

WiiTrack:Your Key to Tracking and Recovering Stolen Vehicles

Rogelio Betancourt, Adelynn Gamboa, David Garcia, Elianna Sanchez
Alta Vista Early College High School, New Mexico, Advisor- Rocio Campos

Problem Statement

Our community faces a rising amount of vehicle theft that is often overlooked, hindering progress towards UN Sustainable Goal 16.4, the recovery and return of stolen assets by 2030.

Objectives

Primary Objectives:

- ❑ Increase the amount of vehicles being recovered.
- ❑ Ensure safety to the community members.

Factors Addressed:

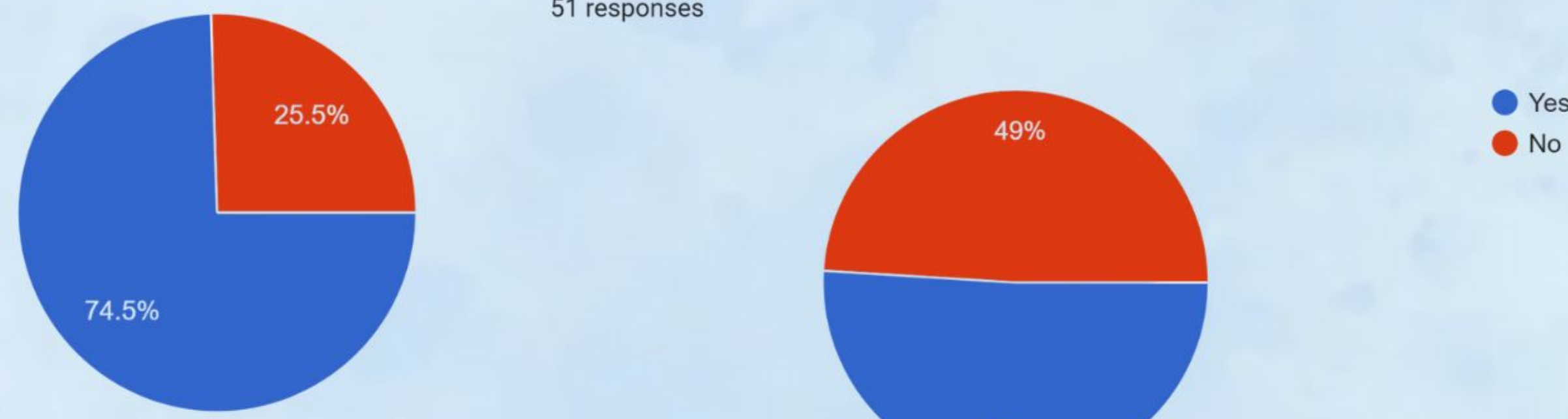
- ❑ Cost-effective
- ❑ Easy-to-use

Secondary Objectives:

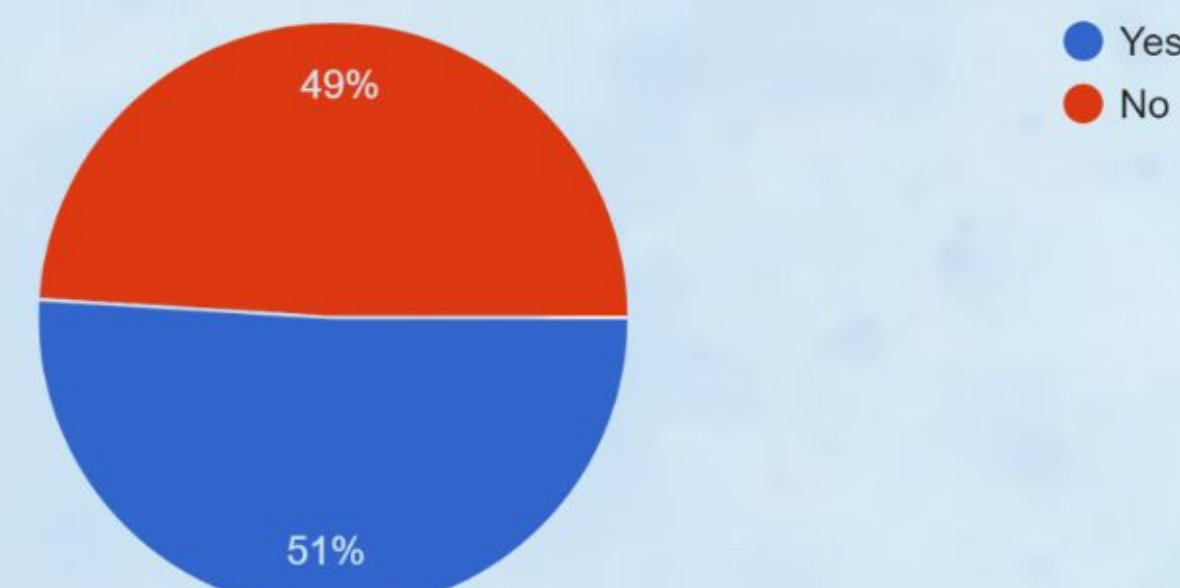
- ❑ Educate the community on how to avoid vehicle theft.
- ❑ Develop both a user-friendly app and physical device to accommodate different vehicles' technological capabilities.

