2021 4th International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2021)

Yibin, China
20 – 22 August 2021
2021 the 4th International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2021)
Table of Contents

Preface ......................................................................................................................................................... x
Committees ................................................................................................................................................. xi

● Image, Speech, Signal and Video Processing

LenC: A Redundancy-Aware Length Control Framework for Extractive Summarization ........................................... 1
   Shuxin Li, Weifeng Su, Jiming Liu

Reinforced Background Aware Correlation Filter with Adaptive Weighting Strategy for RGB-T Tracking ................. 8
   Xin Zeng, Zhongqiang Luo, Xingzhong Xiong

DA-Net: Density-Adaptive Downsampling Network for Point Cloud Classification via End-to-End Learning ............. 13
   Yanan Lin, Yan Huang, Shihao Zhou, Mengxi Jiang, Tianlong Wang, Yunqi Lei

Anti-focal Loss for Speech Recognition on Small-Scale Datasets .................................................................................. 19
   Jiakai Ren, Rize Jin, Tae-Sun Chung

Improved Gradient Vector Flow over Manifold for Image Segmentation Using Active Contours ................................. 23
   Xiaoteng Zhu, Ke Cheng, Qingfang Chen, Yuanquan Wang, Ziyang Zhang

An Improved Whale Optimization Algorithm for Dinosaur Lantern Festival Color Image Multilevel Thresholding Segmentation ......................................................................................................................... 28
   Xin-wen Cheng, Hong-qi Wang, Guo-chao Chen

Using YOLOv5 for Garbage Classification .............................................................................................................. 35
   Ziliang Wu, Duo Zhang, Yanhua Shao, Xiaoqiang Zhang, Xingping Zhang, Yupei Feng, Peng Cui

Decoupled Adaptive Convolutional Neural Networks for the Few-Shot Image Classification ....................................... 39
   Wanrong Huang, Yaqing Hu, Shuofeng Hu, Jingde Liu

Infrared and Visible Image Fusion Based on Multi-scale Decomposition with Gaussian and Co-occurrence Filters ...... 46
   Yifang Hu, Jianjun He, Luyao Xu
Design of DDS Signal Generator Based on FPGA ................................................................. 51
   Zhang Daodong, Peng Yikai, Pu Hongping
SR: Severely Defective Image Inpainting with Structural Reconstruction.............................. 55
   Yuelong Li, Peng Wang, Yue Xing, Jianming Wang
Plug-and-Play ADMM Using Deep Image Prior for Image Denoising.................................. 60
   Zhonghua Xie, Lingjun Liu
OGFNet: Original Resolution Subnetwork and GRU Based Feature Fusion Network for Image Denoising................................................................. 66
   Long Li, Feng Zhao, Wenhao Wang, Rushi Lan, Binyi Qin, Xiaonan Luo
Cartoon Colorization with Gray Image Generated from Sketch........................................... 70
   Yilin Ouyang, Yunbo Rao, Dawei Zhang, Jiajun Cheng
Monocular Depth Recovery Based on Self-Attention Mechanism and Transfer Learning............ 75
   Zeqi Li, Chunmiao Yuan, Yukuan Sun, Jianming Wang
Research on UWB Positioning Based on Improved ABC Algorithm.................................. 81
   Dong Li, Lei Chen, Jun Hu, Hao Wu
Underwater Image Enhancement Method Based on Wavelet Transform and Retinex................. 86
   Xiangru Hu
Using the Improved Mask R-cnn and Softer-nms for Target Segmentation of Remote Sensing Image ......................... 91
   Yiwen Wang, Yunbo Rao, Cheng Huang, Yang Yang, Yuanyuan Huang, Qixue He
Single Image Super-Resolution Based on Capsule Network............................................... 96
   Dongmei Xu, Yi Tang, Zuhai Qin, Yu Pan
One-Dimensional Convolutional Neural Network for Detecting Internal Defects of Arc Magnets ......................... 102
   Tian Yang, Qinyuan Huang, Ying Zhou, Qiang Li

Document Analysis, Biometrics and Pattern Recognition Applications

One Simple Method of Positioning and Segmenting Dot Matrix Characters for Recognition.............. 108
   Huiying Wu, Xiao Zhang, Ming Chen
Nuclide Identification Algorithm Based on TrAdaBoost .................................................................. 114
   Haolin Liu, Haibo Ji, Jiangmei Zhang, Jing Lu
FMCW Multi-person Action Recognition System Based on Point Cloud Nearest Neighbor Sampling Algorithm ........ 120
   Mingxiu Sun, Zhimeng Xu, Beichen Sun, Shanshan Zhang
Analysis and Identification of Pipeline's Work Efficiency Based on OpenPose.......................... 125
   Zhen Zhang, Siyi Chen, Zuodong Chen, Guoli Huang, Cuimei Yang, Zhaohua Chen
COMASNet: Precise Face Mask Detector Network .......................................................... 129
   Shuang Gu, Guancheng Wang, Bob Zhang

