IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Ai-Powered Wildlife Conservation System

[1]Sathya Sheela D, [2]Saniya S, [3]Srinidhi RY, [4]Umesh L, [5]Vivin Vaibhav

[1]Professor, [2]Student, [3]Student, [4]Student, [5]Student

Department of CS&D

K. S. Institute of Technology, Bengaluru, India

Abstract: Artificial intelligence (AI) is playing a critical role in wildlife conservation by enabling species monitoring, poaching prevention, and habitat restoration efforts **[1] .** Due to habitat loss, poaching, and climate change, wildlife conservation is a major concern. Habitat assessment and resource conservation involve AI-powered image analysis, which aids in assessing forest health, detecting deforestation, and identifying areas in need of restoration **[2] .** The AI-Powered Wildlife Conservation System improves animal conservation and monitoring by utilizing artificial intelligence. With the help of sophisticated image recognition algorithms, users can submit photos or scan animals in real time. Additionally, it offers vital conservation status data, showing, based on international databases, if an animal is vulnerable or endangered. The technology also uses the Google Maps API to find local physicians and animal rescue facilities, guaranteeing prompt assistance for wildlife that is hurt or in danger. This project intends to assist wildlife researchers, conservationists, and the general public in preserving biodiversity by fusing AI with geolocation services.

Index Terms **-** Artificial Intelligence (AI), Wildlife Conservation, Animal Identification, Endangered Species Protection, Rescue and Rehabilitation, Conservation Technology, Smart Conservation System, Google Map API, Image Recognition, Environmental Sustainability,

I. INTRODUCTION

Since many species are in danger of going extinct as a result of habitat loss, climate change, poaching, and conflicts between humans and wildlife, wildlife conservation is a critical worldwide concern. Manual tracking and monitoring are frequently used in traditional conservation techniques, which can be ineffective and time-consuming. By using geolocation and artificial intelligence, the AI-Powered Wildlife Conservation System seeks to overcome these obstacles and improve wildlife conservation initiatives.

Users can utilize AI-based image recognition to identify species by uploading photographs or scanning animals in real-time. In order to determine if the detected animal is endangered, vulnerable, or of least concern, it also offers vital information about its conservation status. Furthermore, by integrating Google Maps API, the system helps locate nearby animal rescue centres and veterinarians, ensuring quick response for injured or at-risk wildlife.

This project aids researchers, conservationists, and the public in their efforts to preserve biodiversity by fusing real-time location services with AI-driven identification. By improving the efficiency and accessibility of species identification and rescue operations, the system's scalable and user-friendly design helps to preserve wildlife around the world.

II. METHODOLOGY

The front-end will be built using HTML or/and Python to provide easy navigation and fast response. For the backend we will be using node.js to provide smooth and rapid interactions between various system elements. For database we will be using MongoDB. For the API and external data integration part we will be using Google map's API for locating nearby veterinary hospital and animal care centre for the users. For AI-Model we will use ChatGPT AI model for fetching information from the internet so as to provide accurate information and to guide user along the process of rescuing the animal.

III. OBJECTIVES

3.1 Automated Identification of Animals:

The technology correctly identifies animal species by using AI-powered image recognition. Users can upload an image or scan an animal in real time, and the AI model will identify the species based on the visual characteristics. Researchers, conservationists, and wildlife enthusiasts can more easily identify and record different species thanks to this automation, which does away with the need for manual identification.

3.2 Assessing the State of Conservation:

The technique determines an animal's status—whether it is endangered, vulnerable, near-threatened, or of least concern—by cross-referencing international conservation databases after the species has been recognized. This tool informs users of the importance of conservation efforts and increases awareness of at-risk species. The system supports the protection of animals and promotes responsible behaviour toward biodiversity by offering current information.

3.3 Encouraging Recovery:

The Google Maps API is integrated into the system to assist in finding local physicians and animal rescue facilities. Users can easily contact the appropriate rescue services to guarantee prompt action in the event that an injured or endangered animal is discovered. Because it speeds up rescue efforts and improves the odds of survival for endangered wildlife, this function is essential for environmentalists, animal welfare groups, and the general public.