Visual Data 1-Interview Findings

Are you worried about vehicle theft in our community?
51 responses



Have you or any other family member experienced vehicle theft?
51 responses



Testing Process: Data 1- We asked 51 community members who own vehicles about vehicle theft in our community and found that many community members are affected by vehicle theft.

User Requirements

Explicit

GPS Tracking

Accurately detects and provides real-time vehicle location.

Security Alerts

Instantly notify users when a break-in occurs.

Affordability

Keeps costs low to make security accessible.

Implicit

User-Friendly Interface

Ensures an intuitive and simple app experience.

Easy Installation

The device should be easy to install with minimal help.

Accuracy

Reduces false notifications to avoid unnecessary stress.

Engineering Design Process

Problem



- Vehicle theft is a major issue in our community and around the world
- Stolen vehicles often take a long time to be found

Community Research



- Police struggle to recover stolen vehicles, leaving many unrecovered
- Students and low-income individuals lack affordable security options
- Affordable security options

Plan/Design



- We created a device that will:
- Detect when the users car is being stolen
- Send a notification with live coordinates of where the vehicle is located

Communicate

We presented our solution to:

- **Vehicle Owners-** addressing theft and recovery concerns
- **Police Officers-** exploring how Wiitrack can aid police enforcement

Feedback/Improve



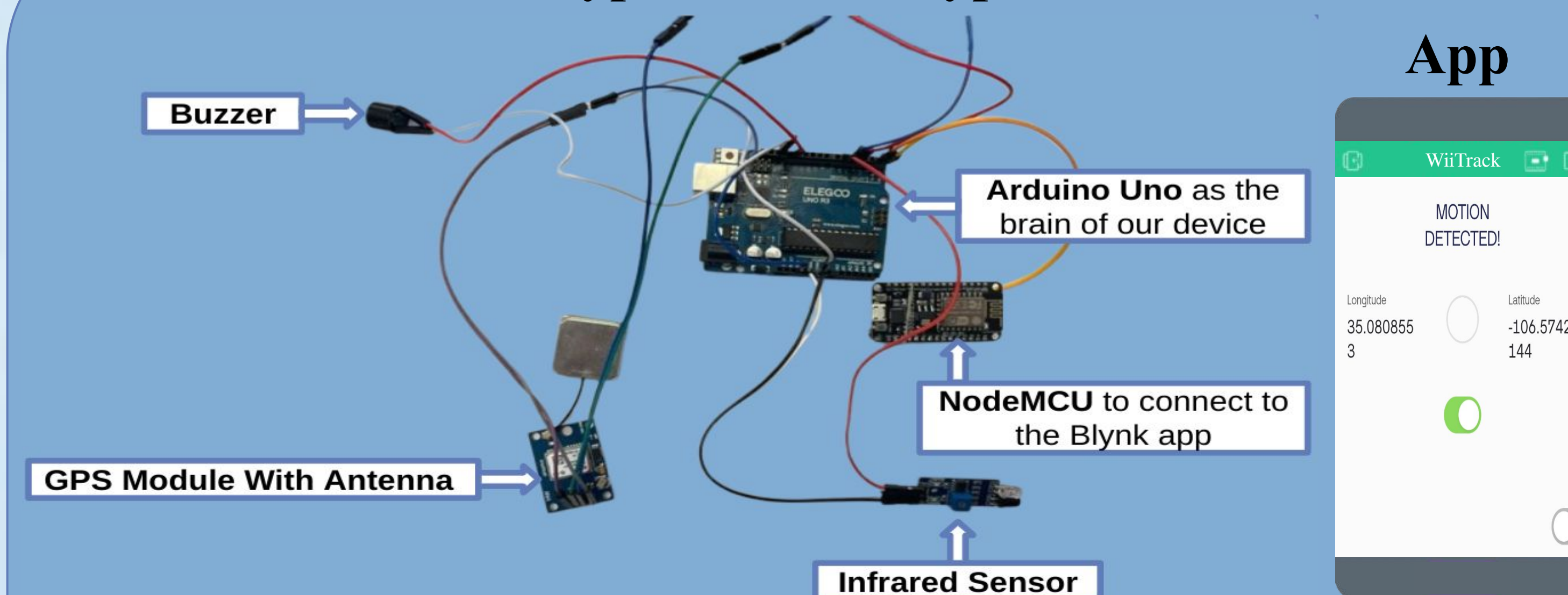
- Made various iterations for our device
- Added a buzzer to scare away the intruder
- Made the device difficult to spot

