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Proceedings of 3rd International Conference on Artificial Intelligence: Advances and Applications

ICAIAA 2022

Editors: Garima Mathur, Mahesh Bundele, Ashish Tripathi, Marcin Paprzycki

Presents research works in the field of artificial intelligence

Discusses results of ICAIAA 2022 held in Jaipur, India

Serves as a reference for researchers and practitioners in academia and industry

Part of the book series: Algorithms for Intelligent Systems (AIS)

5346 Accesses | **2** Citations | **2** Altmetric

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About this book

This book gathers outstanding research papers presented in the 3rd International Conference on Artificial Intelligence: Advances and Application (ICAIAA 2022), held in Poornima College of Engineering, Jaipur, India, during April 23–24, 2022. This book covers research works carried out by various students such as bachelor, master and doctoral scholars, faculty and industry persons in the area of artificial intelligence, machine learning, deep learning applications in health care, agriculture, and business, security. It also covers research in core concepts of computer networks, intelligent system design and deployment, real-time systems, WSN, sensors and sensor nodes, SDN, NFV, etc.

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Keywords

Artificial Intelligence **Intelligent Sensor**

Devices and Application **Machine Learning**

Natural Language Processing **Electronic Devices**

ICAIAA 2022 Proceedings

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Book Title	Book Subtitle	Editors
Proceedings of 3rd International Conference on Artificial	ICAIAA 2022	Garima Mathur, Mahesh Bundele, Ashish Tripathi, Marcin Paprzycki

Intelligence: Advances and Applications

Series Title
Algorithms for Intelligent Systems

DOI
https://doi.org/10.1007/978-981-19-7041-2

Publisher
Springer Singapore

eBook Packages
Intelligent Technologies and Robotics, Intelligent Technologies and Robotics (R0)

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Hardcover ISBN
978-981-19-7040-5
Published: 15 April 2023

Softcover ISBN
978-981-19-7043-6
Due: 29 April 2024

eBook ISBN
978-981-19-7041-2
Published: 14 April 2023

Series ISSN
2524-7565

Series E-ISSN
2524-7573

Edition Number
1

Number of Pages
XIV, 663

Number of Illustrations
81 b/w illustrations, 244 illustrations in colour

Topics
Computational Intelligence, Artificial Intelligence, Image Processing and Computer Vision, Natural Language Processing (NLP), Electronic Circuits and Devices

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Proceedings of 3rd International Conference on Artificial Intelligence: Advances and Applications pp 345–361

A Framework for Smart Agriculture System to Monitor the Crop Stress and Drought Stress Using Sentinel-2 Satellite Image

Tasneem Ahmed, Nashra Javed, Mohammad Faisal & Halima Sadia

Conference paper | First Online: 15 April 2023

100 Accesses | **1** Altmetric

Part of the Algorithms for Intelligent Systems book series (AIS)

Abstract

The demand for many agricultural tracking applications is timely and reliable information on crop quality and development. The most widely used source that yields forecasts and appraisal is coarse spatial resolution satellite image as it provides coverage and temporal resolution at local and national scales. For measuring the quantity of green biomass in agricultural areas, NDVI is used to monitor crop stress, and NDWI to monitor drought stress.

Precision agriculture, forest health monitoring, and other applications where the state of plants is sensitive to changes in water content are all examples of where NDWI is widely used. In this paper, the main focus is to extract complete information on the cultivation and harvesting of wheat crops for proper field monitoring. In total, five Sentinel-2A images from January 2020 to May 2020 have been downloaded and processed to monitor the status of wheat crop cultivation, harvesting, and the post-harvesting cycle. Therefore, by extracting meaningful information on the cultivation and harvesting process of the wheat crop, a sustainable approach is identified for developing a Machine Learning (ML)-based Smart Agriculture System. The proposed framework will help to monitor crop health and crop growth and will provide predictions on crop stress and drought stress. ML-based solutions are currently addressing crop-specific issues; however, farming methods will move to knowledge-based agriculture as automated data recording, data analysis, and decision-making are combined into an integrated framework, which will enhance productivity levels and product quality.

Keywords

Machine learning **Smart agriculture** **NDVI** **NDWI** **Sentinel-2**

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Chapter EUR 29.95
Price includes VAT (India)