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Artificial Intelligence in Wildlife Monitoring and Conservation

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Abstract

Artificial Intelligence (AI) monitoring and management techniques have ushered in a new era for wildlife protection. Although useful, traditional wildlife monitoring techniques are frequently labour-intensive, time-consuming, and have a small scope. Artificial intelligence (AI) tools like computer vision, machine learning, and data analytics are revolutionizing how biologists monitor animal populations, identify risks, and make conservation choices. AI makes it possible to analyze data in real time, on a massive scale, and with accuracy using everything from camera traps and drones to acoustic sensors and satellite pictures. This article examines the use of AI in wildlife monitoring and conservation, as well as its main uses, benefits, drawbacks, and potential future developments. Adopting AI-driven technologies has the potential to significantly improve biodiversity conservation, safeguard endangered species, and promote ecosystem sustainability.

Keywords: Artificial Intelligence, wildlife conservation, machine learning, camera traps, remote sensing,

Introduction

Wildlife is critical to ensuring ecological balance and biodiversity. However, growing human activity, habitat degradation, climate change, and illegal poaching have put enormous strain on global animal populations. Conservationists confront the difficult task of monitoring huge, often inaccessible areas with few resources.

Traditional approaches like field surveys, manual tracking, and observation are time-consuming and may not give real-time data. In recent years, Artificial Intelligence (AI) has emerged as an effective technique for overcoming these constraints.



Artificial intelligence (AI) is the use of computer systems to do activities that need human intellect, such as pattern recognition, decision-making, and data processing. When used to wildlife conservation, AI accelerates and accurately processes enormous amounts of data, allowing for improved monitoring and management of species and ecosystems.

Concept of AI in Wildlife Conservation

AI in wildlife conservation refers to the application of advanced computational techniques to collect, analyze, and interpret ecological data. It integrates technologies such as:

- Machine learning
- Computer vision
- Natural language processing
- Data analytics

These technologies allow conservationists to identify patterns, predict trends, and make informed decisions.

For example, AI algorithms can analyze thousands of images from camera traps to identify animal species, reducing the need for manual sorting.

Applications of AI in Wildlife Monitoring

1. Drone-Based Monitoring: Drones outfitted with cameras and sensors can examine vast and isolated regions.

AI helps in:

- Mapping habitats
- Monitoring illegal activities such as poaching
- Detecting animals from aerial images

Drone-based artificial intelligence systems are particularly effective in forests, wetlands, and protected regions.

2. Camera Trap Image Analysis: Camera traps are widely used to monitor wildlife. However, they generate massive amounts of image data.

AI-based image recognition systems can:

- Count individuals
- Detect rare or endangered animals
- Automatically identify species

This significantly reduces the time required for data processing and improves accuracy.

3. Wildlife Tracking and Behavior Analysis

GPS collars and sensors generate information on animal movement.

AI can:

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- Study behavior patterns
- Predict human-wildlife conflicts
- Analyze migration routes

This information is useful for developing conservation plans.

4. Anti-Poaching Efforts

Poaching poses a significant danger to wildlife.

AI systems can:

- Analyze patrol data
- Provide real-time alerts
- Predict poaching hotspots

These technologies enable authorities to take preventive measures and safeguard endangered animals.

5. Acoustic Monitoring

Many creatures communicate via noises. Artificial intelligence can analyze audio recordings to:

- Monitor bird and amphibian populations
- Detect illegal activities such as gunshots or chainsaws
- Identify species based on vocalizations

This strategy works well in deep woodlands when visual monitoring is difficult.

6. Satellite and Remote Sensing

Satellite photography offers large-scale information on land use and environmental changes.

AI applications include:

- Tracking habitat changes
- Identifying migration patterns
- Monitoring deforestation

This allows conservationists to better comprehend long-term ecological patterns.