Test

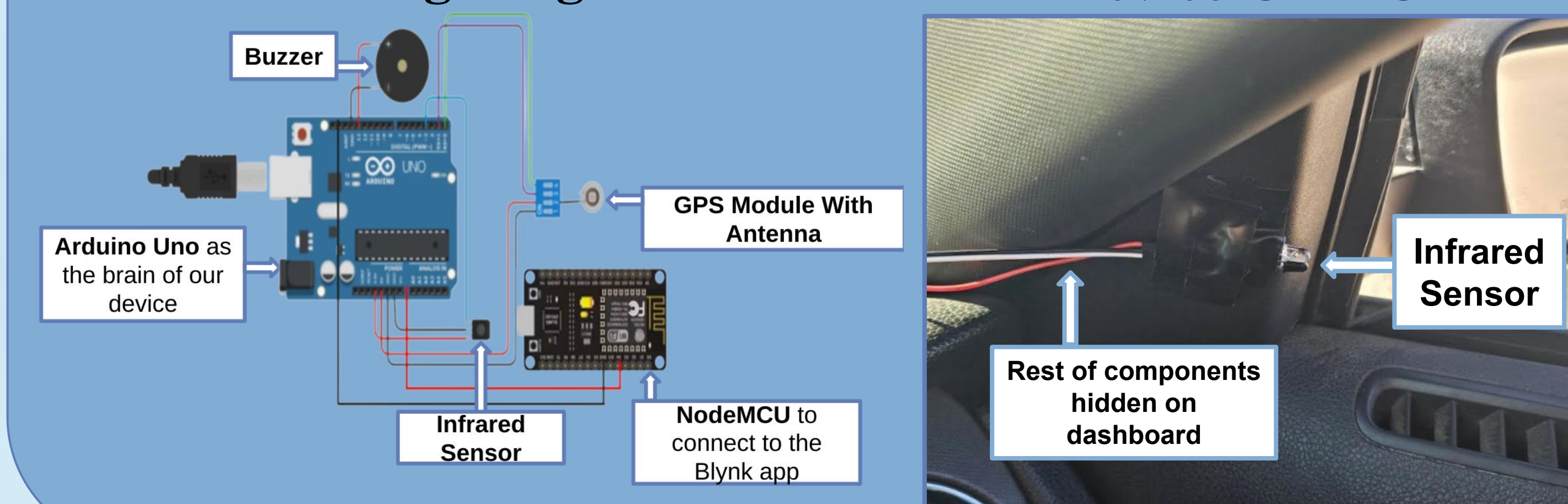


- We tested our device and our software
- We tried different sensors like the Ultrasonic and IR sensors

