Research Article

ADVANCED WILD ANIMAL DETECTION AND ALERT SYSTEM USING THE YOLO V5 MODEL POWERED BY AI

Dr. V. NAGAGOPIRAJU[1] SUVARNA PINNINTI[2] ANJAMMA TAMMA[3] SAI TEJA KAJJAYAM[4] KALESHAVALI KAKARLA[5]

[1]Department of CSE & AI, Chalapathi Institute of Engineering and Technology, LAM, Guntur, Andhra Pradesh, India.
[2]Department of CSE & AI, Chalapathi Institute of Engineering and Technology, LAM, Guntur, Andhra Pradesh, India.
[3]Department of CSE & AI, Chalapathi Institute of Engineering and Technology, LAM, Guntur, Andhra Pradesh, India.
[4]Department of CSE & AI, Chalapathi Institute of Engineering and Technology, LAM, Guntur, Andhra Pradesh, India.
[5]Department of CSE & AI, Chalapathi Institute of Engineering and Technology, LAM, Guntur, Andhra Pradesh, India

ABSTRACT: An advanced wild animal detection and alert system using you only look once version5 (YOLO V5) model. The system utilizes you only look once version5 (YOLO V5) object detection algorithm to identify wild animals and alert users to their presence in real-time. The system employs a camera to capture real-time video, which is then sent to a computer running you only look once version5 (YOLO V5) algorithm. When the system detects a wild animal, it sends an alert to the wild animal by playing any sounds like bullets firing. The system is expected to have a significant impact on the safety of people in areas with high wildlife populations. This advanced wild animal detection and alert system using you only look once version5 (YOLO V5) model has the potential to improve the safety of people in areas with high wildlife populations. Future work will focus on improving the accuracy of the system and implementing it in real-world scenarios.

Key Words: Wild Animal Detection, YOLO V5 Model, Safety, Real Time Video, Early Warnings

1. INTRODUCTION: Advanced Wild Animal Detection and Alert System Using you only look once version5 (YOLO V5) Model is a proposed analyse the images and detect the presence of wild animals. If the system detects the presence of any wild animal, it sends an alert to the authorities through an alarm or message. The proposed system is expected to provide an effective solution to prevent any potential harm caused by wild animals and help preserve wildlife by reducing human -animal conflict. The Advanced Wild Animal Detection and Alert System is an application of the you only look once version5 (YOLO v5) system that aims to detect and alert the presence of wild animals in a particular area using advanced computer vision techniques. This system is designed to provide an effective and efficient solution to detect the presence of wild animals and alert the authorities to take necessary precautions. The system utilizes you only look once version5 (YOLO V5) model, which is one of the most widely used and popular deep learning models for object detection, to detect wild animals.

The proposed system is equipped with advanced sensors and cameras that are mounted on drones or other surveillance devices, which capture real-time. Images and transmit them to a central processing unit for detection and analysis. The YOLO V5 model is then used to object detection algorithm designed to detect wild animals and alert humans about their presence in real-time. This system uses a camera to capture live video feed from the surrounding environment and processes it using the you only look once version5 (YOLO v5) algorithm to detect the presence of wild animals. Once an animal is detected, an alert is sent to the user interface and a notification is sent to the user's mobile device to warn them about the animal's presence. This system is particularly useful for those who live in areas with high populations of wild animals, such as national parks, wildlife reserves, or rural areas, as it can provide an early warning system to prevent dangerous encounters with wild animals.

2. LITURETURE SURVEY:

[1] This study proposes an animal detection and warning system using the Faster regions with convolutional neural networks (RCNN) model. The system aims to detect animals on the road and alert drivers to prevent road accidents. The authors first collected and labeled a dataset consisting of various animal classes commonly found on Indian roads. They then trained the Faster regions with convolutional neural network (R-CNN) model using the TensorFlow object detection API. The model was fine-tuned on the collected dataset and used a camera module attached to a Raspberry Pi. This study proposes a wildlife detection system using the Mask regions with convolutional neuralnetworks (R-CNN) model. The system aims to automatically detect wildlife in the wild for conservation purposes. The authors collected and labeled a dataset consisting of various wildlife species commonly found in China. They then trained the Mask regions with convolutional neural networks (R-CNN) model using the PyTorch deep learning

[2] This study proposes an animal detection and warning system using the Faster regions with convolutional neural networks (RCNN) model. The system aims to detect animals on the road and alert drivers to prevent road accidents.

The authors first collected and labeled a dataset consisting of various animal classes commonly found on Indian roads. They then trained the Faster regions with convolutional neural network (R-CNN) model using the TensorFlow object detection API. The model was fine-tuned on the collected dataset and used a camera module attached to a Raspberry Pi.