➤ Benefits of AI in Wildlife Conservation

1. Time and Cost Efficiency: Data processing is automated, which saves time and money on labor.

2. Improved Accuracy: AI decreases human error and allows for more accurate identification and analysis of animal data.

3. Enhanced Research Capabilities: AI enables academics to examine complicated ecological data and discover fresh insights.



4. Large-Scale Monitoring : Artificial intelligence enables the surveillance of enormous regions that would otherwise be difficult to cover manually.

5. Conservation of Endangered Species : By better monitoring and protection, AI helps vulnerable species survive.

6. Real-Time Decision Making : Instant data analysis enables speedy responses to challenges like poaching and habitat degradation.

Challenges in Using AIs

Despite its advantages, AI faces several challenges in wildlife conservation:

1. Technical Expertise: Conservationists require training to utilize AI tools efficiently.

2. High Initial Cost : Setting up AI systems, which include sensors and software, may be costly.

3. Data Quality Issues : AI models demand huge, precise datasets. Poor data quality might have an impact on the outcomes.

4. Ethical Concerns : The use of drones and tracking equipment may cause issues about animal disturbance and privacy.

5. Infrastructure Limitations : Remote places may lack electricity and internet access.

➤ Role of AI in Biodiversity Conservation

AI plays a key role in preserving biodiversity by:

- Assessing ecosystem health
- Supporting conservation planning
- Monitoring species diversity
- Detecting invasive species

It helps create data-driven conservation strategies that are more effective and sustainable.

Integration with Other Technologies

AI works best when combined with other technologies:

- **Geographic Information Systems (GIS):** Maps and analyzes spatial data.
- **Internet of Things (IoT):** Sensors collect real-time data from the environment.
- **Blockchain:** Ensures transparency in conservation funding and wildlife trade monitoring.
- **Big Data Analytics:** Processes large datasets for meaningful insights.

Case Studies and Global Initiatives

Several conservation projects worldwide are using AI:

- Drone surveillance in national parks to prevent poaching
- Acoustic monitoring of bird populations in tropical forests



- AI-powered camera traps in Africa for monitoring wildlife

These initiatives demonstrate the practical benefits of AI in conservation efforts.

Future Prospects

The future of AI in wildlife conservation is promising:

- Development of low-cost AI tools
- Integration with climate change models
- Improved accuracy of species identification
- Increased collaboration between scientists and technologists

Conclusion

Artificial intelligence is revolutionizing wildlife monitoring and conservation by providing new tools for data collecting, analysis, and decision-making. It allows for precise, efficient, and large-scale monitoring of animal populations and ecosystems. While hurdles like as cost, technical skill, and infrastructure persist, continual developments make AI more accessible and useful. By combining AI with traditional conservation approaches, it is feasible to create long-term strategies for biodiversity protection and endangered species survival. As environmental issues develop, AI will be an important ally in protecting the natural world.

References

- Christin, S., Hervet, E., & Lecomte, N. (2019). Applications for deep learning in ecology. *Methods in Ecology and Evolution*, 10(10), 1632–1644.
- FAO. (2019). Biodiversity and ecosystem conservation.
- Kellenberger, B., et al. (2020). Deep learning in wildlife conservation. *Nature Ecology & Evolution*, 4, 687–695.
- Microsoft AI for Earth (2021). AI tools for environmental sustainability.
- Norouzzadeh, M. S., et al. (2018). Automatically identifying animals in camera trap images. *PNAS*, 115(25), E5716–E5725.
- Schneider, S., et al. (2019). Three critical factors affecting automated image species recognition. *Methods in Ecology and Evolution*.
- Tuia, D., et al. (2022). Perspectives in machine learning for wildlife monitoring. *Nature Communications*.
- United Nations Environment Programme (UNEP). (2021). Digital technologies for conservation.
- Wearn, O. R., & Glover-Kapfer, P. (2019). Camera-trapping for conservation. *Biological Conservation*, 235, 69–75.
- WWF (2020). Artificial intelligence in conservation.

