

Peer Reviewed Refereed and
UGC Listed Journal No. 47026

ISSN 2319 - 359X

AN INTERNATIONAL MULTIDISCIPLINARY
HALF YEARLY RESEARCH JOURNAL

IDEAL

Single Blind Review / Double Blind Review

Volume - XIII | Issue - II

March - August 2025

English Part - II / Marathi Part - II / Hindi Part - I

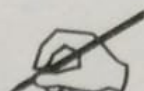


Impact Factor / Indexing
2026 - 8.246
(www.sjifactor.com)

Ajanta Prakashan



EDITORIAL BOARD



7es
/

Mehryar Adibpour

Faculty of Computing London
Metropolitan University,
Holloway Road, London.

Dr. Ashaf Fetoh Eata

College of Art's and Science,
Salmau Bin Adbul Aziz University. KAS

Dr. Altaf Husain Pandi

Dept. of Chemistry University
of Kashmir, Kashmir, India.

Dr. Ramdas S. Wanare

Associate Professor & Head Accounts & Applied Stat,
Vivekanand Art's Sardar Dalip Sing Commerce
& Science College Samarth Nagar, Aurangabad (M.S.)

Dr Harish Kumar

Assistant Professor Department of History,
Mangalayatan University, Extended,
Ner 33rd Milestone, Mathura - Beswan
Aligarh (U.P.) 202146.

Dr. P. A. Koli

Professor & Head (Retd),
Dept. of Economics, Shivaji University,
Kolhapur - (M.S.) India.

Dr. Rana Pratap Singh

Professor & Dean School for Environment Science,
Dr. Babasaheb Bhimrao Ambedkar University
of Raebareilly, Lucknow- India.

Dr. Joyanta Barbora

Head Dept. of Sociology University of
Dibrugarh- India.

Dr. Jagdish R. Baheti

H.O.D., SNJB College of Pharmacy,
Neminagar, Chandwad, Nashik (M.S.) - India.

Prof. P. N. Gajjar

Head, Dept. of Physics,
University of School of Sciences,
Gujarat University, Ahmedabad- India.

Dr. Binoy Musahary

Department of Political Science,
Nalbari College, Nalbari Assam, P. O. Bidyapur.

Dr. Prashant M. Dolia

Dept. of Computer Science and Applications,
Bhavnagar University, India.

Dr. S. Jeyakumar

Assistant Professor, PG & Research Department of
Commerce, P. M. T. College, Melaneelithanallur,
Sankarankovil Tirunelveli, Tamil Nadu.

Dr. P. S. Buvaaneswari

Asst. Professor of Commerce,
University of Madras Chepauk, Chennai-05.

Dr. (CA) Subrahmanya Bhat K. M.

Principal, Department of Commerce,
Swami Vivekananda College, Borim Ponda, Goa.

Dr. G. B. Lamb

Associate Professor & Head,
Department of Mathematics
Baliram Patil College, Kinwat, Dist.Nanded. (M.S.)

4. Artificial Intelligence in Agriculture and Environmental Science

Mrs. Jyoti Rangnath Shelke

Assistant Professor, MVPS Arts, Commerce and Science, Manmad.
(Savitribai Phule Pune University, Pune)

Abstract

Artificial Intelligence (AI) is an important branch of modern technology that enables computers to think, learn, and make decisions similar to human intelligence. The use of AI is increasing in the fields of agriculture and environmental science. With the help of AI, it has become possible to increase crop production, predict weather conditions, detect diseases, manage water efficiently, and protect the environment.

In an agriculture-based country like India, the use of AI helps farmers obtain weather forecasts, detect crop diseases, manage crops effectively, and increase agricultural productivity. As a result, the agricultural sector is becoming more modern, efficient, and sustainable.

This research studies the applications, benefits, and challenges of AI in agriculture and environmental science. AI also plays an important role in environmental science. AI-based systems are useful for studying climate change, pollution control, forest conservation, and biodiversity monitoring. By analyzing large volumes of data, environmental changes can be accurately monitored and appropriate conservation measures can be implemented.