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

The existing system lacks an effective mechanism for the real-time detection and alert of wild animals. It relies on conventional surveillance methods that are often labor-intensive and prone to human error. Manual monitoring of wildlife presence is time-consuming and may result in delayed responses to potential threats. Inefficient data processing and low accuracy levels hamper the system's ability to promptly recognize and alert users about the presence of wild animals. Consequently, it poses a significant safety risk to people in areas with a high wildlife population. The existing system necessitates an urgent upgrade to enhance its capabilities and ensure the safety of individuals in these regions.

LIMITATION OF EXISTING SYSTEM

The limitations of the existing wild animal detection system are as follows:

Manual Monitoring: The system relies heavily on manual monitoring and visual observation, making it labor-intensive and prone to human error.

Low Accuracy: The accuracy of the system is often compromised, resulting in false alarms or missed detections, which can be problematic and inconvenient.

Dependency on Human Operators: Human operators are required to continuously monitor the system, which can be exhausting and inefficient for long periods.

3.2 PROPOSED SYSTEM

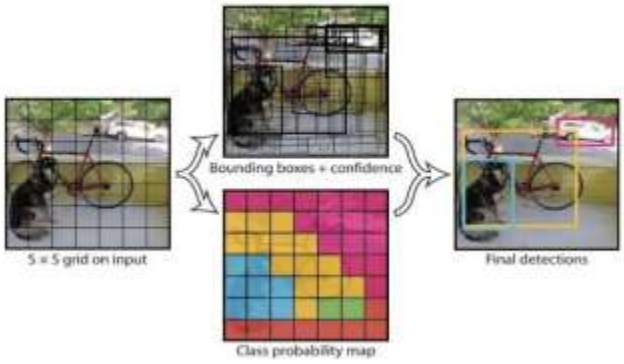
The proposed system for the Advanced Wild Animal Detection and Alert System using you only look once version5 (YOLO V5) model will consist of the following components: Certainly, here are five key modules or components for your project titled "Advanced Wild Animal Detection and Alert System using YOLO V5 Model":

Image Acquisition and Preprocessing: This module involves capturing images or video feeds from cameras and drones placed in the wild. It also includes preprocessing these images, such as resizing, noise reduction, and enhancing image quality to optimize them for the YOLO V5 model.

YOLO V5 Object Detection Model: This is the core of your project. You'll implement the YOLO (You Only Look Once) V5 model for object detection. This module focuses on training and fine-tuning the model to detect specific wild animal species. You may also explore different YOLO model variants (e.g., YOLOv5s, YOLOv5m) for performance and efficiency.

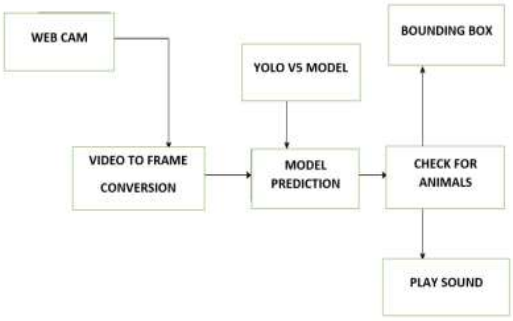
Alert Generation and Communication: When the YOLO model detects wild animals, this module generates real-time alerts. It includes the development of an alert system, such as sending notifications via SMS, emails, or mobile applications. Integration with GPS or mapping services can help provide the exact location of the animal sighting.

4. SYSTEM ARCHITECTURE



5. OBJECT RECOGNITION ALGORITHM

A real-time object recognition algorithm named you only look once version5 (YOLO V5) was created by the machine learning industry. It means for You Only Look Once, which is an advancement above earlier you only look once version (YOLO) iterations. You only look once version5 (YOLO V5) can accurately and quickly detect objects in real-time because it was built for high performance and scalability. In a one forward pass through the model, it predicts the bounding boxes and class probabilities for objects in an image using a single convolutional neural network. The algorithm has undergone numerous benchmark tests and has produced results that are cutting edge in terms of correctness and speed of processing. Many different applications, such as video surveillance, selfdriving cars, and image retrieval systems, use you only look once version5 (YOLO V5).



6.MODULES

Data Collection: A diverse dataset of wild animals will be collected, including various species and environments. The you only look once (YOLO) version 5 model will be trained using this dataset.

Model Training: Modern deep learning methods will be used to train the you only look once version5 (YOLO V5) model using the gathered dataset. The model will be adjusted to increase its capability of correctly identifying wild creatures.

