

Sensor Bat Box

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1.

Introduction

The Problem



Introduction

The Problem:

Bats face habitat loss due to urbanization, which impacts local ecosystems and pest control. Existing solutions often lack durability, weatherproofing, and data insights.

Why It Matters:

Bats play a crucial role in maintaining ecological balance by consuming thousands of insects daily. Providing a safe, monitored shelter addresses both ecological and research needs.

User Requirements And Market Gaps

“Who Cares?”

- **Key User Requirements:**
 - Durable and weatherproof structure.
 - Accurate monitoring of bat transit.
 - Affordable and easy to maintain.
- **Current Solutions:**
 - Traditional bat boxes lack monitoring features and often fail under harsh weather.
- **Importance:**
 - A robust, sensor-integrated solution offers ecological, scientific, and user benefits.
 - Enhancing bat conservation efforts ensures stability of ecosystems, as bats are known for contributing to pest control, and pollination of plants.

Differentiation

“Why You? Why Now?”

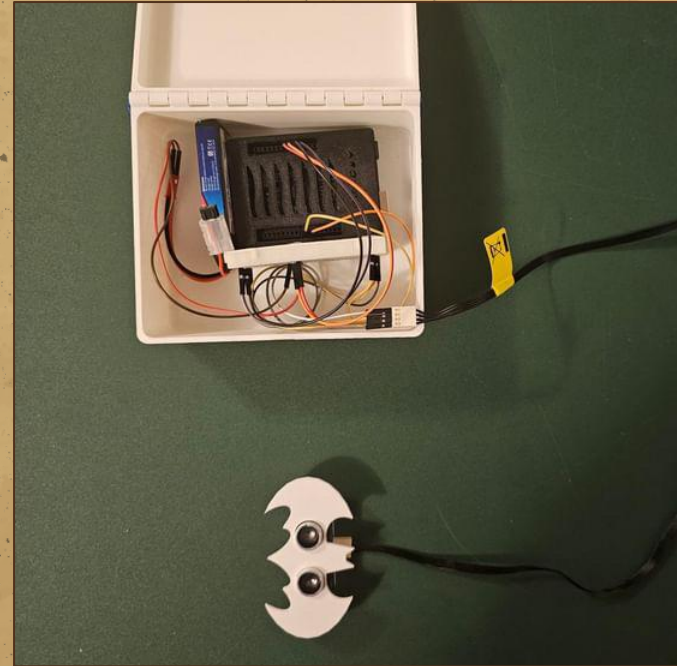
- **Our Solution:**

A trapezoidal bat box with:

- Ultrasonic motion detection for 95% transit accuracy
- Solar-powered rechargeable battery for sustainability
- Weatherproofing to withstand 98% of water load

- **What Sets Us Apart:**

Combines eco-friendly materials, cost-efficiency, and modern technology for a comprehensive solution.



Prototype Overview

Structure

- Trapezoidal plywood box, reinforced with Gorilla Glue and fasteners for durability.
- Steel hinges to support the roof structure, allowing it to open and close smoothly for easy access to electronics.

Circuit Design

- **Components:** Arduino Uno, ultrasonic sensor, solar panel, rechargeable battery.
- **Features:** Logs bat transits, powered by solar energy for extended functionality.

Prototype in Action (Demonstration)

Challenges and Solutions

- **Challenges:**

- Achieving accurate bat detection.
- Creating a secure area for the electronics, to ensure water resistance.
- Balancing the cost of materials and electronic components without compromising on quality, durability, or the necessary features.

- **Solutions:**

- Conducting repeated tests with many variables to ensure a high accuracy rate.
- Designing a hinged compartment that can store the electronics, preventing most water from entering.
- Prioritizing affordable, yet reliable materials, while minimizing waste.

Conclusion and Future Outlook

Impact

- This project addresses the critical issue of habitat loss due to urbanization.
- It offers a durable and innovative shelter that directly benefits bat populations

Next Steps

- Conducting on-site testing in various real-world situations.
- Receiving professional feedback and implementing recommendations.
- Adjusting dimensions for larger quantities of bats.

Questions?