3.4 Supporting Conservationists and Researchers:

The technology assists researchers and conservationists in tracking animal populations and examining their activities by providing precise and up-to-date data on wildlife species. Analysing the gathered data can help identify threats to biodiversity, monitor species migration patterns, and create successful conservation plans. This development in technology improves wildlife studies by offering trustworthy, AI-driven insights.

3.5 Improving Tracking and Monitoring of Wildlife:

For monitoring wildlife populations and their migrations over time, the system can be a useful tool. Conservationists can find patterns in animal distribution, spot changes in habitat, and anticipate possible dangers by gathering and evaluating data from several users. Authorities can take preventative action against poaching, habitat damage, and other threats to animals thanks to this real-time monitoring.

IV. TECHNOLOGY STACK:

To create a scalable and effective Wild Life conservation system, we utilize contemporary web technologies and AI frameworks:

4.1 Frontend (User Interface):

Built with HTML and Python, providing easy navigation and fast response. The UI is made accessible and easily understandable for the user of different levels of digital literacy.

4.2 Backend (Data Processing and API Management):

Developed using Node.js to provide smooth and rapid interactions between various system elements. The backend supports API communication, user authentication and synchronization of data between various platforms.

4.3 Database / Dataset (Data Storage and Management):
Leverages MongoDB to store and manage enormous amounts of structured and unstructured animal(wildlife) data. The data stores the details of the animal like its species, name, population, endangered or vulnerable.

4.4 API (External Data Integration):
The platform incorporates third-party APIs for real-time data fetching. For this we have use Google Map's API for fetching the location of nearby animal rescue centers and veterinarian hospitals for quick reach and provide help for the animal as soon as possible.

4.5 AI-Model:
We will use ChatGPT AI model in the system by integrating it through API connection to the backend for providing accurate information about the animal and to guide the user to help the animal without getting over-whelmed and confused.

v. IMPACTS AND BENEFITS:

5.1 Impacts:

5.1.1 Improved Protection of Wildlife :

Because it assists in identifying and tracking endangered species, the system is essential to wildlife protection. Conservationists can more effectively follow animals and collect vital data for their protection by utilizing AI-based recognition. Better decision-making and the creation of plans to stop the extinction of species are made possible by this proactive approach.

5.1.2 Easier Recovery:

Animals that are hurt, stranded, or in danger can greatly increase their chances of survival if they are identified quickly. Because of the system's interaction with the Google Maps API, users may locate local vets and rescue centres right away. This capability is especially helpful in emergency scenarios where saving endangered species requires prompt action.

5.1.3 Enhanced Public Knowledge:

The system contributes to increasing public awareness of wildlife protection by making information about different animal species and their conservation status easily accessible. By educating users about endangered animals and the dangers they face, more individuals will take part in conservation initiatives and develop a sense of responsibility.

5.1.4 Efforts to Conserve Based on Data:

Research and conservation planning can benefit from the useful data produced by the system. Researchers can examine movement patterns, habitat preferences, and population trends by examining species identification records. This data-driven strategy improves conservation initiatives' efficacy and aids decision-making by policymakers.

5.2 Benefits:

5.2.1 Animal Recognition in Real Time:

By scanning animals or uploading photos, users may quickly identify them thanks to the AI-powered image recognition feature of the system. This real-time feature facilitates wildlife identification and helps people, researchers, and conservationists quickly learn more about different species.

5.2.2 Conservation Data Is Easy to Access:

Without having to look up information from several sources, users can immediately ascertain an animal's conservation status. The system offers current insights on species classification, endangerment levels, and population trends by combining data from international sources. This feature promotes informed conservation efforts and aids in the dissemination of knowledge.

5.2.3 Easy Access to Rescue Support:

It can be difficult to find wildlife that is hurt or in distress right away. The solution makes this procedure easier by utilizing the Google Maps API to find veterinarians and animal rescue facilities in the area. In addition to saving time, this raises the possibility that afflicted animals may successfully recover and undergo rehabilitation.