However, there are also some challenges in the use of AI, such as the high cost of technology, lack of digital infrastructure in rural areas, and the need for technical knowledge. With proper policies, research, and training, the use of AI technology can be expanded to make agriculture and environmental management more efficient, sustainable, and eco-friendly. Therefore, AI will play a significant role in the future of agriculture and environmental management.

Keywords: Artificial Intelligence, Smart Agriculture, Machine Learning, Crop Monitoring, Climate Change, Environmental Protection, Sustainable Agriculture

What is Artificial Intelligence (AI)

1. Artificial Intelligence refers to computer systems that use data analysis, machine learning, deep learning, and robotics to make decisions similar to human intelligence.
2. Main Components of AI

3. Machine Learning – Learning from data
4. Deep Learning – Complex analysis based on large datasets
5. Computer Vision – Identifying images and videos
6. Natural Language Processing – Understanding human language

Introduction

Agriculture is the backbone of India's economy. Due to increasing population, climate change, and scarcity of natural resources, there is a growing need for new technologies in agriculture. Artificial Intelligence is a technology that helps analyze large amounts of data and make accurate decisions.

With the advancement of science and technology, the use of modern tools is increasing in various fields. Among them, Artificial Intelligence is considered a powerful and useful technology. AI enables computers and machines to think, learn, and make decisions like humans. It can analyze large datasets and generate accurate conclusions.

In a country like India where agriculture plays a major role in economic development, farmers face many challenges such as climate change, water scarcity, pest attacks, diseases, and uncertain crop yields. To solve these problems, the use of modern technology is essential. In this context, AI plays a very important role.

With the help of AI, crop monitoring, pest and disease detection, weather prediction, smart irrigation systems, and yield prediction can be performed more accurately. This helps farmers make better decisions and increases agricultural productivity.

AI is also widely used in environmental science for forest protection, pollution control, and climate change studies. By analyzing large environmental datasets, it becomes easier to understand environmental changes and develop solutions.

Therefore, the use of Artificial Intelligence in agriculture and environmental science is very important for sustainable development. Proper planning, research, and technological implementation can increase agricultural productivity and protect the environment.

Review of Literature

Recent studies show that Artificial Intelligence (AI) is transforming agriculture and environmental science by improving productivity, sustainability, and decision-making. AI technologies such as machine learning, computer vision, and remote sensing are widely used in precision farming, crop monitoring, and resource management.

Research indicates that AI helps farmers detect plant diseases, monitor crop growth, predict yields, and optimize the use of water, fertilizers, and pesticides. These technologies reduce costs and environmental impacts while increasing agricultural efficiency.

Several studies also highlight the use of deep learning and satellite data for environmental monitoring, climate analysis, and biodiversity conservation. AI-based systems can analyze large datasets from sensors and satellites to track environmental changes and support sustainable farming practices.

However, the literature also identifies challenges such as high implementation costs, lack of digital infrastructure, limited datasets, and technical knowledge among farmers. Addressing these challenges is essential for the widespread adoption of AI technologies.

Overall, the literature suggests that AI has strong potential to support sustainable agriculture, environmental protection, and global food security.

Objectives

1. To study the concept of Artificial Intelligence (AI)..
2. To analyze AI applications in crop monitoring, pest detection, and yield prediction.
3. To understand AI applications in climate change studies, pollution control, and forest conservation.
4. To analyze how AI can solve agricultural and environmental problems.
5. To study how AI improves crop production and resource management.
6. To study future opportunities of AI for sustainable agriculture and environmental development.

Materials and Methods

Data Collection

This study mainly uses secondary data collected from

1. Research articles
2. Books and academic references
3. Agricultural and environmental journals
4. Government reports and websites
5. Internet and online databases

Study Method

Descriptive and analytical research methods were used to study the applications of AI in agriculture and environmental science.

