

Problem Statement:

Human-elephant conflicts have become a significant issue in regions like Anaikatti, Coimbatore, where elephant intrusions into human settlements and farmlands result in damage to crops, property, and sometimes even loss of life. Traditional deterrent methods are often ineffective, costly, or harmful to the animals. Our goal is to develop a humane, affordable, and effective solution that can prevent these conflicts while ensuring the safety of both the local communities and the elephants.

Use Cases:

Farm Protection: Farmers in regions prone to elephant intrusions can deploy the system to monitor their farms. When elephants are detected, the bee sound deterrent is triggered, preventing crop damage.

Village Protection: Villages situated near elephant habitats can install the system at strategic locations. When an elephant approaches, the deterrent is activated, and real-time alerts are sent to the villagers and forest officers, enabling timely intervention.

Wildlife Conservation Monitoring: The system can be adapted to monitor other wildlife species. It provides non-invasive, real-time tracking and deterrent solutions that help in wildlife conservation efforts.

Forest Monitoring: Forest officers can deploy the system across large areas to monitor elephant movement and take proactive measures to minimize human-elephant interactions.

How We Got the Idea:

This idea was born from our mini-project at Sri Krishna College of Engineering and Technology, where we initially focused on developing simple AI-based detection systems. As we researched further, we came across studies and projects in Africa and Sri Lanka that successfully used the natural fear elephants have of bees to keep them away from farms. We saw potential to adapt this concept using modern technology like AI and the ESP32-CAM to make the solution smarter and more affordable for regions like Anaikatti. After discussing with local farmers and

forest officers, we realized this solution could make a real difference in reducing human-elephant conflicts.

Implementation We Did Till Now:

Hardware Setup: We have set up the ESP32-CAM board with a PIR motion sensor to capture images when movement is detected.

AI Integration: We've trained a custom elephant detection model using Edge Impulse. The AI model analyzes images captured by the ESP32-CAM and detects if the movement is from an elephant.

Bee Sound Playback: Upon detecting an elephant, the system automatically plays a pre-recorded bee sound, which serves as a natural deterrent.

Telegram Integration: We've set up real-time notifications through Telegram. The system sends a photo and alert to designated users (e.g., forest officers, farmers) when an elephant is detected.

Testing: Preliminary tests have been conducted, and the system successfully detected movement and played the deterrent sound.

Component	Cost (in ₹)
ESP32-CAM	590
PIR Motion Sensor	90
DF Mini MP3 Player	150
Speaker	25
Wires and Connectors	50
Solar Panel	380
ESP32 (1 for every 20 devices)	26
Telegram API	Free
Edge Impulse AI Model	Free

Total cost per unit: Approximately ₹1,311

End Result:

Our solution provides a low-cost, humane, and effective method to prevent human-elephant conflicts. By leveraging the elephants' natural fear of bees and integrating AI for accurate detection, we aim to reduce the risks associated with elephant intrusions into farms and villages. The real-time notification system allows for timely intervention, and the overall setup is both scalable and easy to maintain. We believe that this solution has the potential to improve the lives of both humans and elephants by fostering peaceful coexistence.