

AI BASED WILDLIFE CROSSING DETECTION AND ALERT SYSTEM

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ABSTRACT:

Wildlife–vehicle collisions have become a major concern in regions where transportation infrastructure intersects with forested and rural ecosystems. These incidents not only result in the loss of animal life and ecological imbalance but also pose serious risks to human safety and cause significant economic damage. To address this issue, this project proposes an AI-based Wildlife Crossing Detection and Alert System that utilizes advanced deep learning-based object detection models—MobileNet SSD and YOLOv11—to identify the presence of animals in real time and generate timely alerts.

The system processes live video streams from cameras installed near wildlife-prone road segments. MobileNet SSD is employed for lightweight, fast detection on low-powered edge devices, while YOLOv11 enhances detection accuracy and robustness in complex environmental conditions such as low light, occlusions, and varying animal sizes. Depending on the deployment constraints, either model—or a combination of both—can be integrated to balance precision and processing speed.

Once an animal is detected approaching or crossing the road, the system activates alert mechanisms such as alarms, visual indicators, or notifications to connected devices. This proactive intervention enables drivers and authorities to respond quickly, reducing the likelihood of accidents. The implementation also supports scalability for different terrains and animal species by incorporating model retraining and dataset customization.

Experimental results indicate high detection accuracy with minimal latency, making the system viable for real-world deployment in smart transportation networks, national parks, and highways near wildlife reserves. The project demonstrates how artificial intelligence, computer vision, and embedded technologies can collaborate to create an efficient, cost-effective, and automated solution for wildlife conservation and roadway safety.