Data Analysis

The collected data was analyzed to understand

1. Use of AI in agriculture
2. Crop monitoring, disease detection, and yield prediction
3. Role of AI in climate change and environmental protection
4. Benefits and limitations of AI technology

Tools Used

1. Computers and internet
2. AI-based software and digital platforms
3. Research databases and online journals

Scope of the Study

The main aim of this study is to understand the importance, benefits, limitations, and future opportunities of AI in agriculture and environmental science.

Applications of AI in Agriculture

1. Crop Monitoring
2. Weed Detection

Yield Prediction

1. Disease and Pest Detection
2. Weather Prediction
3. Smart Irrigation Systems

Applications of AI in Environmental Science

1. Pollution Control
2. Climate Change Analysis
3. Forest Monitoring
4. Wildlife Protection
5. Disaster Management

Benefits of AI

1. Efficient resource management
2. Faster decision-making
3. Reduced financial losses for farmers
4. Increased agricultural productivity
5. Environmental protection
6. Limitations and Challenges

7. High technology costs
8. Need for training and technical knowledge
9. Data privacy concerns
10. Lack of internet and digital infrastructure in rural areas
11. Data privacy concerns

Suggestions

1. Improve agricultural data collection for better AI predictions.
2. Provide government support and policies for AI adoption.
3. Make AI tools affordable for small and medium farmers.
4. Provide training programs for farmers on AI technologies
5. Use AI for monitoring climate change, pollution, and biodiversity
6. In the future, AI can enable autonomous farming, smart robots, precision agriculture, and advanced environmental management.

Discussion

1. The use of Artificial Intelligence in agriculture and environmental science is increasing rapidly. Modern technology is making agricultural management more accurate, efficient, and sustainable.
2. AI is used in agriculture for crop monitoring, disease detection, weather forecasting, and yield prediction. Satellite images, drones, and sensors help analyze crop conditions accurately. This enables farmers to apply fertilizers, water, and pesticides at the right time, increasing productivity and reducing resource wastage.
3. In environmental science, AI is used to study climate change, monitor pollution, and protect forests. Large environmental datasets can be analyzed to understand environmental changes and develop effective conservation strategies.

However, challenges such as lack of technology in rural areas, limited internet access, and lack of technical knowledge among farmers still exist. Also, AI-based equipment can be expensive.

Therefore, government support, training programs, and research are necessary to promote AI technology in agriculture and environmental management.

Conclusion

1. The study shows that Artificial Intelligence is a highly useful and powerful technology in agriculture and environmental science. AI improves crop monitoring, disease

detection, weather forecasting, irrigation systems, and yield prediction. This helps farmers make better decisions and increases agricultural productivity.

2. AI also plays an important role in environmental science by supporting climate change studies, pollution control, forest conservation, and biodiversity protection.
3. Although there are challenges such as high costs, limited digital infrastructure, and lack of technical knowledge, cooperation among governments, research institutions, and farmers can promote the use of AI technology.
4. Overall, AI has the potential to make agriculture more modern, efficient, and sustainable while also contributing to environmental protection.

Acknowledgement

1. I sincerely express my gratitude to all those who supported and guided me in completing this research project.
2. First, I would like to thank my teacher/professor for their valuable guidance and encouragement in selecting and completing this research topic.
3. I also thank the authors of books, research papers, journals, and online databases that provided valuable information for this project.
4. Finally, I thank my family members and friends for their support, encouragement, and cooperation during the completion of this project.

References

- Camps-Valls, G., Tuia, D., & Zhu, X. X. (2021). *Artificial Intelligence for the Earth Systems*. Wiley.
- Food and Agriculture Organization (2020). *Digital Agriculture and AI for Sustainable Development*.
- "Artificial Intelligence in Agriculture: A Review." *Artificial Intelligence in Agriculture*.
- "Applications of Machine Learning in Agriculture." *Computers and Electronics in Agriculture*.
- Zhang, Q. (2015). *Agricultural Automation: Fundamentals and Practices*. CRC Press.