2023 4th International Conference on Intelligent Design (ICID 2023)

Xi'an, China 20-22 October 2023



IEEE Catalog Number: CFP23AC3-POD **ISBN:**

979-8-3503-4258-1

Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP23AC3-POD
ISBN (Print-On-Demand):	979-8-3503-4258-1
ISBN (Online):	979-8-3503-4257-4

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



Table of Contents

Design and Implementation of the Intelligent Management System of Drainage Pipe Network based on WSNs and MGRF-GBDT-AdaBoost	1
Danyang Di, Dehua Zhu, Ruoyi Wang, Zhaoyang Zhang, Tianwei Li	1
Research on Service System for Intelligent Traditional Chinese Medicine Decocting Machine based on KANO model	7
Shiyu Liao, Bo Li, Linzhen Feng	
Generative Design for Buffer Layer Structures	14
Ding Zhou, Zhengxiang Zhang, Jiawei Huang, Bingjian Liu	14
Research on Improved Design of Community Shared Cargo Vehicle Based on KANO Model and Modular Concept	21
Zewei Wang, Bo Li, Wenhao Fan	
Research on integrated Development of Footwear Design and Manufacturing based on Digital Twin	26
Wei Qiang, Xiangdong Luo, Pashkevych K.	
Controller Design using Piecewise Lyapunov Functions based on Filippov First Order Theory	33
Hugang Han	22
A Visual Simulation System Architecture and Implementation Method of Target Damage Assessment Based on Unity 3D Interactive Technology	37
Shengbin Shi, Chong Ling, Xiaolong Zhang, Qi Meng	
Cabinet design and analysis based on PCB testing equipment	41
Shiguang Zhang, Wenyan Zhao, Zhenlin Zou, Chenglian Liang	17
Decoupling Design of Dual-Band Shared-Aperture Antenna Using Frequency-Selective Surface	47
Jie Sun, Zhongliang Lu, Xuan Wu, Yayi Hu	
Optimization and Research of Equiincrement Compound Genetic Algorithm in Power Generation Load Distribution	51
Yufei Chi, Guangyao Ma	
A Novel Broadband Differential Feed Metasurface Antenna Based on SIW	56
Xuan Wu, Zhongliang Lu, Jie Sun	50
Intelligent Design of Energy Storage Degaussing Based on Transformer	60
Xueliang Pang, Dundun Zheng	00
Intelligent Distribution Car Design	64
Jiafa Deng, Hanhong Tan, Guiqi Fang, Mingxin Wang, Jinteng Guan	04
Research on Glass Ball Defect Visual Detection Method Based on Deep Learning	68
Zhankui Huo, Cunming Hao, Bing Xie	00
Design and Research of Intelligent Writing and Drawing Robot	73
Xiangdong Yang, Shijie Wang	15
A Ground Power Digital Monitoring Method	77
Jingtao Guo, He Zhang, Keying Huang	11
Hybrid Path Filling Method of Continuous Fiber Reinforced 3D Printing in Topological Configurations Based on Euler Path	81
Heyu Xi, Shikai Jing, Jinrui Xu, Yue Xu	

Design of End-effector Quick-change Device for Medical Collaborative Robots	0.0
Zhaohui Yang, Honghua Zhao, Hao Tian, Jinghan Wang	86
Coal Grate Cleaning Device Based on YOLOV5s	01
Jianyu Li, Chengliang Zhang	91
Interface Interaction Design of Railroad Dispatcher Fatigue State Analysis System	96
Ye Xiao, Juntai Xie, Zengyao Yang, Meng Li	90
Design of A Three-dimensional Magnetic Sensing Array Localization System for Precise Positioning of the Intracavity Environment	101
Dingwen Tong, Zhengnan Wu, Yutan Chen, Yiqun Zhao, Zhan Yang, Xinjian Fan	
Research on Neural Network Digital Pre-distorter Based on Transformer	107
Huang Huang, Xiaoxuan Huang, Jinrong Xie, Xi Huang	107
Research on the Design of Guidance Service for the Elderly under Intelligent Medical Environment	112
Hao Qu, Hao Zhu	
Passive Ecological Building Practice Based on Intelligent Design and Detection of Material Energy Efficiency	121
Quan Jing, Chang Liu, Meng Jia	
A New Art Design Method Based on AIGC: Analysis from the Perspective of Creation Efficiency	129
Jian Rao, Mengzhen Xiong	
Product form design of multiple user clusters based on Kansei engineering	135
Ge Wang, Xueming Qian	155
Element Extraction and Reconstruction of Lingnan Clothing Based on Machine Learning	142
Lan Mo, Xiaopu Zhang, Asliza Bt Aris, Haiping Gu	
Research on the Application of sports slipper Design based on Eye Tracking Technology and Kansei Evaluation Experiment	146
Pin Gao, Shenghua Tan, Xiangbin Shu, Fuyang Zheng, Shihui Peng	
Research on Digital Restoration Design of Stone Lions in Lugou Bridge	152
Zeyuan Li, Ruitong Liu, Tianyi Cao	152
A Visual Study of Automotive Augmented Reality Head Up Display Warning Signals	156
Weijun Li, Jing Zhang, Tian Qiu, Chengqi Xue	100
Building Model Form Generation of Eco-smart Community Based on CFD (Computational Fluid Dynamics) Simulation	162
Huijuan Xia, Mimi Tian	
Target protection using multiple unmanned aerial vehicles based on Stackelberg security game	169
Hongliang Wang, Qiang Chang, Yuan Zuo	
Research on the Interactive Product Design for Children with ASD Based on Cognitive Behavioral Therapy	175
Xiaowen Liu, Xiaowei Liu, Ni Liu	
Smart Glasses for Alzheimer's Disease	180
Shixuan Zhao	100
A Study on the Impact of Deviation in VR Natural Pointing	186
Jun Xu, Xiaozhou Zhou, Yibing Guo	