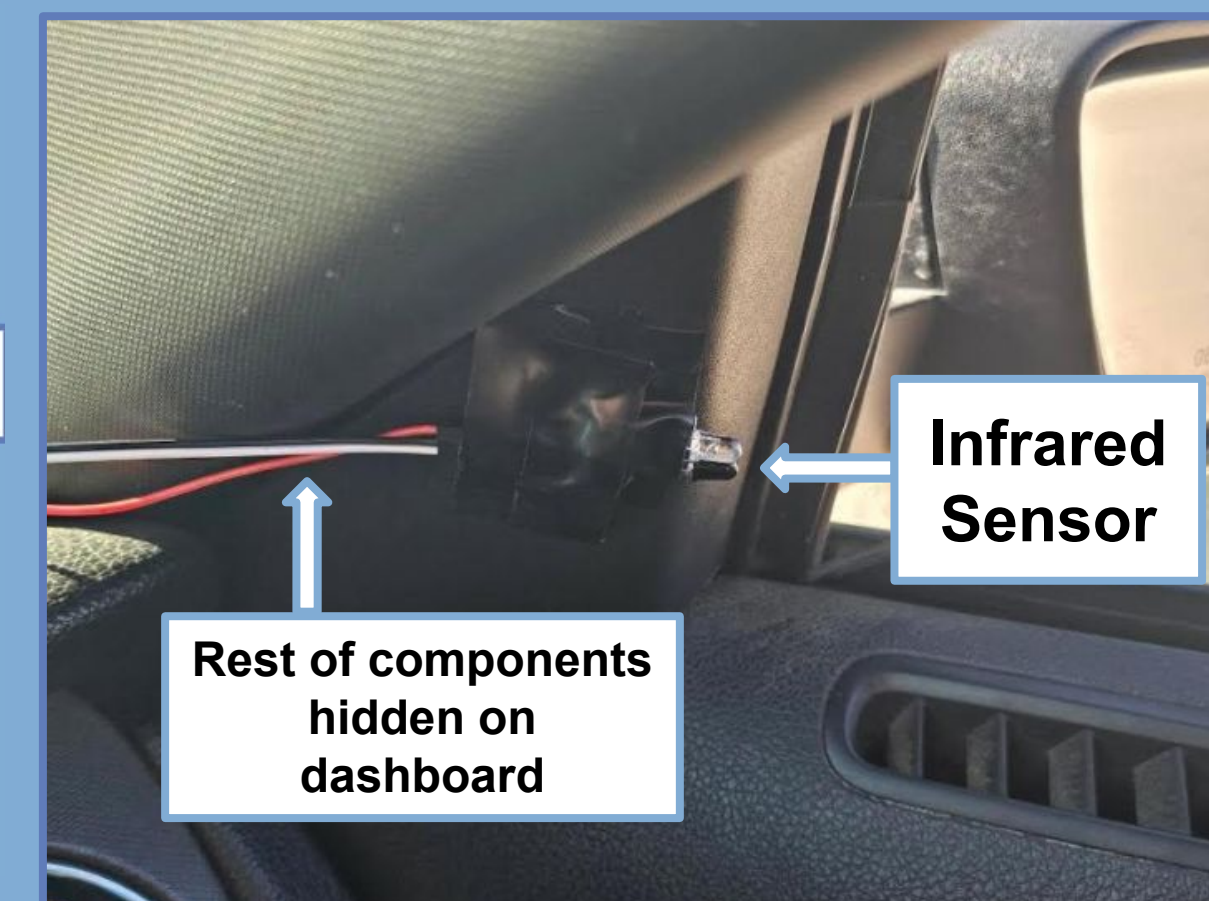
Prototype and Prototype Detail



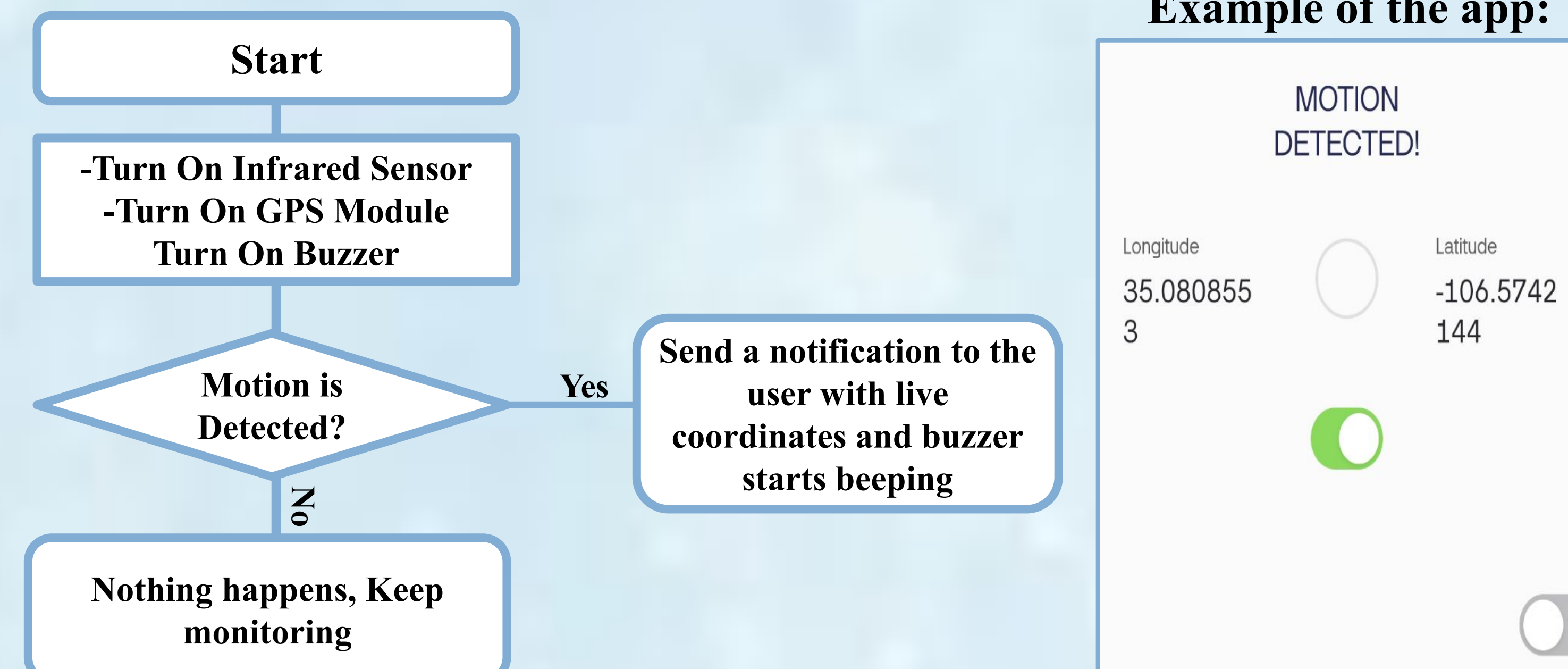
Wiring Diagram



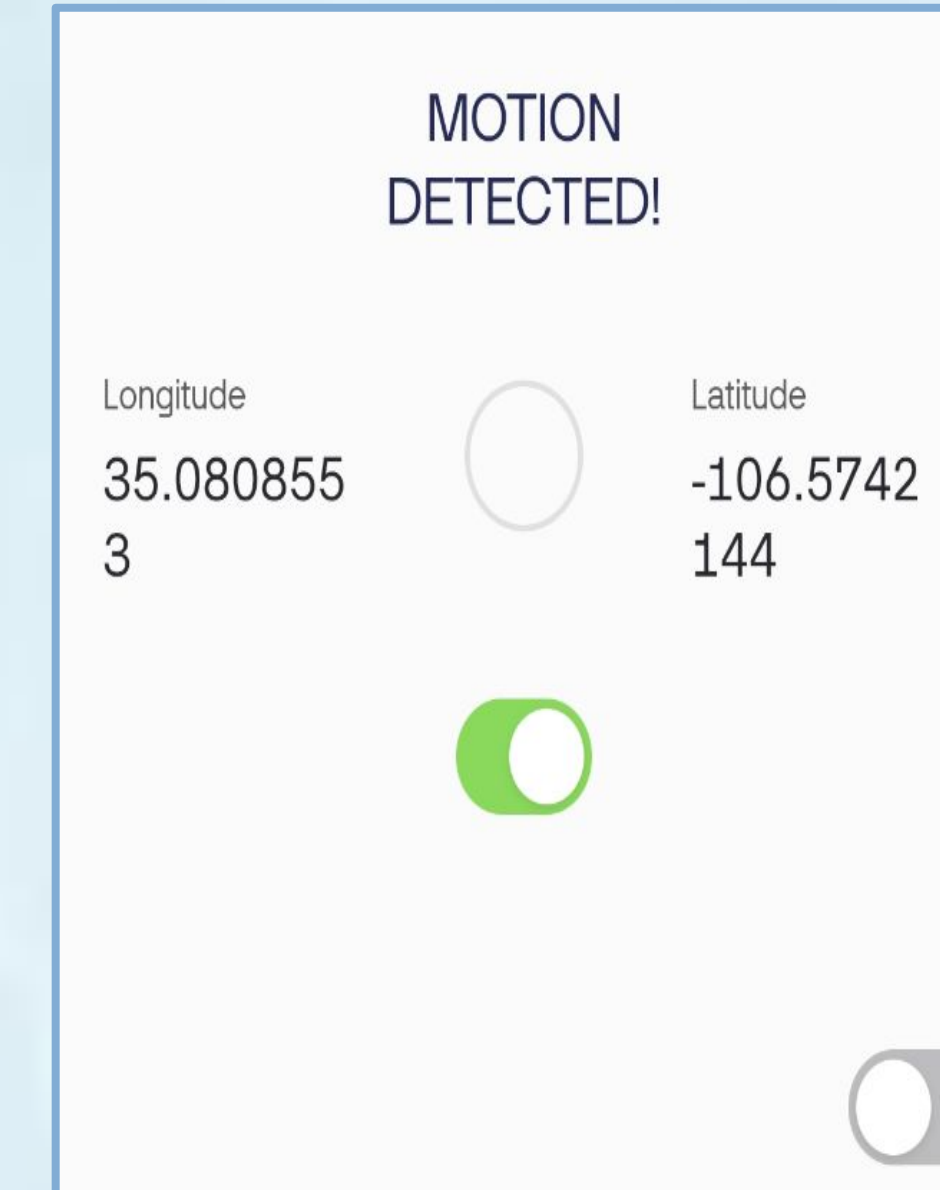
Device On a Car



Visual Element/Code Flowchart



Example of the app:



Visual Data 2- Testing Process

Trials	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Was Motion Detected with the IR Sensor?	Yes	Yes	Yes	Yes	Yes

