

ABSTRACT

The electricity distribution network is a vital component of the power system that distributes energy from substations to end consumers. The reliability and operational continuity of these networks often face challenges, one of which is disruption due to the presence of animals. Such disturbances can cause power outages, economic losses, and even animal deaths. This research aims to design a computer vision-based intelligent detection system with the YOLO algorithm that is able to detect the presence of animals in real-time on electricity distribution networks.

The designed system consists of a camera module, Raspberry Pi 5 as a microcomputer, speaker, and LCD. The camera is used as an input to capture images, while the speaker is used as an output that will emit sounds to repel animals. This system was developed as an alternative to previous approaches, hoping to simplify the components as well as provide fairly accurate detection under certain conditions. The system is expected to contribute to reducing animal interference in electricity distribution networks.

Based on the results of testing and analysis, the detection system using Raspberry Pi Camera Module 3 NoIR and YOLOv8s model successfully detects animals accurately in various lighting conditions, both bright and dark with the help of infrared (IR) lights. The system was able to provide an automatic response via an active speaker to repel detected animals, reducing disruption to the distribution power grid. Although detection degrades slightly in low lighting conditions and fast-moving objects, the use of IR lights and system customization can improve detection performance, even in low light conditions. Overall, the system can prevent animal intrusion in the distribution power grid with an automatic response.

Keywords: Animal Detection, YOLO, Distribution Network, Animal Nuisance.