何 伟 (2207)
<b>综述评论</b>	
雷达辐射源个体识别综述 .....	..... 史 亚, 张文博, 朱明哲, 王 磊, 徐胜军 (2216)
FPGA三模冗余工具的关键技术与发展 .....	..... 陈 雷, 张瑶伟, 王 硕, 周 靖, 田春生, 庞永江, 马筱婧, 周 冲, 杜 忠 (2230)

# JOURNAL OF ELECTRONICS & INFORMATION TECHNOLOGY

Vol.44 No.6 June 2022

## CONTENTS

### Special Topic on Advanced Underwater Acoustic Communication and Signal Processing

Hybrid Bi-directional Turbo Equalization for Underwater Acoustic Communications Based on Kalman Filter .....	YANG Binbin, YAN Shefeng, ZHANG Shaochen, YE Zihao	(1879)
Variational Bayesian Inference Based Direction Of Arrival Estimation in Presence of Shallow Water Non-Gaussian Noise .....	FENG Xiao, ZHOU Mingzhang, ZHANG Xuebo, YE Kun, WANG Junfeng, SUN Haixin	(1887)
Robust Adaptive Matched Field Processing of Rank Reduction for Source Localization under Internal Solitary Waves .....	LI Jiemeihui, SHI Yang, YANG Yixin, HUANG Xiaodong	(1897)
Source Depth Discrimination Based on the Interference Striation Slopes Distribution of Radiated Noise .....	AN Liang, XU Ruojun, CAO Hongli	(1906)
Cooperative Target Location Method Based on Master-slave Autonomous Underwater Vehicles Mobile Network .....	ZHAO Jingxu, ZHAO Chen, ZHOU Feng	(1919)
Dynamic Path Planning for Autonomous Underwater Vehicle Assisted Localization of Underwater Acoustic Aensor Networks .....	HUANG Peishuo, WANG Yiyin, GUAN Xinping, HUANG Mengxing	(1927)
Improved Parallel Combinatory Spread Spectrum Underwater Acoustic Communication Based on Gold Codes .....	LI Yan, JIA Ning, HUANG Jianchun, LIU Biao, GUO Shengming	(1937)
Classification of Ship Radiated Noise Based on Bi-Logarithmic Scale Spectrum and Convolutional Network .....	XU Yuanchao, CAI Zhiming, KONG Xiaopeng	(1947)
Line Spectrum Trajectory Extraction Method of Underwater Acoustic Signal Based on Dynamic Parameter HMM .....	LUO Xinwei, LI Lei, SHEN Zihan	(1956)
Hybrid Geographical Routing Protocol for Internet of Underwater Things .....	YAN Lei, HE Tiankai, WANG Yiyin, ZHANG Rongxin, LI Xinbin	(1966)
Research on Classification Algorithm of Ship Radiated Noise Data Based on Generative Adversarial Network .....	LI Li, LI Xiangxin, YIN Jingwei	(1974)
Index Detection for Underwater Acoustic Multi-carrier Communication Based on Deep Bidirectional Long Short-term Memory Network .....	ZHU Yunan, XIE Fangtong, ZHANG Mingliang, WANG Biao, GE Huilin	(1984)
Research on an Improved Compressive Matched Field Localization Algorithm for Arctic Double Channels .....	LÜ Yujiao, LIU Chonglei, ZHANG Yangfan, HUANG Haining	(1991)
Underwater Target Tracking Algorithm Based on Improved Adaptive IMM-UKF .....	WANG Pingbo, LIU Yang	(1999)
Underwater Acoustic Spread Spectrum Communications Based on Space-Time Cluster Processing .....	ZHOU Feng, ZHANG Wenbo, ZHANG Baosheng, NIE Donghu, WANG Yang, LIU Bing	(2006)
Implementation and Routing Performance Analysis Based on Network Simulator-3 for Coordinate Radio-Acoustic Network .....	JIANG Zilong, WANG Yan, ZHONG Xuefeng, CHEN Fangjiong, GUAN Quansheng, JI Fei	(2014)
Combination Differential Direct Sequence Spread Spectrum Algorithm for Mobile Underwater Acoustic Communication .....	HU Yaohui, HAN Shuping, LIU Jianbo, ZHANG Qi, ZHANG Yanhou	(2024)
Doppler Frequency Shift Estimation Method for Orthogonal Frequency Division Multiplexing Underwater Acoustic Communication Based on Data Sample Variance .....	ZHOU Chengyang, WANG Wei, HONG Danyang, ZHANG Chunhua	(2035)
Bionic Underwater Acoustic Communication by Mimicking Dolphin Whistle Based on Frequency Shift Keying .....	MA Tianlong, LIU Songzuo, QIAO Gang, PU Wangyi	(2045)

