



Chapter 5

AI Techniques


P. Selvakumar

 <https://orcid.org/0000-0002-3650-4548>
Nehru Institute of Technology, India

Pamarthi Satyanarayana

 <https://orcid.org/0009-0008-4041-3674>
VEL TECH University, India


Yuvraj Lahoti

 <https://orcid.org/0009-0003-4408-0196>
Vishwakarma University, India


Lalitha Saipogu

CVR College of Engineering, India

Mohit Sharma

 <https://orcid.org/0009-0007-2280-8077>
Maharshi Dayanand University, India

T. C. Manjunath

 <https://orcid.org/0000-0003-2545-9160>
*Rajarajeswari College of Engineering,
India*

ABSTRACT

Artificial Intelligence mitigate environmental degradation, enhance sustainability, and optimize the use of natural resources. One of the key areas where AI is making a significant impact is climate change mitigation. Machine learning algorithms analyze vast amounts of climate data, helping scientists predict extreme weather events, model climate change scenarios, and develop strategies for reducing greenhouse gas emission. In biodiversity conservation, AI plays a crucial role in monitoring wildlife populations and detecting threats to endangered species. Advanced image recognition and drone surveillance powered by AI help researchers track animal movements, identify poaching activities, and assess habitat loss. AI-driven bioacoustic monitoring systems analyze sounds in forests and oceans to detect changes in biodiversity and identify species at risk. These technologies provide conservationists with valuable insights, allowing them to take proactive measures to protect ecosystems and wildlife.

DOI: 10.4018/979-8-3373-3246-8.ch005

INTRODUCTION

Artificial Intelligence mitigate environmental degradation, enhance sustainability, and optimize the use of natural resources. One of the key areas where AI is making a significant impact is climate change mitigation. Machine learning algorithms analyze vast amounts of climate data, helping scientists predict extreme weather events, model climate change scenarios, and develop strategies for reducing greenhouse gas emission. In biodiversity conservation, AI plays a crucial role in monitoring wildlife populations and detecting threats to endangered species. Advanced image recognition and drone surveillance powered by AI help researchers track animal movements, identify poaching activities, and assess habitat loss. AI-driven bioacoustic monitoring systems analyze sounds in forests and oceans to detect changes in biodiversity and identify species at risk. These technologies provide conservationists with valuable insights, allowing them to take proactive measures to protect ecosystems and wildlife., and AI-driven systems help optimize water usage through real-time monitoring of water distribution networks, detecting leaks, and predicting water demand. AI-powered sensors and satellite imagery assist in precision agriculture by analyzing soil health, predicting crop yields, and recommending optimal irrigation schedules, thereby reducing water wastage and increasing food production efficiency. AI is also transforming waste management by enhancing recycling processes and reducing landfill waste. Smart waste sorting systems use AI-powered robots to identify and separate different types of waste more efficiently, improving recycling rates. Additionally, AI-driven circular economy models help industries minimize resource consumption by predicting product lifecycles, optimizing supply chains, and promoting sustainable manufacturing practices. Pollution is a major environmental concern, and AI-based technologies are being deployed to monitor and mitigate air, water, and soil pollution. AI-powered air quality monitoring systems use sensors and predictive models to detect pollution hotspots and forecast pollution levels, allowing authorities to implement timely interventions. AI-driven water quality analysis tools assess pollution levels in rivers, lakes, and oceans, identifying sources of contamination and helping policymakers enforce environmental regulations. AI-driven land use planning tools help urban planners design sustainable cities by optimizing green spaces, reducing carbon footprints, and improving overall environmental resilience. and predictive modeling, humanity can make more informed decisions to preserve biodiversity, optimize resource usage, and combat climate change. As AI technology continues to evolve, its responsible and ethical implementation will be crucial in shaping a sustainable future for our planet.

30 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/ai-techniques/379032

Related Content

A New Two-Level Clustering Approach for Situations Management in Distributed Smart Environments

Achouri Mounir, Alti Adel, Derdour Makhoul, Laborie Sébastien and Roose Philippe (2019). *International Journal of Ambient Computing and Intelligence* (pp. 91-111). www.irma-international.org/article/a-new-two-level-clustering-approach-for-situations-management-in-distributed-smart-environments/225773

An Intelligent Traffic Engineering Method over Software Defined Networks for Video Surveillance Systems Based on Artificial Bee Colony

Reza Mohammadi and Reza Javidan (2016). *International Journal of Intelligent Information Technologies* (pp. 45-62). www.irma-international.org/article/an-intelligent-traffic-engineering-method-over-software-defined-networks-for-video-surveillance-systems-based-on-artificial-bee-colony/171440

Fostering Academic Integrity in the Age of Artificial Intelligence

Saadia Mahmud (2024). *Academic Integrity in the Age of Artificial Intelligence* (pp. 1-20). www.irma-international.org/chapter/fostering-academic-integrity-in-the-age-of-artificial-intelligence/339216

Building Ethical Governance Frameworks for AI in Higher Education

Salman Bashir Memon, Saadia Bashir Memon and Sapna Shah (2026). *Overdependence on AI in Academia* (pp. 19-58). www.irma-international.org/chapter/building-ethical-governance-frameworks-for-ai-in-higher-education/409165

Risk Perception and Management

Cemre Yoldas (2026). *Intersecting AI, Neurofinance, and Behavioral Finance for Decision Making* (pp. 437-458). www.irma-international.org/chapter/risk-perception-and-management/405836