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## Smart Farm Protection System with Animal Intrusion Detection and Frequency – Based Deterrents

V Veena<sup>1</sup>, Bhutham Sudeeshna<sup>2</sup>, Voggu Bharath Kalyan<sup>3</sup> Assistant Professor, Department of IT<sup>1</sup> UG Scholars, Department of CSB<sup>2,3</sup>

Mahatma Gandhi Institute of Technology, Hyderabad, Telangana, India vveena\_it@mgit.ac.in, sudeeshnapatel@gmail.com, bharathkalyan6363@gmail.com

Abstract: Animal intrusions into agricultural fields and residential areas pose significant risks to crop safety, human well-being, and overall environmental security. This project introduces a vision-based, intelligent, real-time system for animal detection and repulsion. Instead of using traditional motion or infrared sensors, the system uses sophisticated image processing techniques to detect the presence of animals in either static or live visual input. The system uses GPIO-based actuation via a Raspberry Pi to automatically activate physical deterrents, such as an acoustic buzzer and a water spray mechanism, once an animal is detected. To guarantee that the user is aware of the intrusion right away, an SMS alert is sent to them simultaneously. PyQt was used to create an intuitive graphical user interface that allows users to upload images, stream live video, and monitor activity for detection. In addition to providing real-time feedback on detections and actions taken, a user-friendly graphical interface created with PyQt allows users to stream live video, upload images, and monitor activity. This solution supports more secure and effective farm or property management by providing a scalable, economical framework for protecting sensitive areas from animal encroachment through the use of multimodal deterrence and automated alerting.

Keywords: Animal Intrusion, Computer Vision, Real-time Detection, Raspberry Pi, Automated Repellent, Smart Agriculture, GUI Monitoring

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