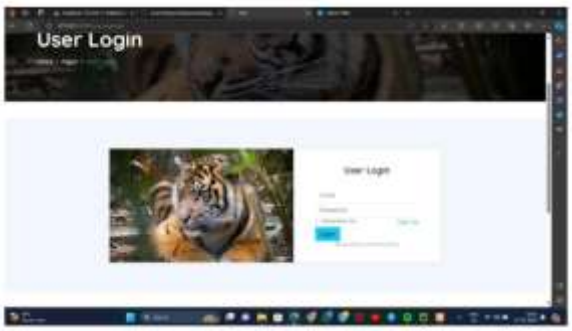
Object Detection: The you only look once version5 (YOLO V5) model will be used to detect wild animals in real-time using video feeds from cameras installed in wildlife areas. When animals are detected, the model will produce bounding box coordinates around them and the corresponding class names.

Tracking: A tracking algorithm will be implemented to track the movements of detected wild animals. The algorithm will use the output from the you only look once version5 (YOLO V5) model to track the animals and update their positions in real-time.

Alert System: An alert system will be implemented to provide real-time alerts in case of potential danger. The alert system will use the tracking information to determine the proximity of the detected wild animals to populated areas, and if necessary, send an alert to the relevant authorities.
User Interface: A user-friendly interface will be developed to allow users to view the real-time video feeds, detections, and alerts.

Evaluation: The system's performance will be assessed using common metrics like recall, accuracy, and precision. The system will undergo testing in a real-world environment, and its efficiency in locating and tracing untamed animals will be evaluated. The Advanced Wild Animal Detection and Alert System using you only look once version5 (YOLO V5) model will provide a cost-effective solution for detecting and tracking wild animals, improving the safety and well-being of communities and the environment.

7. RESULT:



8. CONCLUSION
The Advanced Wild Animal Detection and Alert System using you only look once version5 (YOLO V5) model is a cost-effective solution for detecting and tracking wild animals. The system leverages you only look once version5 (YOLO V5) object recognition model and tracking algorithms to provide real-time alerts in case of potential danger. The system can improve the safety and well-being of communities and the environment by providing timely and accurate information about wild animals. The system has the potential to make a significant contribution to wild animal.

FUTURE WORK: Improving Alert System: The alert system can be improved by incorporating more sophisticated methods for determining the potential danger of wild animals, such as incorporating animal behaviour patterns and population density data.

REFERENCES

[1] Shivang A, Jean O D T and Frédéric D 2018. J. Recent Advances in Object Detection in theAgeof Deep Convolutional Neural Networks. arXiv e-prints arXiv1809.03193.
[2] Ross G 2015. J. Fast R-CNN. 2015 IEEE International Conference on Computer Vision. 1440-1448.
[3] Carranza-García M, Torres-Mateo J, Lara-Benítez P and García-Gutiérrez J 2021. J. OnthePerformance of One-Stage and Two-Stage Object Detectors in Autonomous Vehicles UsingCamera Data. Remote Sens. 13(1): 89.
[4] Kanlayanee K, Siranee N and Joshua M P 2021. J. Open source disease analysis systemof cactus by artificial intelligence and image processing. The 12 th International ConferenceonAdvances in Information Technology.
[5] Delong Q, Weijun T, Qi Y and Jingfeng L 2021. B. YOLO5Face: Why Reinventinga FaceDetector. ECCV Workshops. [6] Joseph R, Santosh D, Ross G and Ali F 2015. J. You Only Look Once: Unified, Real-TimeObject Detection. 2016 IEEE International Conference on Computer Vision and PatternRecognition. 779-788
[7] Joseph Rand Ali F 2018. J. YOLOv3: An Incremental Improvement. arXiv e-printsarXiv1804.02767
[8] Alexey B, Chien-Yao W and Hong-Yuan M L 2020. J. YOLOv4: Optimal Speed and Accuracyof Object Detection. arXiv e-prints arXiv2004.10934

[9] Hu J, Zhi X, Shi T, Zhang W, Cui Y and Zhao S. 2021, J. PAG-YOLO: APortableAttention-Guided YOLO Network for Small Ship Detection. Remote Sensing. 13(16):3059
[10] Hou Y, Yang Q, Li L and Shi G 2023. J. Detection and Recognition Algorithmof Arbitrary-Oriented Oil Replenishment Target in Remote Sensing Image. Sensors (Basel). 23(2):767.
[11] Munhyeong K, Jongmin J, and Sungho K 2021. J. ECAP-YOLO: Efficient Channel AttentionPyramid Yolo for Small Object Detection In Aerial Image. Remote Sensing, 13(23):4851.
[12] Madodomzi M, Philemon T, Tsungai Z and Abel R 2021. J. On the Performance of One-Stageand Two-Stage Object Detectors in Autonomous Vehicles Using Camera Data. Remote Sens. 13(1):89.