Classification Method of Birdsong Based on Gabor_WT Feature Image and Convolutional Neural Network ........ 134
   Jiang Liu, Yan Zhang, Danjv Lv, Jing Lu, Haifeng Xu, Shanshan Xie, Yanjiao Xiong

Image Style Transfer Based on DPN-CycleGAN .................................................................. 141
   Mingyu Yang, Jianjun He

Enhancing Low Quality in Radiograph Datasets Using Wavelet Transform Convolutional Neural Network and Generative Adversarial Network for COVID-19 Identification ......................................................... 146
   Grace Ugochi Nneji, Jingye Cai, Deng Jianhua, Happy Nkanta Monday, Ijeoma Amuche Chikwendu, Ariyo Oluwasanmi, Edidiong Christopher James, Goodness Temofe Mgbejime

Sentiment Analysis of Barrage Text Based on ALBERT-ATT-BiLSTM Model ........................................ 152
   Yifan Wu, Jianjun He

✧ Modern Information Technology and Algorithm

Parametric Drawing Profile Milling Cutter Based on AutoCAD .................................................. 157
   Zhou Lingli, Liu Guoqing, Yun Qingfang

Optimization of Quantum Key Distribution Parameters Based on Random Forest ....................... 164
   Yuling Yi, Yunbo Rao, Cheng Huang, Shaoning Zeng, Yang Yang, Qixue He, Xiaofei Chen

End-to-End Matching Network for Invariant Local Features ..................................................... 169
   Di Wang, Hongying Zhang, Yanhua Shao

A Factorization Machine Based Deep Neural Network for Synergism of Cancer Drug Combinations Prediction ........ 176
   Xin Ma, Wenbin Lin, Xiaoli Wu, Huifang Xie, Yi Chen, Shengwen Dong, Xiaona Cao

Motivating Students by Visualizing the Learning Process in College English Classes ..................... 182
   Ming Li

Research on UAV Intelligent Fault Diagnosis Method Based on FS-SVM ........................................ 186
   Liu Guo-qing, Shi Xiao-chun, Wang Ning

Knowledge Graph Construction and Intelligent Question Answering on Science and Technology Intermediary Service ........................................................................................................... 192
   Siling Feng, Zhaocheng Tu, Mengxing Huang, Yuanyuan Wu

Research of Smart Sensors in Unmanned Warehouse System ...................................................... 197
   Demei Huang, Haoyuan Zhu
Enhanced Deep Convolutional Neural Network for Building Component Detection Towards Structural Health Monitoring.......................................................................................................................... 202
  Isaac Osei Agyemang, Xiaoling Zhang, Isaac Adjei Mensah, Bernard Cobbinah Mawuli, Bless Lord Y. Agbley, Joseph Roger Arhin

Intelligent Question Answering System Based on Entrepreneurial Incubation Knowledge Graph ...................................... 207
  Siling Feng, Hao Chen, Mengxing Huang, Yuanyuan Wu

Learning to Detect Keypoints of Multi-type UAVs with OpenPose Network................................................................. 213
  Bo-Hao Tao, Jian-Hua Deng, Zakria

♦ Biomedical Image Analysis and Applications

A Super-Resolution Generative Adversarial Network with Siamese CNN Based on Low Quality for Breast Cancer Identification.......................................................................................................................... 218
  Grace Ugochi Nneji, Jingye Cai, Deng Jianhua, Happy Nkanta Monday, Chukwuebuka Joseph Ejiyi, Edidiong Christopher James, Goodness Temofe Mgbejime, Ariyo Oluwasanmi

Real-Time Simulation of First Porta Treatment Based on Position Based Dynamic.......................................................... 224
  Jian Sun, Yuan Gao, Hongyu Wu, Pengfei Wang, Ke Tan

Capsule Interpretability in Object Detection.......................................................................................................................... 230
  Wei Wang, Quanfeng Xu, Zuhai Qin, Yi Tang

The Capability of Multi Resolution Analysis: A Case Study of COVID-19 Diagnosis................................................................. 236
  Happy Nkanta Monday, Jian Ping Li, Grace Ugochi Nneji, Edidiong Christopher James, Ijeoma Amuche Chikwendu, Chukwuebuka Joseph Ejiyi, Ariyo Oluwasanmi, Goodness Temofe Mgbejime

Brain Tumor Image Segmentation Method Based on M-Unet Network .................................................................................. 243
  Qingjun Ru, Guangzhu Chen, Zaizuo Tang