Results- The IR sensor accurately detected movement 5 out of 5 times

Trials	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Was Motion Detected with the Ultrasonic Sensor?	Yes	Yes	No	Yes	Yes

Results- The Ultrasonic sensor accurately detecting movement 4 out of 5 times

Trials	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Was The GPS Module Accurate?	Yes	Yes	Yes	Yes	Yes

Results- The GPS Module sent accurate coordinates 5 out of 5 times

Testing Process: Sensor testing - Our team tested two different sensors by moving our hand in front of it to see which one was more accurate, we decided to use the IR sensor for its accuracy. GPS Module testing- We tested the GPS Module coordinates to see if they were accurate and reliable; we determined that the coordinates were 100% correct.

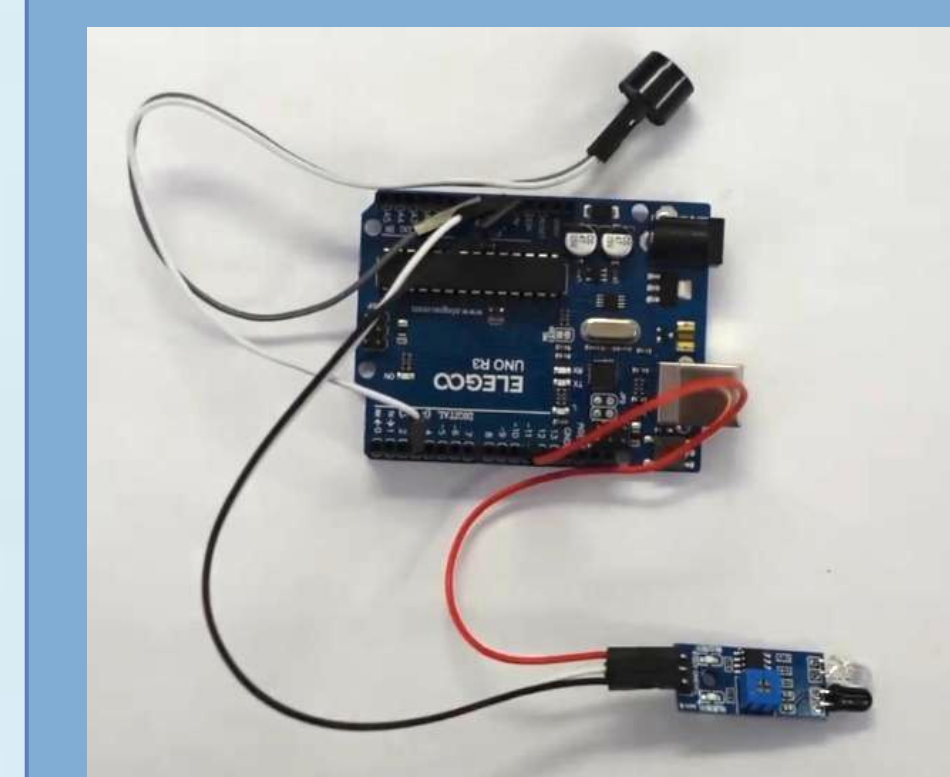
Design Iterations/Solutions To User Feedback