Evaluation Model for Public Building Design Based on Artificial Intelligence Algorithms	104
Jiali Liu, Leihua Xia	194
Evaluation and Optimization of User-Friendly Enteral Feeding Pump Interface Design Based	
on Eye Tracking Technology	199
Jiayi Jiang, Wei Yu	
The Application of Style Transfer Algorithms in the Graphic Design of Yunnan Tea Carvings	204
Lin Liu, Hanlong Xia	
Research on Influencing Factors of Solar Energy Harvesting for Forestry Internet of Things	209
Yang Dai, Junqiu Li, Qinghui Zhang, Rong Jian	207
Aircraft aerodynamic parameter correction technology based on Tent-PSO	214
Shaoqi Wang, Junmin Zhao, Liangliang Liu, Yijie Zhang	211
Design of assembly line material sorting system based on machine vision	221
Qingsong Yuan, Fuyun He, Jande Su, Ruiqiang Xue	221
Generational Product Design for Convergent Demand Based on KANO Modeling	225
Wen Yan, Chengxin He, Yanmin Xue, Mingming Zhang	223
DFNet: Towards Real-Time Semantic Segmentation with Depthwise Separable Convolution	230
Zhiwei Huang, Luping Wang, Wuming Wu	230
Visual Analysis of Scenic Spot Logo Shape and Color Based on Intelligent Image Classification Technology	236
Zhengcong Wei, Meng Chen	
Research on morphological bionic design based on extensible semiotics and fuzzy comprehensive evaluation	243
Xian Zhou, Wenwen Zhu, Wei Wei, Min Yan	
The Interaction Interface Design Method of Fresh Food E-Commerce Based on Kansei Engineering	247
Kai Wu, Chaoxiang Yang	
Design of Human-computer Interaction System Based on Virtual Reality and its Application in the Dissemination of Study Lodge Culture	251
Yiyi Liu	
Application Research of Computational Design Aesthetics	257
Ding Zhou, Yukun Zhang, Jiawei Huang, Bingjian Liu	231
User Interface Design of Floor Sweeping Robot Based on the Background of Aging Society	263
Tianshuang Zhang, Qiqi Deng	203
A Color Matching Design Method Integrating Color Semantics and Adjacent Network Models	268
Xian Zhou, Wei Wei, Wenwen Zhu, Min Yan	208
The Application Path of AIGC in Assisting Game Character Design - A Case Study of the Black Bear Monster from Journey to the West	275
Xin Mi, Qiao Li, Yang Cao	
Design and Application of Early Warning Fresh Packaging Based on Digital Technology	101
Minghai Sun, Yueheng Yang	283
The Dynamic Turn of Texture Design in Digital Illustration	207
Yue Wang, Honghai Zhang	287

Evaluation of Interactive Interface Design of Alcohol Shopping App Based on Emotional Design Theory	291
Minghai Sun, Zhiqi Zhu	
Research on the extraction and application of cultural design genes based on eye-tracking technologytaking the Nansheng Department Store as an example	296
Pin Gao, Shenghua Tan, Fengpei Han	
Neighborhood-based User Preference Modeling for Conversational Recommender Systems	202
Danqing Li, Na Liu	303
Carrot Rolling Detection Based on Machine Vision	207
Lunan Guan, Chengliang Zhang	307
Research on the design of high-speed train boarding space based on Grasshopper's parametric design	311
Wenming Liu, Jingwen Xiao	
Improving Code Summarization Performance with Model Fusion	215
Yuqing Guo, Hongyu Gao, Hang Su, Qingcheng Sun	315
Financial News Sentiment Analysis Method Based on WMSA-Bi-LSTM	210
Yiyao Chen	319
Multi-Label Text Classification Based on Multi-Task Dynamic Decoding	202
Chaoqun Huang, Aiguo Chen	323
Experimental Study on Time Parameter Correction of Human Machine Interaction Based on GOMS Model	329
Jinshou Shi, Na Zhang, Ming-Fei Qu, Chao Ma, Linjie Li	
Author Index	334