



ISSN 1672- 6944  
CN 32-1675/TN

2021 04 第 18 卷 Vol.18

# 无线互联科技

WIRELESS INTERNET TECHNOLOGY

中国核心期刊（遴选）期刊

中国学术期刊网络出版总库（中国知网）全文收录

万方数据 - 数字化期刊群全文收录

中文科技期刊数据库（维普网）全文收录

ISSN 1672-6944



9 771672 694217

主管：江苏省科学技术厅

主办：江苏省科学技术情报研究所

万方数据

2004年创刊  
2021年第4期  
(总第200期)  
第18卷  
半月刊  
2021年2月25日

主管: 江苏省科学技术厅

主办: 江苏省科学技术情报研究所

编辑出版: 《无线互联科技》杂志社

社长: 李敏

副社长: 李克贵

主编: 严文强

副主编: 汤洪

编辑部主任: 王雪芬

本期责任编辑: 何琳

编委: (按姓氏笔画为序)

马永浩 孙斌

金福兰 周晓明

黄水清 薛飞

# 目次

## 通信观察

- 1 人工智能技术在5G网络中的应用 佟志勇  
3 5G无线通信技术概念及其应用研究 樊娟  
5 线性均衡算法在高铁车灯通信中的应用研究 姜良奎, 林蓝, 张琪  
9 高寒高海拔环境对光纤传输系统的影响及应对策略分析 朱川, 黄玺  
12 某型机载平面阵列天线结构设计 高宏涛

## 无线天地

- 16 基于物联网和人工智能技术的智能行李安检系统研究 叶宁  
18 物联网技术在智能电网中的应用 刘锐  
20 齿轮箱振动无线监测节点发展现状 钱黎明, 郭峰, 查朦, 陆卫卫  
22 单WiFi室内分米级定位技术探讨 杨树桦  
24 无线传感网络部分覆盖技术研究展望 宋刚, 黄科  
27 基于空谱特征稀疏表达的治安风险检测文献综述 徐慧, 于晓青  
30 上下游行业用电变化的因果关系及预测方法 包永迪, 杨一帆, 王旭强, 周佳禾

## 网络地带

- 34 基于MFC串口服务器的网络控制系统研究 刘艳茹  
36 工业自动化层级以太网架构系统的应用 周资清, 许镇嵩, 柳凯旋  
38 基于大数据环境下网络安全相关问题探索 董明  
40 基于网络计划的施工项目调度优化问题研究 柯玲  
42 融媒体广电工程中网络技术应用的思考 闫鑫龙  
44 数字化医院信息安全建设与管理策略分析 方万庚

## 软件透视

- 46 陆梁油田物联网实时监控平台的优化与应用 胡雅, 肖翔, 赵腾飞  
48 图书馆座位资源精细化管理系统设计与实现 敖健  
50 摊位信息管理系统的建立与应用 王楠, 苗志刚, 曹莹, 季茗轩, 黄敬  
52 基于SSM框架的拼团自由玩系统设计与实现 肖勇彪  
54 精准扶贫辅助测评系统设计 杨超, 文展, 那晏禾, 张宇杰  
56 基于微信公众号的缴费充值系统设计 韩健

## 设计分析

- 58 基于边云协同的智能吸尘式黑板擦设计分析与应用探讨 方世纪  
61 一种为站内UPS供电的光伏发电系统设计 李洪伟, 史俊, 熊晓川, 徐学帅, 刘乐  
63 智能快递柜全天自助服务技术分析 邓灿, 汪辉, 余员琴, 张冲  
65 基于深度学习算法的智能视觉环卫小车设计 黄丽娟, 刘小红, 唐启涛, 和振鹏, 游喜涛, 袁练  
67 Verilog HDL数字钟电路的设计研究 李冠霖, 张宝玲  
69 基于轮轴原理的新型自行车手刹装置设计与实验 齐非凡, 夏百花  
71 基于CentOS7的邮件服务器的设计与实现 任开军  
73 基于区块链智能合约的数据安全平台设计与实现 张小芳, 朱熠熠  
76 基于单片机的心率监测和分析系统设计 周宇阳, 酒衷豪  
78 基于高校校园网站的界面设计研究——以武汉纺织大学外经贸学院为例 金子维