Using Channel Concatenation and Lightweight Atrous Convolution in U-net for Accurate Rectal Cancer Segmentation .......................................................................................................................... 247
  Yunbo Rao, Weibin Zheng, Shaoning Zeng, Jihong Sun

Analysis of EEG in Unipolar and Bipolar Depression Based on Phase Synchronization................................................................. 255
  Lijuan Duan, Hongli Liu, Changming Wang, Yuanhua Qiao

Ultrasound Vector Flow Mapping in Left Ventricle: A Do it Yourself Study ................................................................. 261
  Yang Wu, Bo Peng, Yaru Luo, Shenghua Xie, Jingfeng Jiang

Improved Convolutional Neural Multi-resolution Wavelet Network for COVID-19 Pneumonia Classification .................... 267
  Happy Nkanta Monday, Jian Ping Li, Grace Ugochi Nneji, Ariyo Oluwasanmi, Goodness Temofe Mgbejime, Chukwuebuka Joseph Ejiyi, Ijeoma Amuche Chikwendu, Edidiong Christopher James
Employing Machine Learning Algorithms to Discover Risk Factors of Glaucoma.......................................................... 274
Abdulkawi Yahya Radman Al-Shamiri

Early Diabetes Risk Prediction Based on Deep Learning Methods................................................................. 282
Luyao Xu, Jianjun He, Yifang Hu

\* Computer Model and Intelligent Computing

A-LSTM Model for Predicting the Deaths Caused by COVID-19 in U.S. ................................................................. 287
Yang Li, Yali Yang, Cong Yang, Baolin Zhang

Research and Development of Fungus-Shaped Blade Root CAM Software Based on VB ................................. 291
Zhou Lingli, Liu Guoqing, Xiong Xiaocong

Deep Masking Generative Network for Irregularly Sampled Multivariate Time Series.............................................. 296
Zenghao Liu, Haoran Wang, Yudong Zhang, Xingli Wang

Design of Altitude Control System for Quadrotor UAV Based on PID and LADRC ................................................. 301
Yubo Liu, Haohan Bei, Wenhao Li, Ying Huang

Photovoltaic Power Generation Prediction Based on Correlation Analysis and GA-BP Neural Network.................... 306
Ji Zeng, Cong Wang, XiuQiong Hu

An Efficient Acoustic Model Based on Deep Feedforward Sequential Memory Networks and Convolutional Neural
Networks........................................................................................................................................................................... 310
Yanrui Zheng, Xiaofeng Yuan, Gang Peng, Wei Zeng

A New Method for Sewage Treatment MBR Membrane Cleaning Model................................................................. 314
Xue Xingfu

Research and Application of Second-Hand Housing Price Prediction Model Based on LSTM................................. 320
Shunshun Ma, Gangwu Jiang, Jianhui Liu, Xin Wang

Big Data Analysis of Intellectual Property Service Agencies ....................................................................................... 326
Siling Feng, Zhi Yang, Mengxing Huang, Yuanyuan Wu

A New Prediction Method of COVID-19 Epidemic................................................................................................. 331
Kaiping Tang, Yiqi Ma, Hao Yan, Yunbo Rao

Enhancing Robustness of Classifiers Based on PCA.............................................................................................. 336
Xueyang Wang, Xiaozhang Liu

A Collision-Free Fast Planning Algorithm for Snake-Like Redundant Manipulators via Reinforcement Learning ....... 342
Ji Qu, Zeliang Zhang, Yue Lin, Yunque Zhang, Jianming Wang, Xuan Xiao
An Unsupervised Discriminative Random Vector Functional Link Network for Efficient Data Clustering …………………..347
Yikai Zhang, Qi Zhu, Yong Peng, Wanzeng Kong

