Team FrontRunners

BACKSEAT CAR SECURITY: TRACKING YOUR CAR FOR YOU

Jarod Davis, Jeff Kissick, Connor McCombs, Devin Suttles, & Bahozhoni White
EECS 388 | UNIVERSITY OF KANSAS

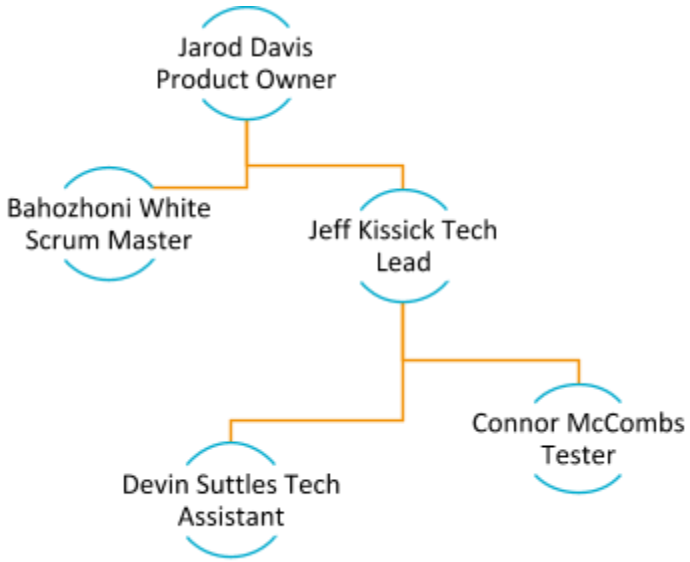
User Manual

1. Provide power to the Raspberry Pi.
    a. Notice: an internet connection is required to use the device, via a hotspot/ethernet/5g network or otherwise.
2. To ensure the GPS has a fix, please place the gps tracking device near a window in your vehicle.
3. When the red LED indicator light begins to blink the device is ready to scan your RFID tag
    a. Your RFID tag can be unique or unwritten, however text messages and emails will only be enabled if your phone number is placed on the RFID.
4. Once the RFID has been scanned, the LED indicator light will turn into a solid red color. This indicates that device is now tracking your vehicle!
5. Navigate to https://people.eecs.ku.edu/~jkissick/carpi/carsecurity.html to keep track of your vehicle!
6. To disarm the device, scan the IDENTICAL RFID that was scanned to arm the device.
    a. The LED will again blink and feel free to go back to step 3 if desired.
7. To shutdown the device, simply stop providing the device power.

Introduction - Purpose

The motivation behind BackSeat Car Security came after Product Owner, Jarod Davis, experienced several car thefts in his neighborhood. After seeing the chaos this crime can cause a family or college student he knew a device was needed that would help combat the problem. Unlike other car security systems that are on the market, BackSeat is compatible with any vehicle, old or new. Not everyone can afford the monthly fees that come with OnStar, but also need extra security that a simple GPS tracker doesn't offer. BackSeat allows users to track their vehicle online or from a mobile device, for a one-time payment.

Group Roles



Product Backlog

As a Developer:

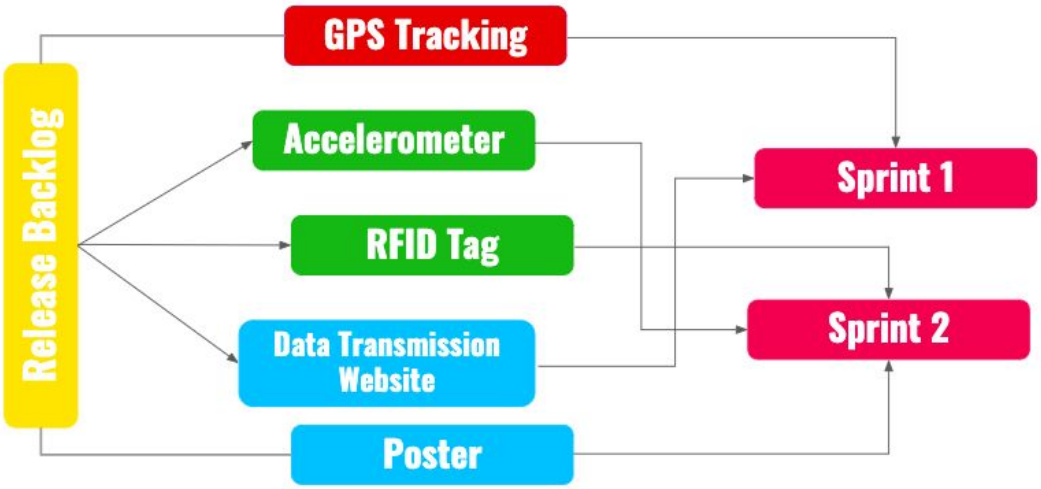
- A multiple piece unit that allows for GPS tracking even if one unit is tampered with
- Capability to connect to open Wi-Fi or mobile networks and send live information to the victim or police
- A phone app that will allow the user to manually initiate the camera and/or the GPS if the unit does not detect theft
- RFID car tags that will allow the user to enter and drive the system without triggering the tracking system