## 技术应用

- 80 计算机图像识别技术现状及优化策略研究 尹雅楠
- 82 基于SVG的可视化技术在电力系统中的应用 付 奎, 王 涛, 刘志松
- 84 三维数字地形图测绘技术研究 吕友成, 梁忠森, 樊继福
- 86 计算机技术在档案数字化管理中的应用研究 张 玲
- 88 高校学生管理中计算机技术的有效应用分析 张小锋
- 90 电子科技企业信息安全技术应用分析 赵浚宇
- 92 GPS技术在大气探测中的运用 尼玛楚多
- 94 自动控制技术在机械加工工艺中的应用研究 丁彬瀚
- 96 抗攻击的图像水印技术综述 李云亚, 李冬森, 付 蓉
- 102 微电子封装技术的优势与应用 夏旭晖
- 104 电磁频谱监测数据运用研究 彭 程, 杨 馨, 王 哲, 赵志远

## 实验研究

- 108 半导体温差发电转换效率研究 冯倩倩, 杨浩钦, 韩娅钟, 冷 敏, 肖 啸
- 110 数字信号处理对电子测量与仪器的影响 朱展枢
- 112 高校计算机实验室桌面化虚拟化建设的研究 张园园, 冯光南
- 115 照明方式与配光曲线对隧道照明质量的影响分析 李 志
- 117 NW型轮边减速器关键零部件的承载能力分析 王海霞, 信 稳, 李铁峰

## 数字教育

- 119 “停课不停学”背景下有效开展在线教学的措施分析 马 慧
- 121 “互联网+”视域下继续教育泛在学习资源建设模式研究 谢 兵
- 123 依托虚拟教研室的“铁路信号基础”课程建设研究 王墨琦
- 126 “互联网+”背景下高校“高等数学”“金课”的打造路径研究 蔡晓伦
- 128 基于能力培养的“电路分析基础”课程教学过程设计  
蒋龙云, 李 伟, 岳倩倩, 谢 芳
- 130 基于TRIZ理论的“数据库原理及应用”课程教学研究与实践  
梁 娟, 吴 媛, 刘 丹, 马世霞
- 132 基于CDIO-OBE工程教育模式的学生综合能力提升的探索  
——以“操作系统”课程为例 徐向艺, 赵郑营
- 134 基于信息技术的高等院校混合式教学模式研究 张单妹
- 136 “向导-主体”网络教学模式探索 马清珍, 张玉魁
- 140 “互换性与技术测量”课程在线教学实践探索 穆 欣, 贾利晓
- 142 Packet Tracer在“计算机网络”课程教学中的应用研究 胡 斌
- 144 电教媒体对美术课堂教学的优化作用研究 黄秀祥
- 146 基于CDIO理念的混合式教学研究——以“计算机网络技术”课程为例  
孙继征
- 148 高职院校“Python语言”课程教学探讨 油 晔
- 150 基于实践模式的“电力系统分析”课程研究 李建军, 酉育红, 邹梦丽
- 152 引导式教学方法在“天线”课程教学中的应用 叶志红, 王 平, 李 强
- 154 基于“两性一度”标准的VB课程建设研究与实践 包空军, 孙占锋
- 157 基于OBE理念的大学“计算机公共基础”课的改革与实践 王鹏远, 张 凯
- 159 青年教师信息化教学能力培养途径  
——基于混合式教学的“计算机网络基础”课程改革与研究 荆于勤
- 161 高校教师信息化教学能力的提升策略研究  
——基于某高校的调查结果 蒋 凤
- 163 “云计算”环境下人才培养模式创新发展路径研究 仇永明
- 167 基于大数据的高校学生学业评价体系探讨 谢于晨

中国标准连 ISSN 1672-6944  
续出版物号: CN 32-1675/TN

邮发代号: 28-473

发行范围: 公开

发 行: 江苏省报刊发行局

印 刷: 南京百花彩色印刷广告制作  
有限责任公司

定 价: 40.00元

《无线互联科技》杂志社

社 址: 江苏省南京市龙蟠路171号

电 话: (025)-85433097

(025)-85410361

邮 编: 210042

网 址: www.sti.js.cn

(科技宣传—科技传媒服务中心)

邮 箱: hlkj@sti.js.cn

户 名: 江苏省科学技术情报研究所

账 号: 4301012509001028301

开 户 行: 工商银行南京市板仓支行

# WIRELESS INTERNET TECHNOLOGY

No.04 2021 ( Total No.200 )