(To be continued on inside back cover)

(Continued)

A One-way Prediction Based Joint Self-localization and Synchronization Algorithm for Mobile Underwater Acoustic Asynchronous Networks .....	GAO Jingjie, WANG Wei, CHEN Peng, SHEN Xiaohong	(2054)
Research on Underwater Source Ranging Algorithm Based on Joint Distribution Adaptation .....	LI Li, SUN Yulin, CAO Ran, GUO Longxiang	(2061)
Multiple-snapshot Compressive Beamforming with Non-convex Sparse Constraints .....	DING Feilong, CHI Cheng, LI Yu, HUANG Haining	(2071)
<b>Circuit and System Design</b>		
Memory Circuit Design, Implementation and Analysis Based on Memristor Full-function Pavlov Associative .....	DONG Zhekang, QIAN Zhikai, ZHOU Guangdong, JI Xiaoyue, QI Donglian, LAI Junsheng	(2080)
Research on the Security Characteristic and Metric Method for Ring Oscillatror-based True Random Number Generator under Fault Disturbance .....	LUO Fang, OU Qingyu, ZHOU Xueguang, CHU Weiyu, GAO Fei	(2093)
Asymmetric Memristor-induced Attractor Asymmetric Evolution and Its Mechanism .....	WU Huagan, ZHOU Jie, CHEN Shengyao, CHEN Mo, XU Quan	(2101)
Design of Four-bit Subracter Using Excess-3 Code Rules Based on DNA Domain Coding .....	HUANG Chun, GUO Yifei, ZHANG Xinya, SUN Junwei, WANG Yingcong, LI Panlong, WANG Yanfeng	(2110)
<b>Radar, Sonar and Navigation</b>		
Small Target Detection on Sea Surface Based on Label Propagation Algorithm .....	Xu Shuwen, Ru Hongtao	(2119)
Two-dimensional Underwent Synthetic Aperture Radar Imaging Based on Iterative Proximal Projection .....	LI Jiaqiang, GUO Guixiang, CHEN Jinli, ZHU Yanping	(2127)
Design and Verification of Retracking Estimator for Synthetic Aperture Altimeter Based on Weighted Least Squares .....	WANG Jiaming, XU Ke, JIANG Maofei	(2135)
Interference Suppression Technology Based on Singular Value Decomposition of Periodic Truncated Data Matrix .....	QI Liangang, SHEN Zhenheng, WANG Yani, GUO Qiang, Kaliuzhny Mykola	(2143)
<b>Wireless Communication and Internet of Things</b>		
Research on Low Frequency Communication Technology Based on Rotating Permanent Magnet .....	ZHANG Feng, SUN Faxiao, QU Xiaodong, GONG Zhaoqian, JI Yicai, FANG Guangyou	(2151)
Unmanned Aerial Vehicle Jamming Resource Scheduling Based on Parallel Genetic Algorithm with Elite Set .....	DENG Min, WU Zhigao, YAO Zhiqiang, CHEN Yongqi	(2158)
<b>Pattern Recognition and Intelligent Information Processing</b>		
Unreferenced Low-lighting Image Enhancement Based on Deep Convolutional Neural Network .....	CHEN Yong, CHEN Dong, LIU Huanlin, HUANG Meiyong, WANG Bo	(2166)
Anchor-free Object Detection Algorithm Based on Double Branch Feature Fusion .....	HOU Zhiqiang, GUO Hao, MA Sugang, CHENG Huanhuan, BAI Yu, FAN Jiulun	(2175)
Link Prediction in Knowledge Graphs Based on Hyperbolic Graph Attention Networks .....	WU Zheng, CHEN Hongchang, ZHANG Jianpeng	(2184)
A Dynamic Control Method of Population Size Based on Euclidean Distance .....	JI Weidong, NI Wanlu	(2195)
Hyperspectral Image Classification Based on Multi-scale Superpixel Texture Preservation and Fusion .....	TU Bing, ZHU Yu, ZHOU Chengle, CHEN Siyuan, HE Wei	(2207)
<b>Overviews</b>		
Specific Radar Emitter Identification: A Comprehensive Review .....	SHI Ya, ZHANG Wenbo, ZHU Mingzhe, WANG Lei, XU Shengjun	(2216)
Key Technology and Development of Triple Modular Redundancy Tool for FPGA .....	CHEN Lei, ZHANG Yaowei, WANG Shuo, ZHOU Jing, TIAN Chunsheng, PANG Yongjiang, MA Xiaojing, ZHOU Chong, DU Zhong	(2230)