

The Springer Series in Applied Machine Learning

Debashis De  
Diganta Sengupta  
Tien Anh Tran *Editors*



# Artificial Intelligence and Edge Computing for Sustainable Ocean Health

 Springer

# Contents

## Part I AI for Ocean Health

<b>Artificial Intelligence for Sustainable Ocean Health</b> . . . . .	3
Mahamuda Sultana, Suman Bhattacharya, Nilanjana Adhikari, Diganta Sengupta, and Debashis De	
<b>Role of Artificial Intelligence and Technologies in Improving Ocean Health in Promoting Tourism</b> . . . . .	39
Birendra Kishore Roy	
<b>Leveraging the Power of AI for Sustainable Oceans</b> . . . . .	53
Medini Gupta and Sarvesh Tanwar	
<b>Blue Ocean and Machine Learning Trajectories SDG 14: Life Below Water for Handling Ocean Pollution: Metaverse Conserve Ocean Health Sustainability Through the Lens of Transboundary Legal-Policy Regulations as Articulating Space for Futuristic Changes</b> . . . . .	77
Bhupinder Singh and Christian Kaunert	
<b>Marine Resources: Identification, Restoring, and Monitoring of Fisheries Food Resources Using Deep Learning and Image Processing</b> . . . . .	101
N. Nasurudeen Ahamed and Amreen Ayesha	
<b>Utilisation of Underwater Wireless Sensor Network Through Supervising a Random Network Environment in the Ocean Environment</b> . . . . .	123
Sathish Kumar, C. V. Ravikumar, A. Srinivasulu, and Tien Anh Tran	
<b>Role of Preprocessing Algorithm in the Underwater Image Analysis</b> . . . .	149
Abhishek Choubey and Shruti Bhargava Choubey	

## Part II Explainable AI for Ocean Health

<b>Sustainable Development Goal 14: Explainable AI (XAI) for Ocean Health</b> .....	167
Wasswa Shafik	
<b>Explainable AI (XAI) for Ocean Health: Exploring the Role of Explainable AI in Enhancing Ocean Health</b> .....	199
Sidra Tahir, Ehtesham Safeer, and Faizan Ahmad	
<b>A Comprehensive Study of AI (XAI) for Ocean Health Monitoring</b> .....	213
Shreya Singh, Tien Anh Tran, and Momina Shaheen	
<b>Explainable Artificial Intelligence for Ocean Health: Applications and Challenges</b> .....	241
Gnanasankaran Natarajan, Elakkiya Elango, Rakesh Gnanasekaran, and Sandhya Soman	

## Part III Edge Computing Based IoT for Ocean Health

<b>Revolutionizing Internet of Underwater Things with Federated Learning</b> .....	273
Momina Shaheen, Muhammad Shoaib Farooq, Tariq Umer, and Tien Anh Tran	
<b>Federated Learning for Internet of Underwater Drone Things</b> .....	295
Ehtesham Safeer, Sidra Tahir, Momina Shaheen, and Muhammad Shoaib Farooq	
<b>Enhancing Underwater Imagery with AI/ML and IoT in ROV Technology</b> .....	311
N. Chaithra, Janhvi Jha, Anu Sayal, M. Shravani Priya, Nithin Allagari, K. Chandana, and Navya Aggarwal	
<b>Revolutionizing Ocean Cleanup: AI and Robotics Tackle Pollution Challenges</b> .....	343
Divyansh Dadheech, Aditya Sunit Paul, Sonali Vyas, and Akanksha Malakar	
<b>Review on the Optics and Photonics in Environmental Sustainability</b> ...	359
Sunil Sharma, Sandip Das, Bhupendra Soni, and Md. Sabir	
<b>Intelligent Hash Function Based Key-Exchange Scheme for Ocean Underwater Data Transmission</b> .....	387
Mukesh Soni, Ismail Keshta, Renato R. Maaliw III, Shweta Singh, and Pankaj Kumar	

**Artificial Intelligence as Key Enabler for Safeguarding the Marine Resources** ..... 409  
Mehtab Alam, Ihtiram Raza Khan, Farheen Siddiqui, and M. Afshar Alam

**Correction to: Sustainable Development Goal 14: Explainable AI (XAI) for Ocean Health** ..... C1  
Wasswa Shafik