◊ Computer Vision and Robot Vision

IV-WA: An Information Visual Tool with WebAR……………………………………………………………………………………………………353
Shanshan Xiang, Wensheng Tang, Yunqiang Pei, Yadong Wu, Yonghui Chen, Fupan Wang, Zhiwei Hou
Visual Analysis of Chinese Pattern Recognition Algorithms Research in Recent Ten Years ………………………………………..362
Peng Huang, Jiandong Zhao, Lirong Dong, Xiongna Deng, Tingting Lu
Landslide Detection Based on Improved YOLOv5 and Satellite Images………………………………………………………………………367
Tao Wang, Mingzhe Liu, Hong Zhang, Xin Jiang, Yao Huang, Xueyao Jiang
Ship Detection Based on SAR Imaging Supervised by Noisy Ship Direction …………………………………………………………………………372
Jiangyi Huang, Yuzhen Niu, Weize Gan
Holistic Attention on Pooling Based Cascaded Partial Decoder for Real-Time Salient Object Detection ……………………………..378
Chiagoziem C. Ukwuoma, Qin Zhiquang, Md. Altab Hossin, Bernard M. Cobbinah, Ariyo Oluwasanmi, Ijeoma A.
Chikwendo, Chukwuebuka J. Ejiyi, Hassan S. Abubakar
SDCDet: Robust Remote Sensing Object Detection Based on Instance Segmentation Direction Correction………………385
Yuelong Li, Zhiwei Wang, Jianming Wang, Peng Wang
Aircraft Rotated Boxes Detection Method Based on YOLOv5…………………………………………………………………………………………390
Xu Baiqi, Jiang Gangwu, Liu Jianhui, Wang Xin, Yu Peidong
MPTS-AFDP: Multi-pedestrian Tracking and Segmentation Based on Anchor-Free Detector …………………………………………395
Xiaobing He, Keyang Cheng, Chunyun Meng
A Visual SLAM Algorithm Based on Image Semantic Segmentation in Dynamic Environment ………………………………………401
Yukun Wang, Xiaojie Duan, Yukuwan Sun, Jianming Wang
Object-Orient Semantic-to-Visual Generation Model for Stickers Synthetizing …………………………………………………………….406
Xiaorui Li, Bin Li, Cheng Xie, Qing Liu
Accurate Landing System of Electrical Power Plant Inspection UAV Based on Vision Guidance ………………………………………412
Qimeng Huang, Yanhua Shao, Yanying Mei, Zhiyuan Chang, Liangtao Zhong, Zhiyang Zhou, Hongyu Chu, Huayi
Zhan, Mingqi Huang
Subspace Capsule Network for Blurred Image Super-Resolution……………………………………………………………………………………416
ZuHai Qin, Yi Tang, Wei Wang, DongMei Xu, Yu Pan
Producing High Quality Labels through Progressively Improving Strategy…………………………………………………………………………422
Di Wang, Ronghao Yang, Xiao Wang, Hanhu Liu, Jin Liu, Wang Miao, Dalan Xie
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern Recognition and Machine Learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsupervised Representation Learning of Point Cloud via Local</td>
<td>Yunan Huang, Yan Zhang, Mengxi Jiang, Yanan Lin, Lingli Chen, Yunqi</td>
<td>428</td>
</tr>
<tr>
<td>Discriminability Enhancing</td>
<td>Lei</td>
<td></td>
</tr>
<tr>
<td>Parallel Classification and Detection System for High-Resolution</td>
<td>Jiang Min, Zhang Xuebo, Zhang Chengguang</td>
<td>434</td>
</tr>
<tr>
<td>Remote Sensing Images</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistency-Based Semi-supervised Learning for Point Cloud</td>
<td>Lingli Chen, Yan Zhang, Yanan Lin, Mengxi Jiang, Yunan Huang, Yunqi</td>
<td>440</td>
</tr>
<tr>
<td>Classification</td>
<td>Lei</td>
<td></td>
</tr>
<tr>
<td>Design of Online Handwritten Mathematical Expression Recognition</td>
<td>Zheng Endong, Liu Licheng</td>
<td>446</td>
</tr>
<tr>
<td>System Based on Gated Recurrent Unit Recurrent Neural Network</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underwater Target Recognition Method Based on Domain Adaptation</td>
<td>Boying Zhang, Jingzhe Fang, Zi'ao Ma</td>
<td>452</td>
</tr>
<tr>
<td>A Combined Data-Driven Method for Electricity Theft Identification</td>
<td>QiLin Li, ZheMin Zhang, Yun Li, Wenxing Jin</td>
<td>456</td>
</tr>
<tr>
<td>Using Deep Learning</td>
<td>Nurit Kewyu</td>
<td></td>
</tr>
<tr>
<td>Research on Malicious Traffic Detection Methods Based on Deep</td>
<td>Bin Hui Tang, Shang Yu Deng, Chun Peng Wu, Ze Feng Wang, Jian Ping</td>
<td>469</td>
</tr>
<tr>
<td>Learning</td>
<td>An, Zi Fa Zhao</td>
<td></td>
</tr>
<tr>
<td>A Model-Based Approach to Solve the Sparse Reward Problem</td>
<td>Shuailong Li, Xiaohui Wang, Wei Zhang, Xin Zhang</td>
<td>476</td>
</tr>
<tr>
<td>Android Malware Detection Based on Deep Learning Techniques</td>
<td></td>
<td>481</td>
</tr>
<tr>
<td>Internal Defect Identification of Arc Magnets Based on a Deep</td>
<td>Bin Hui Tang, Qiao Kang, Zan Xi Ni, Hai Da, Jing Hong Xu, Tong Bin</td>
<td>487</td>
</tr>
<tr>
<td>Residual Network Combined with GRU and SqueezeNet</td>
<td>Liang, Qiang Sheng Bai</td>
<td></td>
</tr>
<tr>
<td>Author Index</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>