smart crop protection system from animals and birds

Abstract:

The smart crop protection system uses a combination of sensor technology, deterrent mechanisms, and intelligent monitoring to reduce crop damage caused by animals and birds. The project offers an automated method to safeguard crops while reducing environmental impact, addressing the urgent need for sustainable agricultural practices. The choice of suitable sensors designed to detect particular pests—such as motion sensors for rodent detection, proximity sensors for larger animals, and ultrasonic sensors for bird deterrence—is one of the project's key components. These sensors are positioned thoughtfully throughout the agricultural fields to efficiently monitor pest activity. Once a pest is identified, the system incorporates deterrent mechanisms to prevent it. These mechanisms include visual deterrents like scarecrows or reflective materials, motion-activated deterrents that trigger lights or water sprays, and ultrasonic deterrents that emit high-frequency sounds. Utilizing intelligent algorithms, the system optimizes resource utilization and effectiveness by adjusting deterrent intensity based on environmental conditions and pest activity levels. Microcontrollers (like the Arduino and Raspberry Pi), power sources (like solar panels and batteries), and communication modules (like WiFi and GSM) are the hardware components that make up the setup for remote monitoring and control. Sensor interfaces, data processing algorithms for pest identification, decision-making logic for turning on deterrent mechanisms, and communication protocols for data logging and reporting are all included in software development. The system is put through field testing and optimization to see how well it works at keeping pests away while reducing false alarms and energy usage. The system's dependability and functionality in a range of environmental circumstances are guaranteed by ongoing maintenance and monitoring. Reducing dependency on chemical pesticides and increasing biodiversity in agricultural landscapes, the smart crop protection system provides an environmentally responsible and sustainable method of crop protection. The project advances sustainable agriculture and food security initiatives by fusing cutting-edge technology with environmental monitoring practices.

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