5.2.4 Accessible and User-Friendly:

The methodology guarantees that anyone can contribute to animal protection, regardless of their level of expertise. It promotes more engagement from those who might not have previous experience in wildlife research or rescue operations because to its user-friendly features and straightforward design.

VI. CHALLENGES AND FUTURE SCOPE:

6.1 Challenges:

6.1.1 Animal Identification Accuracy:

Assuring good accuracy is one of the main obstacles to deploying AI-powered animal identification. Animals that are partially visible, in hazy photos, or in low light levels may be difficult for the algorithm to detect accurately. Furthermore, similar-looking species may be mistakenly identified by AI models, resulting in inaccurate judgments of conservation status. It takes sophisticated machine learning techniques and ongoing training on a variety of datasets to increase picture recognition accuracy.

6.1.2 Limited Coverage of Databases:

The diversity and accessibility of the system's species database determine how effective it is. The AI model might not correctly identify uncommon or recently found species if the dataset has insufficient photos and information about them. Identification capabilities can be enhanced by growing the database by adding user-generated data and international wildlife resources.

6.1.3 Restrictions on Real-Time Processing:

It takes a lot of processing power to run AI models for real-time animal detection, particularly when working with high-resolution photos and live scanning. The method may take longer to detect species in places with inadequate internet connectivity or processing power. This problem can be solved in part by enabling offline capabilities and optimizing AI models for quicker processing.

6.1.4 Integration of conservation databases:

The IUCN Red List and other international wildlife databases must be seamlessly integrated in order to maintain the conservation status of species. It can be difficult to guarantee data synchronization and sustain constant access to these databases. The system's dependability can be increased by forming alliances with conservation groups and using APIs to automate updates.

6.1.5 Working Together with Environmental Groups:

The legitimacy and efficacy of the system can be increased by collaborating with international wildlife protection organizations, academic institutions, and governmental entities. These partnerships have the potential to increase data precision, broaden the system's application, and support practical conservation efforts. The use of AI-driven conservation tools can also be encouraged by collaborating with NGOs and wildlife sanctuaries.

6.1.6 Ethical and Privacy Issues:

Using AI and geolocation data to track and monitor wildlife raises ethical questions about data protection and possible misuse. There is a chance that poachers or illegal dealers will take advantage of sensitive wildlife location data. Conservationists and animals can both be protected by putting in place stringent security measures, access limitations, and data anonymization methods.

6.2 Future Scope:

6.2.1 Improved AI Precision:

Future advancements in computer vision and deep learning may increase the precision of animal identification. The system can identify animals more accurately in a variety of scenarios by using AI models that have been trained on bigger and more varied datasets. Identification capabilities can be further improved by incorporating AI approaches like self-learning algorithms and generative adversarial networks (GANs).

6.2.2 Offline Capabilities:

The technology would be more beneficial in isolated locations with poor connectivity if it could be expanded to operate without internet access. Field researchers, forest rangers, and conservationists operating in remote areas may find the system more dependable if it enables users to download necessary datasets and carry out AI-based identification offline.

6.2.3 Automated Tracking of Wildlife:

Real-time wildlife monitoring can be improved by integrating GPS tracking devices, drones, and IoT-enabled sensors. These tools can be used to monitor migratory paths, habitat changes, and animal movement patterns, giving conservationists important information. This function would be very helpful in stopping poaching and safeguarding endangered animals.

6.2.4 System for Community Reporting:

A crowdsourced conservation network can be established by allowing people to report instances of poaching, habitat destruction, and wildlife observations. The system can develop into a collaborative platform that offers real-time information on animal presence and hazards by enabling data contributions from the general population. By involving citizens, this strategy can improve conservation efforts.

6.2.5 Conservation Predictive Analytics:

AI can be used to forecast future dangers to wildlife populations by analysing historical data. The method can alert conservationists to trends in species decrease, habitat degradation, and the consequences of climate change. Policymakers and wildlife organizations can take proactive steps to stop the extinction of species with the aid of predictive analytics.

