Swarm Drone System with YOLOv8 Algorithm for Efficient Locust Management in Agricultural Environments

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Abstract: *In recent years, the recurring invasions of locusts have emerged as a significant threat to global agriculture, jeopardizing both crop yields and vast uncultivated lands. To address this pressing issue, this research paper introduces an innovative approach that leverages artificial intelligence (AI) for real-time locust management. Extensive investigations into locust behavior, life cycles, and existing management techniques have informed the development of a novel swarm drone system capable of detecting and eliminating locusts in farms using object detection and targeted pesticide spraying. The core technology employed in the system is the YOLOv8 algorithm, a convolutional neural network model renowned for its robustness in object recognition. The coordinated actions of the swarm drones are facilitated by the ArduPilot system, enabling efficient collaboration and synchronized locust eradication efforts. By harnessing AI for locust detection and eradication, the proposed system demonstrates the potential to significantly enhance efficiency and accuracy, thereby mitigating crop damage and elevating agricultural yields. This research paper sheds light on a promising solution that amalgamates AI, drones, and object detection to tackle the critical issue of locust management, fostering sustainable agricultural practices in the face of mounting challenges.*

Keywords: *Locust Management, Artificial Intelligence (AI), Drone, Object Detection, Swarm Drone System, YOLOv8 Algorithm, ArduPilot System, Locust Detection, Locust Eradication, Crop Damage, Agricultural Yields, Sustainable Agricultural Practices*

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