

Animal Intrusion Detection Model based on Temporal Convolutional Network for Smart Farming

Abstract

Human-wildlife conflicts arising from habitat encroachment and deforestation have led to an alarming increase in crop raiding, causing substantial losses to farmers and posing risks to human safety. Conventional methods, ranging from lethal measures to non-lethal deterrents, have proven insufficient, often leading to environmental pollution, high costs, and limited effectiveness. In response to these challenges, this project proposes novel Integrated Wildlife Management System that combines Computer Vision, leveraging Temporal Convolutional Networks (TCN), for precise animal species detection and recognition, with a targeted ultrasound emission technique for species-specific repelling. The system, driven by edge computing, ensures real-time responsiveness to mitigate crop raiding. The workflow commences with the activation of the camera by the edge computing device, triggering the deployment of an advanced Animal Intrusion Detection Model. This model accurately identifies the invading species, and upon detection, transmits a message to the Animal Repelling Module. In response, the module emits a species-specific ultrasound, effectively deterring the encroaching wildlife. Distinguishing itself from traditional methods, our approach minimizes environmental pollution and addresses financial constraints associated with maintenance costs and reliability issues. By incorporating cutting-edge technologies, the Integrated Wildlife Management System offers a robust and adaptable solution for safeguarding crops from a variety of wild animals, such as elephants, wild boar, and deer. By leveraging cutting-edge technology, the proposed solution seeks to strike a balance between protecting crops and minimizing environmental impact. This project contributes to the ongoing discourse on human-wildlife conflict resolution and highlights the potential of technology-driven solutions in fostering coexistence between agriculture and biodiversity.

Software specification

Server Side : Python 3.7.4(64-bit) or (32-bit)

Client Side : Bootstrap

IDE : IDLE, Flask 1.1.1

Back end : MySQL 5.

Server : Wampserver 2i

DL DLL : TensorFlow, Pandas, SiKit Learn