User Feedback

"I want to try to avoid my car being stolen..."

Iteration 1

- Arduino Uno
- Buzzer
- IR sensor



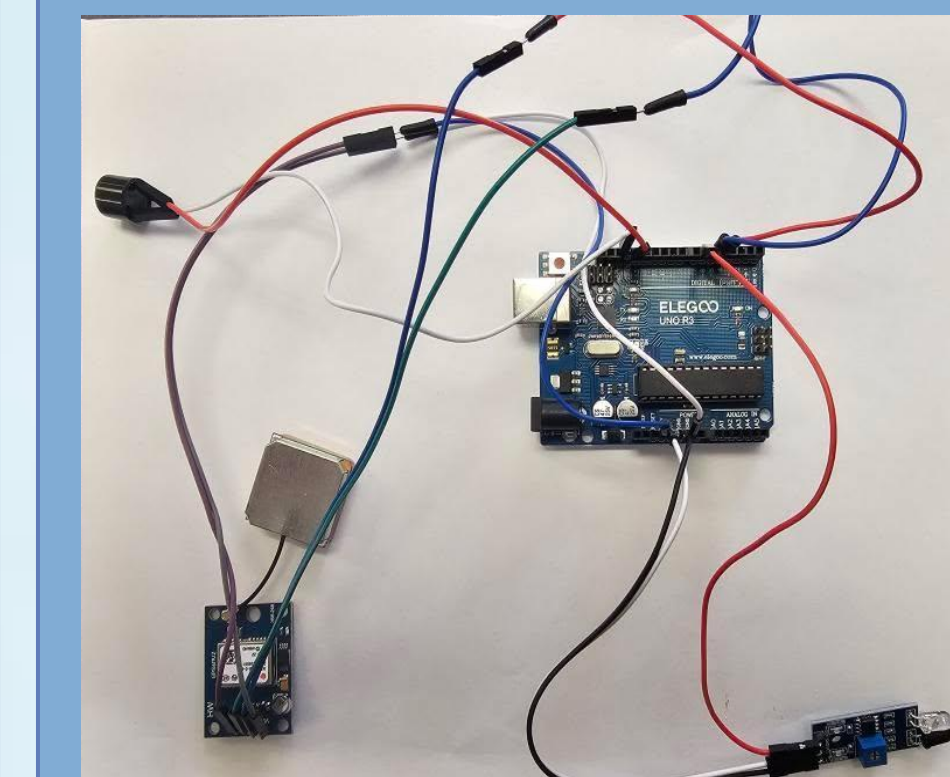
Included a buzzer to try to scare away the thieves.

User Feedback

"I won't be able to afford something expensive..."