## CONTENTS

Application of artificial intelligence technology in 5G network .....	Tong Zhiyong ( 1 )
Research on the concept and application of 5G wireless communication technology .....	Fan Juan ( 3 )
Application analysis of Linear Equalization Algorithm in high-speed railway car light communication .....	Jiang Liangkui, Lin Lan, Zhang Qi ( 5 )
Analysis on the influence of high altitude and cold environment on optical fiber transmission on countermeasures .....	Zhu Chuan, Huang Xi ( 9 )
Structural design of a type of airborne planar antenna array .....	Gao Hongtao ( 12 )
Research on intelligent baggage security system based on Internet of Things and artificial intelligence technology .....	Ye Ning ( 16 )
Application of IoT technology in smart grid .....	Liu Rui ( 18 )
Development status of gearbox vibration wireless monitoring node .....	Qian Liming, Guo Feng, Zha Meng, Lu Weiwei ( 20 )
Discussion on the location technology of meter in single WiFi room .....	Yang Shuhua ( 22 )
Research and prospect of partial coverage of wireless sensor networks .....	Song Gang, Huang Ke ( 24 )
Literature review of public security risk detection based on sparse expression of spatial spectrum features .....	Xu Hui, Yu Xiaoqing ( 27 )
Causality and forecasting methods of electricity consumption changes in upstream and downstream industries .....	Bao Yongdi, Yang Yifan, Wang Xuqiang, Zhou Jiahe ( 30 )
Study on network control system based on MFC serial server .....	Liu Yanru ( 34 )
Application on the industrial automation level ethernet network architecture system .....	Zhou Ziqing, Xu Zhensong, Liu Kaixuan ( 36 )
Exploration of network security related issues based on Big Data environment .....	Dong Ming ( 38 )
Research on construction project scheduling optimization based on network planning .....	Ke Ling ( 40 )
Thoughts on the application of network technology in media broadcasting engineering technology .....	Yan Xinlong ( 42 )
Analysis on information security construction and management strategy of digital hospital .....	Fang Wangeng ( 44 )
Optimization and application of real-time monitoring platform for Internet of Things in Luliang Oilfield .....	Hu Ya, Xiao Xiang, Zhao Tengfei ( 46 )
Design and implementation of fine management system for library seating resources .....	Jiao Jian ( 48 )
Establishment and application of stall information management system .....	Wang Nan, Miao Zhigang, Cao Ying, Ji Mingxuan, Huang Min ( 50 )
Design and implementation of free play system based on SSM framework .....	Xiao Yongbiao ( 52 )
Design of precision poverty alleviation auxiliary evaluation system .....	Yang Chao, Wen Zhan, Na Yanhe, Zhang Yujie ( 54 )
Design of payment charging system based on official account of WeChat .....	Han Jian ( 56 )
Analysis and application of intelligent vacuum blackboard eraser based on side cloud co-operation .....	Fang Shiji ( 58 )
Design on photovoltaic power generation system for UPS in the station .....	Li Hongwei, Shi Jun, Xiong Xiaochuan, Xu Xueshuai, Liu Le ( 61 )
Analysis of all day self service technology of intelligent express cabinet .....	Deng Can, Wang Hui, Yu Yuanqin, Zhang Chong ( 63 )
Design of intelligent vision sanitation vehicle based on deep learning algorithm .....	Huang Lijuan, Liu Xiaohong, Tang Qitao, He Zhenpeng, You Xitao, Yuan Lian ( 65 )
Design and research of Verilog HDL digital clock circuit .....	Li Guanlin, Zhang Baoling ( 67 )
Design and experiment of new bicycle handbrake device based on wheel shaft principle .....	Qi Feifan, Xia Baihua ( 69 )
Design and implementation of CentOS7 based mail server .....	Ren Kaijun ( 71 )
Design and implementation of data security platform based on blockchain smart contract .....	Zhang Xiaofang, Zhu Rongrong ( 73 )
Design of an intelligent electronic pricing device for post office .....	Zhou Yuyang, Jiu Zhonghao ( 76 )
Research on the interface design of university campus website—a case of International Business Economic College of Wuhan Textile University .....	Jin Ziwei ( 78 )

