SRI VENKATESWRA COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

IMAGE PROCESSING-BASED ANIMAL INTRUSION DETECTION SYSTEM IN AGRICULTURAL FIELDS USING DEEP LEARNING

UG FINAL YEAR PROJECT- 2023

TEAM MEMBERS: OVIYA G(190701071), PRAPTI D(190701078), MENTOR: Mrs. K.SRIVIDHYA

ABSTRACT

•Agriculture is one of the most important industries in any economy since it plays a big role in the food supply chain.

•Agricultural fields, on the other hand, confront a number of issues, including animal encroachment, which can cause severe crop damage and loss.

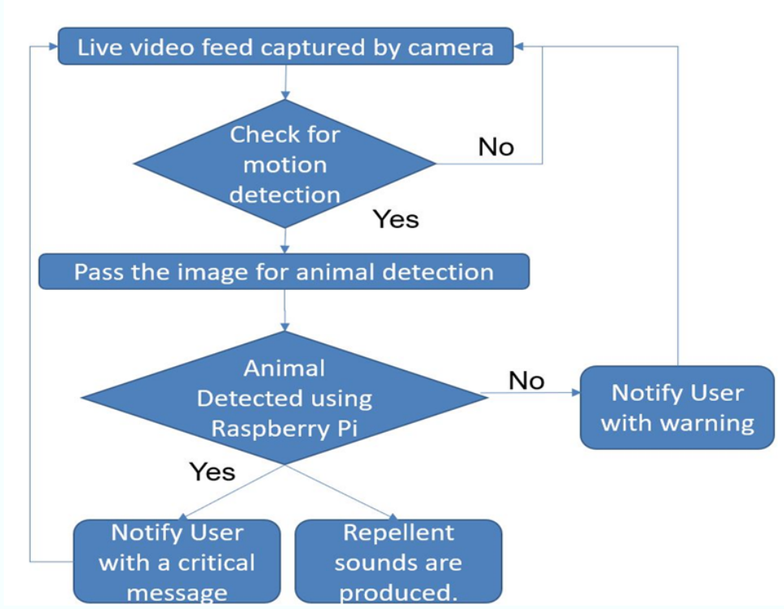
•Traditional animal control tactics, such as electrical fences, physical barriers, and scarecrows, can be inefficient, time-consuming and a serious threat to animal lives.

•To overcome these problems we propose a unique method that involves image processing-based animal incursion detection system in agricultural fields using Raspberry Pi and deep learning technique, mainly the YOLOv7.

•The system generates SMS notification to alert the farmers and also produces repellent noise to scare away the intruding animal.

•This method provides an efficient and practical alternative for crop damage prevention and human-wildlife conflict reduction in agricultural settings.

WORKFLOW



REQUIREMENTS

HARDWARE COMPONENTS:

- Raspberry Pi 4 model B
- Webcam
- Speakers

SOFTWARE COMPONENTS:

- Python – 3.9
- Visual studio code
- OBS Studio

PROPOSED MODEL

•This model proposes an image processing-based animal intrusion detection system in agricultural fields using the Raspberry Pi model in agricultural fields by comparing deep learning algorithms such as YOLOv7 and Faster RCNN model to avoid human-wildlife conflict and crop damage.

•The You Only Look Once (YOLOv7) model is a state-of-the-art object detection model that has been shown to achieve high accuracy and fast processing speeds.

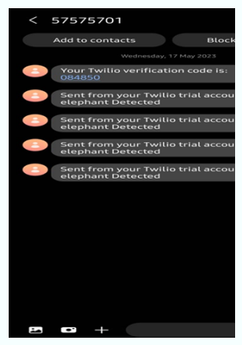
•The Faster RCNN model is a widely used object detection model that has been around for a while and is known for its high accuracy.

RESULT

YOLOv7 RESULT:

Faster RCNN RESULT:

SIMULATION OUTPUT



•When an elephant is intruded inside the specified agricultural boundary, the alerts are generated via SMS and simultaneously the repellent sound is played in order to scare away the animal.

• For example, in this case honey bee sound is played as elephants are irritated by this particular noise.

CONCLUSION AND FUTURE WORKS

•The image-processing-based AIDSAF implemented using the YOLOv7 algorithm utilizes a webcam to capture the live video feed of the agricultural fields, and detects and analyzes the intrusion using Raspberry Pi 4 model B and DL model.

•If an intrusion is detected, the system produces repellent sounds with the help of speakers and also sends an SMS alert to farmers.

•The YOLOv7 model is highly preferred in terms of accuracy and speed.

•By this method, the animal's lives are in a less threatening position and also the main aim to protect the field from damage is achieved.

•The data set of classes can be expanded and each image in the class can be maximized for even better accuracy.

•Our future works include the usage of drones which will give a bird's eye view for enhanced security and monitoring. More powerful night vision cameras can be used in our future development.

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