VII. CONCLUSION:

An important development in the preservation and protection of wildlife is the AI-Powered Wildlife Conservation System. There has never been a greater need for cutting-edge technologies to monitor, protect, and maintain biodiversity as human activity continues to upset ecosystems. This system offers a comprehensive platform that enables the public and conservationists to actively participate in wildlife preservation by combining artificial intelligence, geolocation, and real-time image recognition. The drawbacks of manual species identification are removed by AI-based automation, guaranteeing quicker and more precise detection. This not only improves real-time tracking but also provides crucial insights for assessing the conservation status of endangered species, strengthening efforts to protect them.

This system's integration with the Google Maps API is a crucial component that greatly speeds up response times for injured or endangered animals by enabling users to find local rescue facilities and veterinarians with ease. This capacity is especially important in situations where prompt action can save lives. By offering easily available information on different species and their conservation status, the portal also functions as a teaching tool. By increasing public awareness, the system encourages greater participation in wildlife protection efforts while also supporting researchers and policymakers with valuable data on animal populations, human-wildlife interactions, and conservation trends.

Despite its many advantages, several challenges remain in optimizing the system’s effectiveness. Enhancing the accuracy of animal identification across various environmental conditions, ensuring seamless integration with global conservation databases, and overcoming real-time processing limitations in remote areas with poor connectivity are key areas for improvement. However, advancements in AI, machine learning, and

cloud computing present opportunities to refine the system further. By leveraging these technologies, the platform can become even more efficient in tracking and protecting wildlife, ultimately making conservation efforts more data-driven and impactful.

Looking ahead, the AI-Powered Wildlife Conservation System has immense potential for growth and innovation. Future enhancements could include IoT-enabled sensors, drone-based real-time tracking, and offline functionality for use in remote regions. Expanding the system to support multiple languages and region-specific needs would make it a truly global platform for conservation. Additionally, collaborations with international wildlife organizations, improvements in data security, and the implementation of predictive analytics can help prevent species extinction and mitigate the effects of climate change on wildlife. This system not only leverages modern technology but also encourages individuals, researchers, and organizations to take an active role in preserving biodiversity. This flexible platform has the potential to revolutionize how we engage with and safeguard species as conservation demands change, guaranteeing that future generations will inherit a planet abundant in biodiversity.

REFERENCES:

[1] Oladele, O.K., 2025. AI in Wildlife Conservation: Species Monitoring, Poaching Prevention, and Habitat Restoration.
[https://www.researchgate.net/profile/Oluwaseyi-Oladele-3/publication/390066060_AI_in_Wildlife_Conservation_Species_Monitoring_Poaching_Prevention_and_Habitat_Restoration/links/67ddd14de2c0ea36cd87fbc3/AI-in-Wildlife-Conservation-Species-Monitoring-Poaching-Prevention-and-Habitat-Restoration.pdf]

[2]Chisom, O.N., Biu, P.W., Umoh, A.A., Obaedo, B.O., Adegbite, A.O. and Abatan, A., 2024. Reviewing the role of AI in environmental monitoring and conservation: A data-driven revolution for our planet. _World Journal of Advanced Research and Reviews_, _21_(1), pp.161-171.
[https://wjarr.co.in/wjarr-2023-2720]

[3] Rayhan, A., 2023. AI and the environment: Toward sustainable development and conservation. _Research Gate_, _10_, pp.10-13140.
[https://www.researchgate.net/profile/Abu-Rayhan-11/publication/372717931_AI_AND_THE_ENVIRONMENT_TOWARD_SUSTAINABLE_DEVELOPMENT_AND_CONSERVATION/links/64c3d9f2cda2775c03ccbd32/AI-AND-THE-ENVIRONMENT-TOWARD-SUSTAINABLE-DEVELOPMENT-AND-CONSERVATION.pdf]

[4] Shukla, R., Utkarsh, K., Banwal, H., Chaudhary, A., Sahu, H. and Yadav, A.L., 2024. Wildwatch: AI-powered wildlife guardianship system using machine learning. *Available at SSRN 4932785*.
[https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4932785]