As A User:

- To know where my car is with access via phone or computer
- A camera that can catch a picture of the perp as soon as the device is triggered by an illegal start
- To know about a missing car as soon as possible with notifications via text or email
- To know if my child is misusing the vehicle by speeding or going outside a specified area
- Car security that is more affordable than what is on the market today

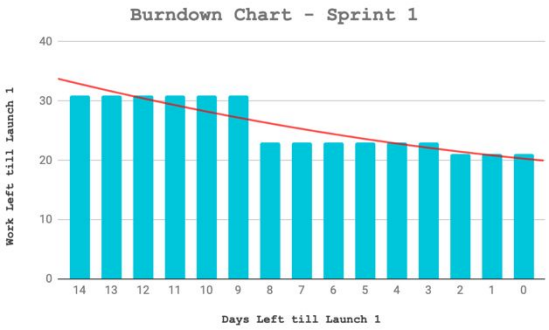
Release Backlog & Sprints

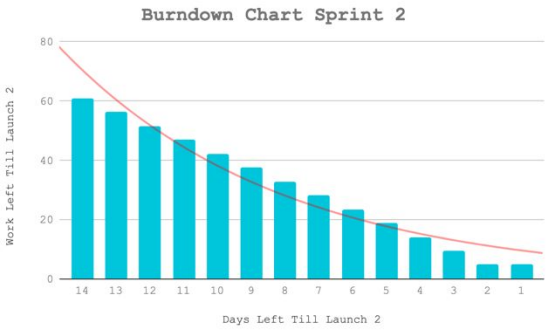
Release Backlog:



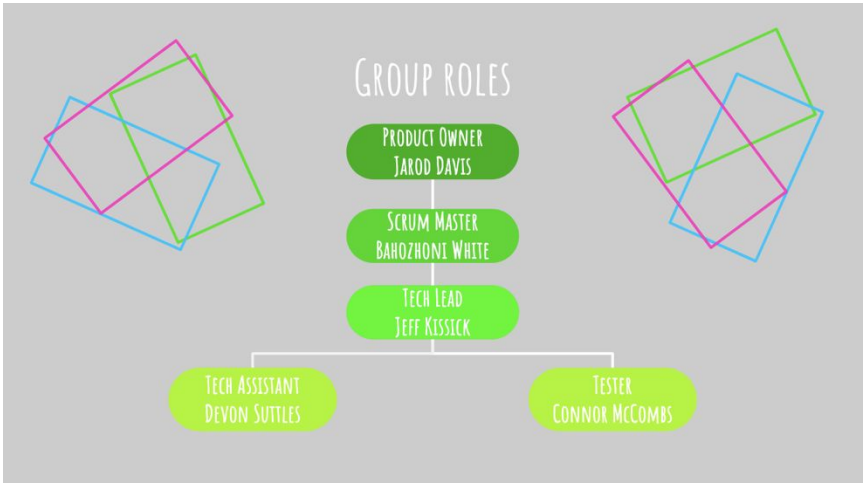
Burndown Chart Sprint 1:

Burndown Chart Sprint 2:



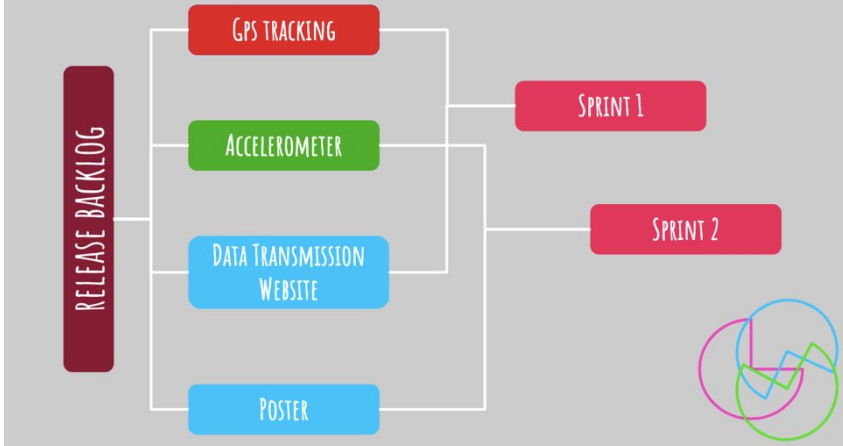


Sprint 1 PowerPoint:

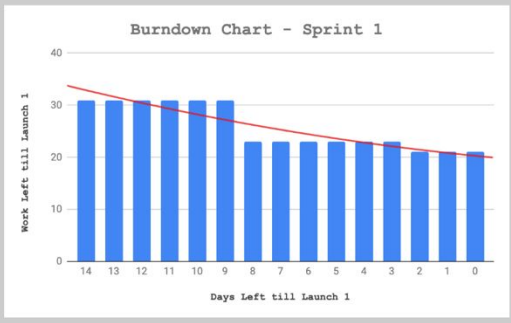


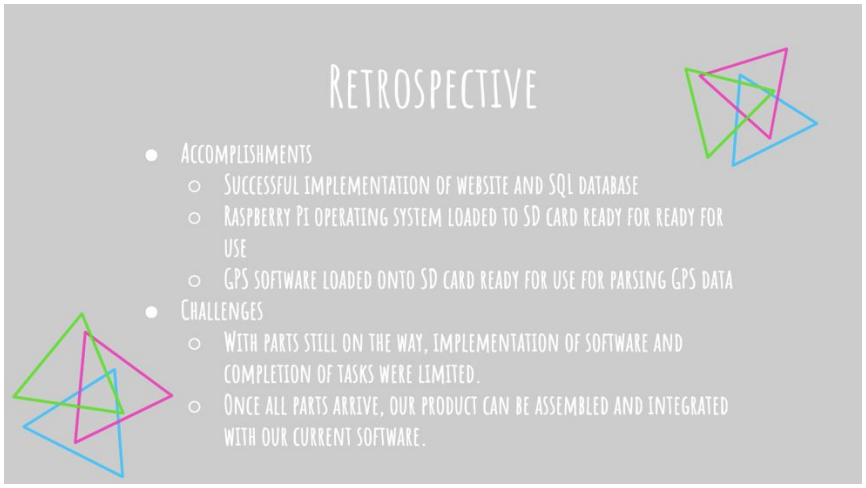
Purpose of product

Our product is an automotive GPS tracker, triggered by an accelerometer, that will provide our customers easy access to their vehicle's whereabouts. This product is designed to provide internet and mobile based service to allow our customers to access from any computer, and any mobile device. Having such ease of access will serve both convenience and a greater peace of mind to our customers. Vehicles are stolen every single day. Should this happen to our customers, our product will provide instant geographical information allowing law enforcement to act quickly, thus increasing the odds of vehicle recovery.

