## eep Learn pplicatio In Computer Vision, Signals and Networks 163 63 1763 63 1

63 63

[]

.03

MA

M

ດ<sup>ີ</sup> Xuaກຼິ່ Yun Xiang Dongwei Xu

רכי רכי רבירביבייניי

163 163

כם כבור בבור כם ניסור של הבור כם ובם מכור כם רבים בבור כם רבים

าเราเรอ เรือ เรือ

6363636363163

10210210

163 63-

109109 09 09

631 63 63 63 691 691 เอาสอเอาาเอา แอาเออาโออา

10 0 0 0 10 10 031 103 0311 631 63 1163 63 TG3163 63 63

co con conco con co co co co con

5163163163163

1100 00 1100 100 60

כשר כשר כשר כשר כשר בשר

מסורפין ובפירפיין

ca cantan can ca

10 1 031 03103 031 03 03 03 031 03

רכסררכז רפזרים בזהרכז ביולים אויים אויי רכסררכזר ביור רפזרים בזהרכז ביורים אויים אויים

World Scientific



## Deep Learning Applications

## In Computer Vision, Signals and Networks

Edited by

Qi Xuan Yun Xiang Dongwei Xu

Zhejiang University of Technology, China





NEW JERSEY • LONDON • SINGAPORE • BEIJING • SHANGHAI • HONG KONG • TAIPEI • CHENNAI • TOKYO

© 2023 World Scientific Publishing Company https://doi.org/10.1142/9789811266911\_fmatter

## Contents

Pr	eface	v
Ab	About the Editors Introduction	
Int		
Pa	rt I: Vision Applications	1
1.	Vision-Based Particulate Matter Estimation	3
	Kaihua Zhang, Zuohui Chen, and Yun Xiang	
2.	Automatic Ship Plate Recognition Using Deep Learning Techniques Hang Xu, Xinhui Zhang, and Yun Xiang	19
3.	Generative Adversial Network Enhanced Bearing Roller Defect Detection and Segmentation Jiafei Shao, Zuohui Chen, and Qi Xuan	41
4.	Application of Deep Learning in Crop Stress Qijun Chen, Qi Xuan, and Yun Xiang	61

Contents
----------

Pa	rt II: Signal Applications	79
5.	A Mixed Pruning Method for Signal Modulation Recognition Based on Convolutional Neural Network	81
	Shuncheng Gao, Xuzhang Gao, Jinchao Zhou, Zhuangzhi Chen, Shilian Zheng, and Qi Xuan	
6.	Broad Learning System Based on Gramian Angular Field for Time Series Classification	103
	Tingting Feng, Zhuangzhi Chen, Dongwei Xu, and Qi Xuan	
7.	Denoising of Radio Modulation Signal Based on Deep Learning	125
	Hongjiao Yao, Qing Zhou, Zhuangzhi Chen, Liang Huang, Dongwei Xu, and Qi Xuan	
8.	A Graph Neural Network Modulation Recognition Framework Based on Local Limited Penetrable Visibility Graph	145
	Jinchao Zhou, Kunfeng Qiu, Zhuangzhi Chen, Shilian Zheng, and Qi Xuan	
Pa	rt III: Network Applications	165
9.	Study of Autonomous System Business Types Based on Graph Neural Networks	167
	Songtao Peng, Lu Zhang, Xincheng Shu, Zhongyuan Ruan, and Qi Xuan	
10.	Social Media Opinions Analysis	193
	Zihan Li and Jian Zhang	
11.	Ethereum's Ponzi Scheme Detection Work Based on Graph Ideas	215
	Jie Jin, Jiajun Zhou, Wanqi Chen, Yunxuan Sheng, and Qi Xuan	

xvi

	Contents	xvii
12.	Research on Prediction of Molecular Biological Activity Based on Graph Convolution	243
	Yinzuo Zhou, Lulu Tan, Xinxin Zhang, and Shiyue Zhao	

Index