Research on the status quo and optimization strategies of computer image recognition technology .....	Yin Yanan ( 80 )
Application of SVG—based visualization technology in power system .....	Fu Kui, Wang Tao, Liu Zhisong ( 82 )
Research on mapping technology of 3D digital topographic map .....	Lyu Youcheng, Liang Zhongsen, Fan Jifu ( 84 )
Research on the application of computer technology in the digital management of archives .....	Zhang Ling ( 86 )
Research on the effective application of computer technology in the management of college students .....	Zhang Xiaofeng ( 88 )
Application analysis of information security technology in electronic technology enterprises .....	Zhao Junyu ( 90 )
Application of GPS technology in atmospheric exploration .....	Nimachuduo ( 92 )
Application of automation control technology in machining process .....	Ding Binhan ( 94 )
Summary of anti-attack image watermarking technology .....	Li Yunya, Li Dongsen, Fu Rong ( 96 )
Advantages and applications of microelectronic packaging technology .....	Xia Xuhui ( 102 )
Research on utilization of electromagnetic spectrum monitoring data .....	Peng Cheng, Yang Xin, Wang Zhe, Zhao Zhiyuan ( 104 )
Study on the conversion efficiency of semiconductor thermoelectric generation .....	Feng Qianqian, Yang Haoqin, Han Yazhong, Leng Min, Xiao Xiao ( 108 )
Influence of digital signal processing on electronic measurement and instrument .....	Zhu Zhanshu ( 110 )
Research on the construction of desktop virtualization in university computer LABS .....	Zhang Yuanyuan, Feng Guangnan ( 112 )
Analysis of the influence of lighting method and light distribution curve on tunnel lighting quality .....	Li Zhi ( 115 )
Bearing capacity analysis of the critical parts in NW wheel-side reducer .....	Wang Haixia, Xin Wen, Li Tiefeng ( 117 )
Analysis on online teaching effectively under the background of suspension without suspension .....	Ma Hui ( 119 )
Study on the construction model of learning resources in continuing education from the perspective of Internet .....	Xie Bing ( 121 )
Construction of “Railway Signal Basis” course based on virtual teaching and research office .....	Wang Moqi ( 123 )
Study on building path of “golden course” of higher mathematics in colleges and universities under Internet .....	Cai Xiaolun ( 126 )
Design of teaching process based on ability training in the course of “Introductory Circuit Analysis” .....	Jiang Longyun, Li Wei, Yue Qianqian, Xie Fang ( 128 )
Teaching research and practice of principles and applications of database based on TRIZ Theory .....	Liang Juan, Wu Yuan, Liu Dan, Ma Shixia ( 130 )
Exploration of improving students’ comprehensive ability based on CDIO—OBE engineering education model: taking “Operating System” course as an example .....	Xu Xiangyi, Zhao Zhengying ( 132 )
Research on the mixed teaching mode in colleges and universities supported by information technology .....	Zhang Chanmei ( 134 )
Research on online teaching mode of “guide – master” .....	Ma Qingzhen, Zhang Baokui ( 136 )
Online teaching practice of “Interchangeability and Technical Measurement” .....	Mu Xin, Jia Lixiao ( 140 )
Application research of Packet Tracer in “Computer Network” course teaching .....	Hu Bin ( 142 )
Research on the optimization function of audio-visual media to art classroom teaching .....	Huang Xiuxiang ( 144 )
Research on hybrid teaching based on CDIO concept: taking “Computer Network Technology” course as an example .....	Sun Jizheng ( 146 )
Discussion on “Python Language” teaching in higher vocational colleges .....	You Ye ( 148 )
Research on “Power System Analysis” course based on practice model .....	Li Jianjun, You Yuhong, Zou Mengli ( 150 )
Application of guided teaching method in “Antenna” course teaching .....	Ye Zhihong, Wang Ping, Li Qiang ( 152 )
Study and practice on the construction of VB curriculum based on the “Two Property and One Degree” standard .....	Bao Kongjun, Sun Zhanfeng ( 154 )
Reform and practice of college “Computer Public Basic” courses based on OBE concepts .....	Wang Pengyuan, Zhang Kai ( 157 )
Research on the cultivation approach of young teachers’ informatization teaching ability—the reform and research of “Computer Network Foundation” course based on blended teaching .....	Jing Yuqin ( 159 )
Study on the strategy of improving information-based teaching ability of college teachers—based on the survey of a university .....	Jiang Feng ( 161 )
Research on innovation and development path of talent training mode in “Cloud Computing” environment .....	Qiu Yongming ( 163 )
Discussion on college students’ academic evaluation system based on Big Data .....	Xie Yuchen ( 167 )