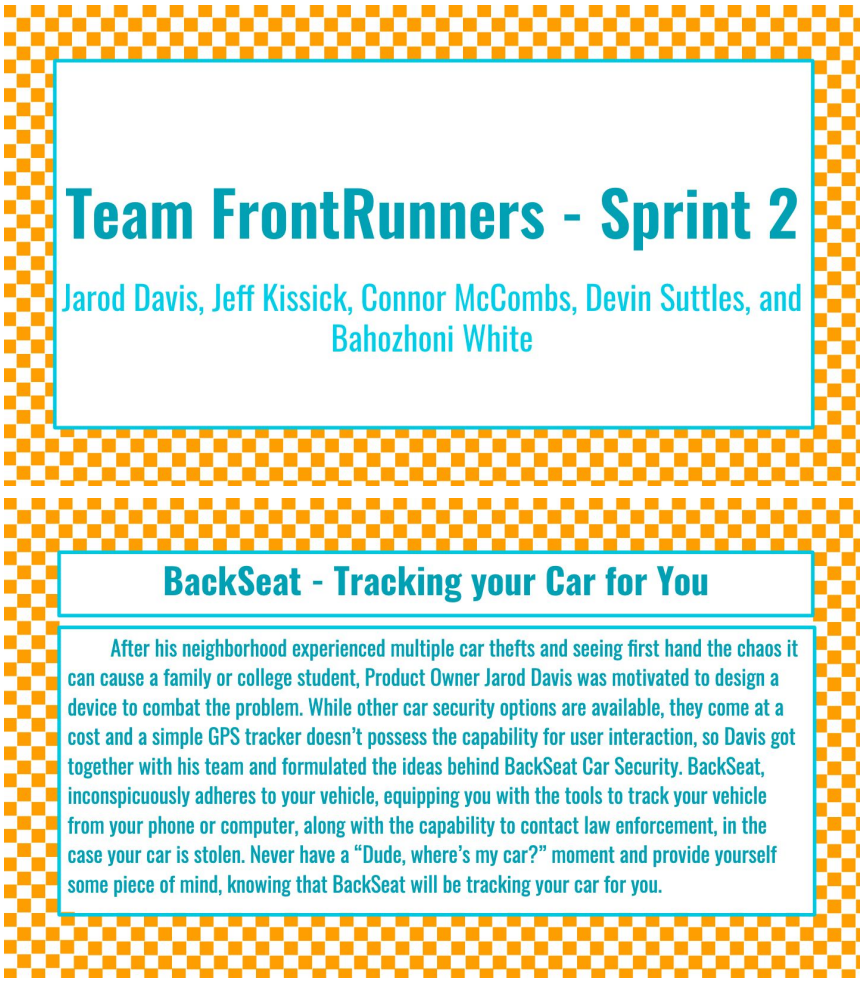


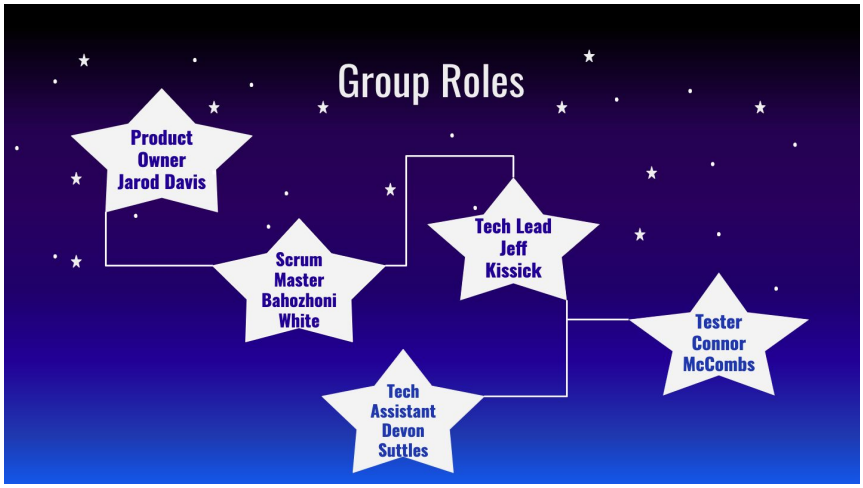
Burndown chart

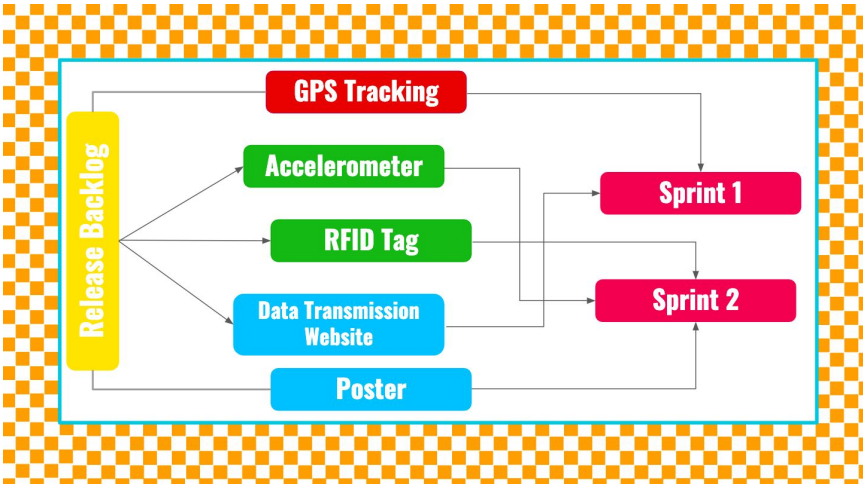


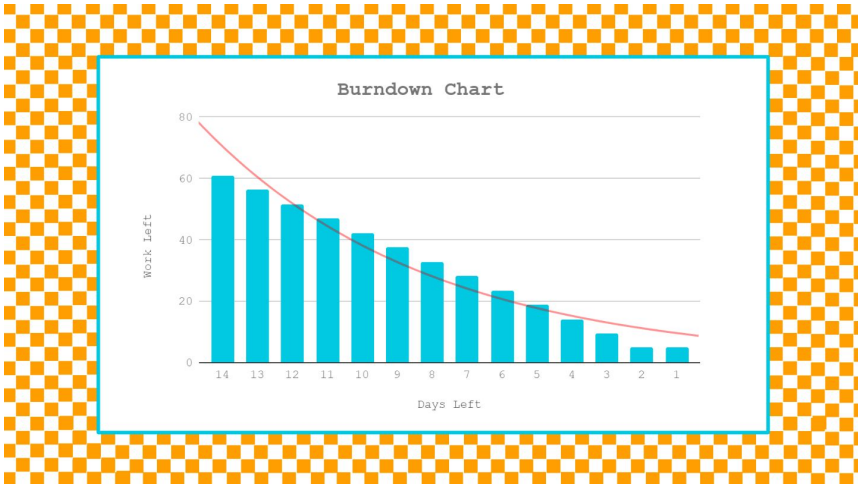


Sprint 2 PowerPoint:




Group Roles
Product Owner Jarod Davis
Scrum Master Bahozhoni White
Tech Lead Jeff Kissick
Tester Connor McCombs
Tech Assistant Devon Suttles


Release Backlog
GPS Tracking
Accelerometer
RFID Tag
Data Transmission Website
Poster
Sprint 1
Sprint 2


Burndown Chart
Work Left
80
60
40
20
0
14 13 12 11 10 9 8 7 6 5 4 3 2 1
Days Left

Retrospective

Accomplishments

- Successful assembly and implementation of RFID tag system
- GPS software communicates and with and updates MySQL server
- Google API loads location image of most recent gps coordinates in the MySQL server

Challenges

- Most of the online solutions were partially outdated, so some of our solutions involved trial and error.
- GPIO pin labels from the GPS HAT were not arranged the same way the Pi pins, were, so pin configuration also required trial and error.

Final Poster

EECS 388 Embedded Systems

University of Kansas

BackSeat Car Security – Tracking your car for you

Jarod Davis – Product Owner, Jeff Kissick – Tech Lead, Bahozhioni White – Scrum Master, Connor McCombs – Lead Dev Tester, Devin Suttles – Tech Assistant

ABSTRACT

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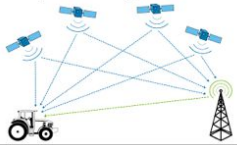

BACKGROUND

Products like OnStar are available but come with a cost and simple GPS tracker doesn't provide the desired user interaction, our product includes.

Embedded systems included:

Raspberry Pi 3 B+

GPS sensor and antenna

RFID Tag system

Communication via SQL database and Google Maps for visual representation.

PROBLEM

Vehicles are stolen every single day. Should this happen to our customers, our product will provide instant geographical information allowing law enforcement to act quickly, thus increasing the odds of vehicle recovery. Having such ease of access will serve both convenience and a greater peace of mind to our customers.

COST

Cost of design with parts included:

$160

Software: open source

APPROACH

Raspberry Pi 3 B+ outfitted with an Ultimate GPS HAT attached via GPIO pins.

GPS module receives signals using the supplied antenna.

Signals converted and parsed to readable data then transmitted to the SQL database.

Google API running to convert longitude and latitude for visual representation.

REFERENCES

Pi & GPS HAT

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RFID

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