

Design of a Low-Cost Monkey Deterrent System

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Project Background

- ▶ Crop damage caused by vervet monkeys
- ▶ Significant impact on small-scale farmers in Zimbabwe
- ▶ Need for a low-cost, autonomous, non-harmful solution

Project Objectives

- ▶ Design a low-cost monkey deterrent system
- ▶ Ensure non-lethal and ethical wildlife deterrence
- ▶ Operate autonomously using renewable energy
- ▶ Adaptable and sustainable design

Target Species

- ▶ • Vervet monkey (*Chlorocebus pygerythrus*)
- ▶ • Intelligent and adaptable
- ▶ • Highly attracted to cultivated crops

Design Requirements

- ▶ • Non-harmful deterrent methods
- ▶ • Weather-resistant outdoor design
- ▶ • Off-grid renewable power supply operation
- ▶ • Low-cost and low maintenance

Deterrent Techniques

- ▶ • Predator sound playback (100Hz Leopard, 1000Hz eagle)
- ▶ • High-intensity LED strobe lighting
- ▶ • Input rotation to cover a larger area

Control System

- ▶ • Arduino Uno microcontroller to control input and output devices
- ▶ • PIR sensor and ultrasonic detection sensor for dual validation to prevent nuisance tripping
- ▶ • Motor driven housing to provide 360 degree of viewing from sensor platform

System Behaviour

- ▶ • Continuous slow rotation of the unit
- ▶ • Deterrents activate only when both sensors detect movement
- ▶ • Escalating response if monkeys remain nearby (increased frequency output of LED strobe light and buzzer)

Power System

- ▶ • Solar panel with rechargeable battery providing 27 hours of continuous use at full output operation
- ▶ • Designed for daytime operation and can be operated at night if needed
- ▶ • Battery provides backup during low sunlight

Mechanical Construction

- ▶ • Elevated galvanized steel tripod
- ▶ • Weatherproof enclosures for electronics
- ▶ • Solar panel mounted on top

Cost Analysis

- ▶ • Estimated total cost below £500
- ▶ • More economical than manual crop guarding
- ▶ • Minimal running and maintenance costs

Conclusion

- ▶ • Effective and ethical monkey deterrent solution
- ▶ • Suitable for rural agricultural environments
- ▶ • Scalable and adaptable for future improvements