Iteration 2

- Added a GPS Module with Antenna



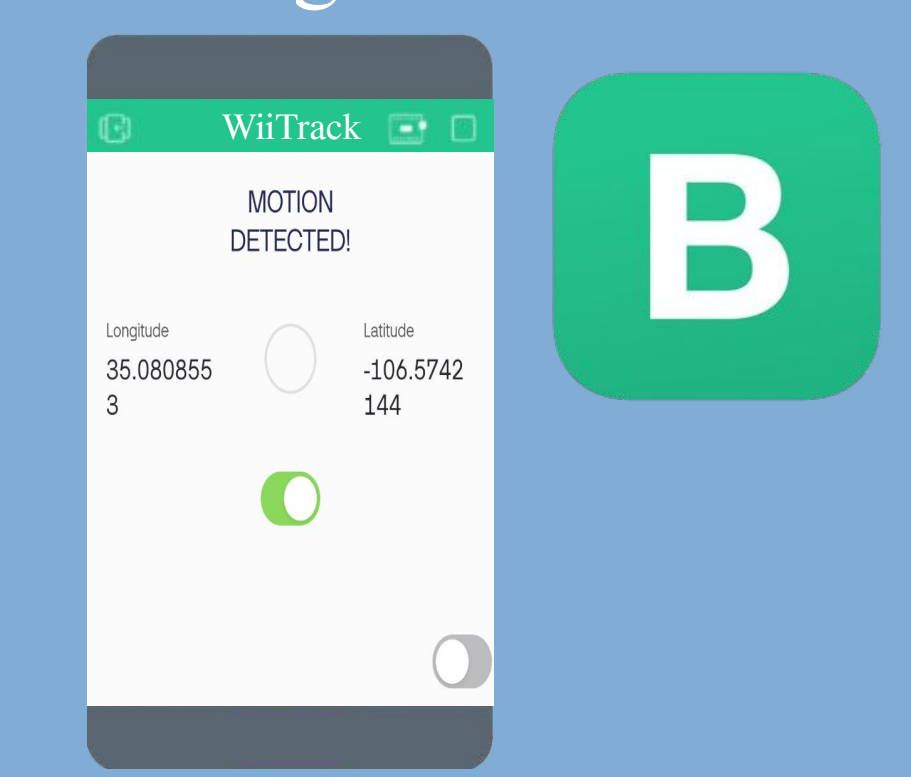
Ensured that our solution was affordable while adding key features.

User Feedback

"How can I track where my vehicle is?"

Iteration 3

- Connected it to the Blynk App by adding a NodeMCU



Configured the GPS module to send phone notifications via the Blynk app.

Current Security Options Compared to WiiTrack

Pros

- Accurate Location Tracking
- Low Cost

Apple Airtag



Cons

- Only usable to Apple users
- No alert when car is broken into
- No option to send location to authorities
- No attempt to deter thieves

Results

- ❑ WiiTrack addresses the inequity of vehicle theft in underserved communities by providing an affordable, easy-to-install device. It balances break-in detections and real-time location alerts while being cost-effective and reliable. In testing, the GPS module gave accurate coordinates in all trials, and the IR sensor detected motion five out of five times.
- ❑ Our device supports UN Goal 16.4 by helping recover stolen vehicles and improves safety for low-income communities with a cost-effective solution.

Conclusion

WiiTrack meets the user requirements effectively:

- ❑ **GPS Location:** The GPS sensor accurately tracks vehicles in real time.
- ❑ **Technology:** Sends break-in notifications via the app connected.
- ❑ **Accuracy:** The IR sensor ensures reliable alerts every time there is a break-in.
- ❑ **User-Friendly:** Simple interface, tested and refined for ease of use.
- ❑ **Easy Installation:** The device is simple to install with minimal assistance.
- ❑ **Affordable:** Our device is affordable at a price of only \$34.99.

Next Steps

- ❑ Incorporate a camera module that will allow the user to see the thieves through the app.
- ❑ Incorporate a way to detect if only parts of the car are being stolen like the tires.
- ❑ Expand Wiitrack to everyone in our community to stop the constant fear of vehicle theft.

Citations

(Las Cruces Sun-News, 2025)

Las Cruces Sun-News. (2025, March 21). A stolen car joy ride ends as kids kill a NM bicyclist. Should they face murder charges? *Las Cruces Sun-News*.

<https://www.lcsun-news.com/story/news/crime/2025/03/21/kids-charged-murder-new-mexico-bicyclist/82589651007/>

(Hailie & Helene, personal communication, December 2, 2024)

(Officer Adler, personal communication, March 25, 2025)