

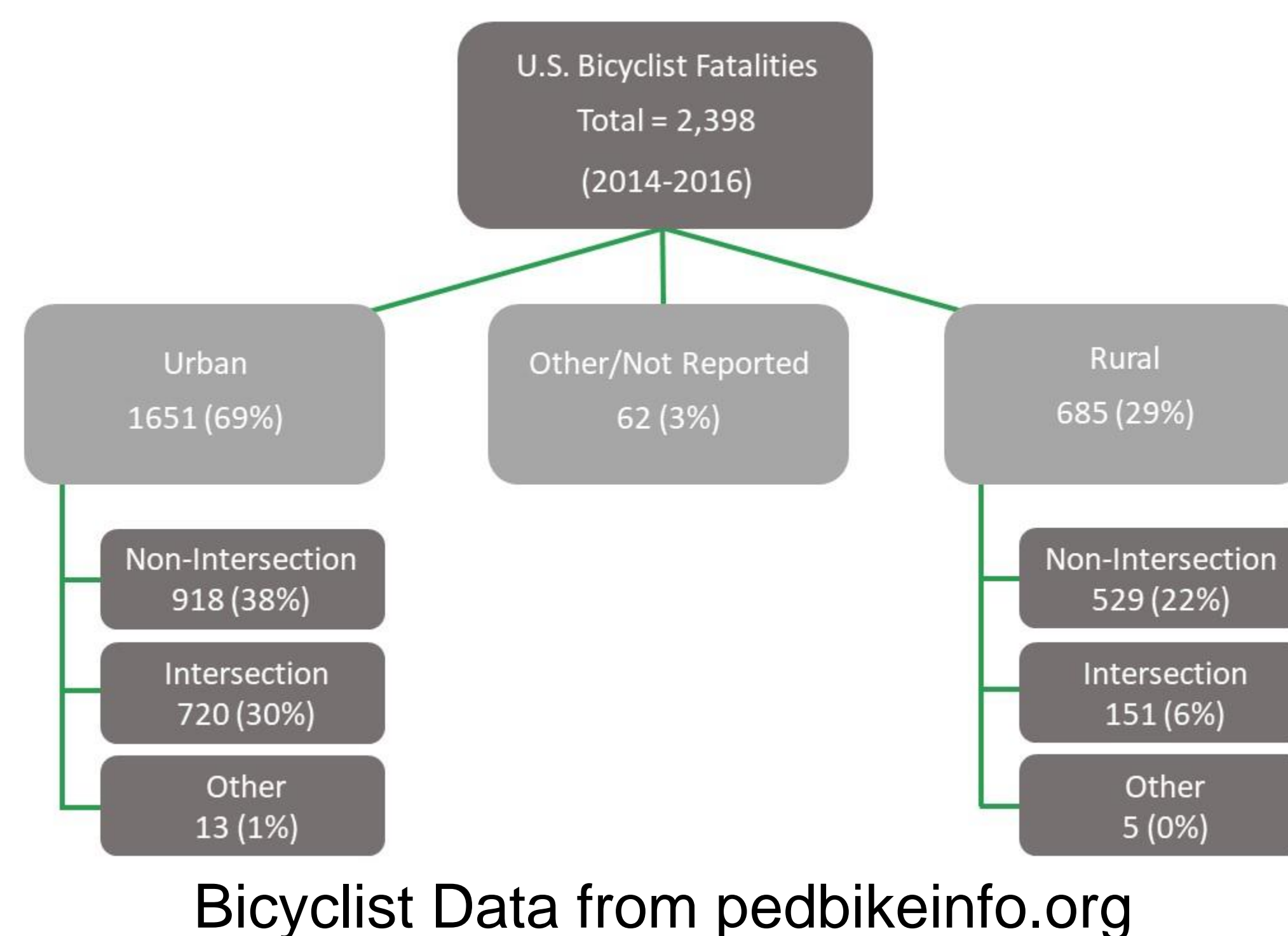
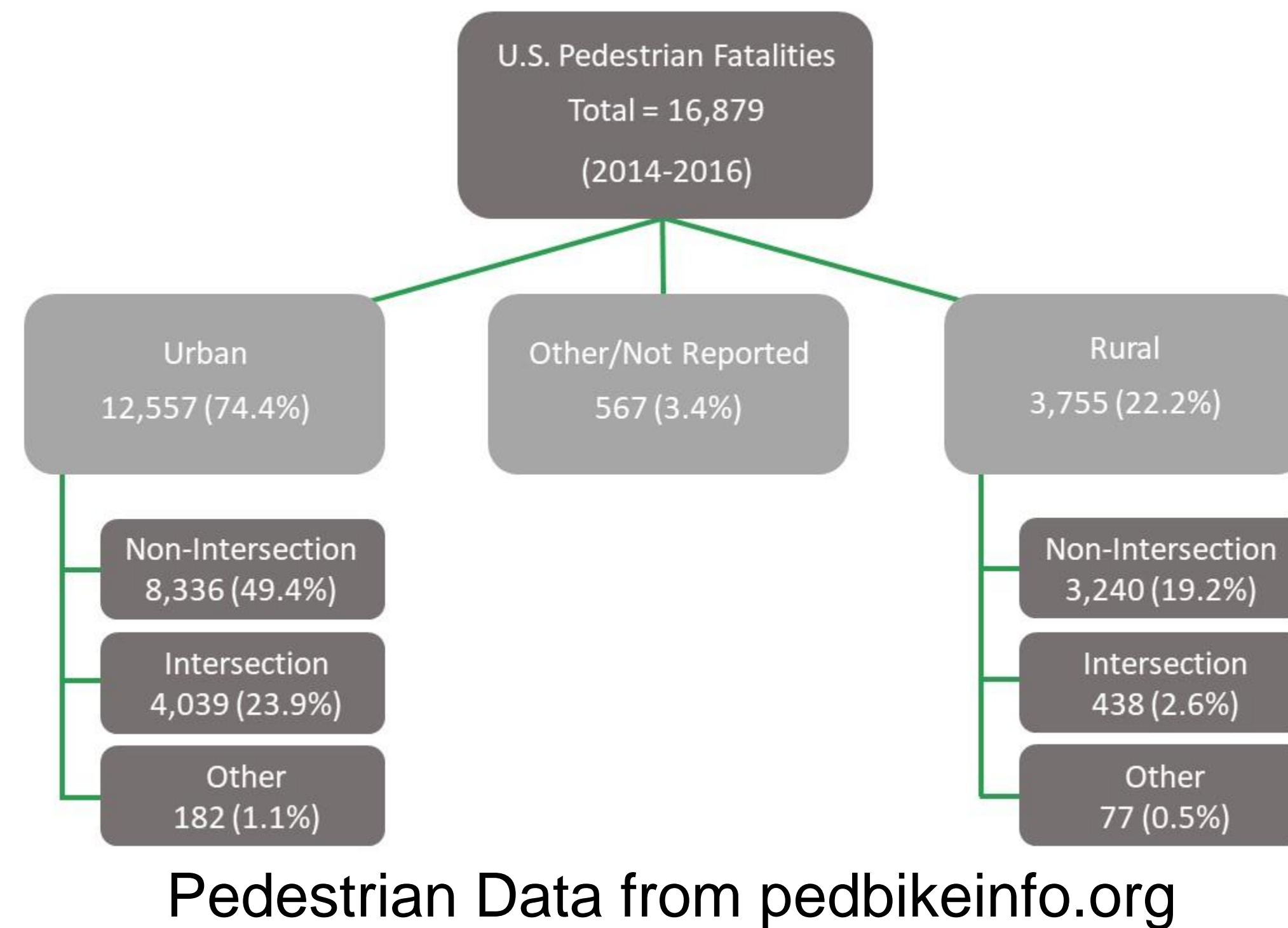
Computer Vision Pedestrian Awareness System

A Senior Design Capstone Project
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Research Objective: To improve the safety of pedestrian or bicyclist users as they navigate urban and rural environments.

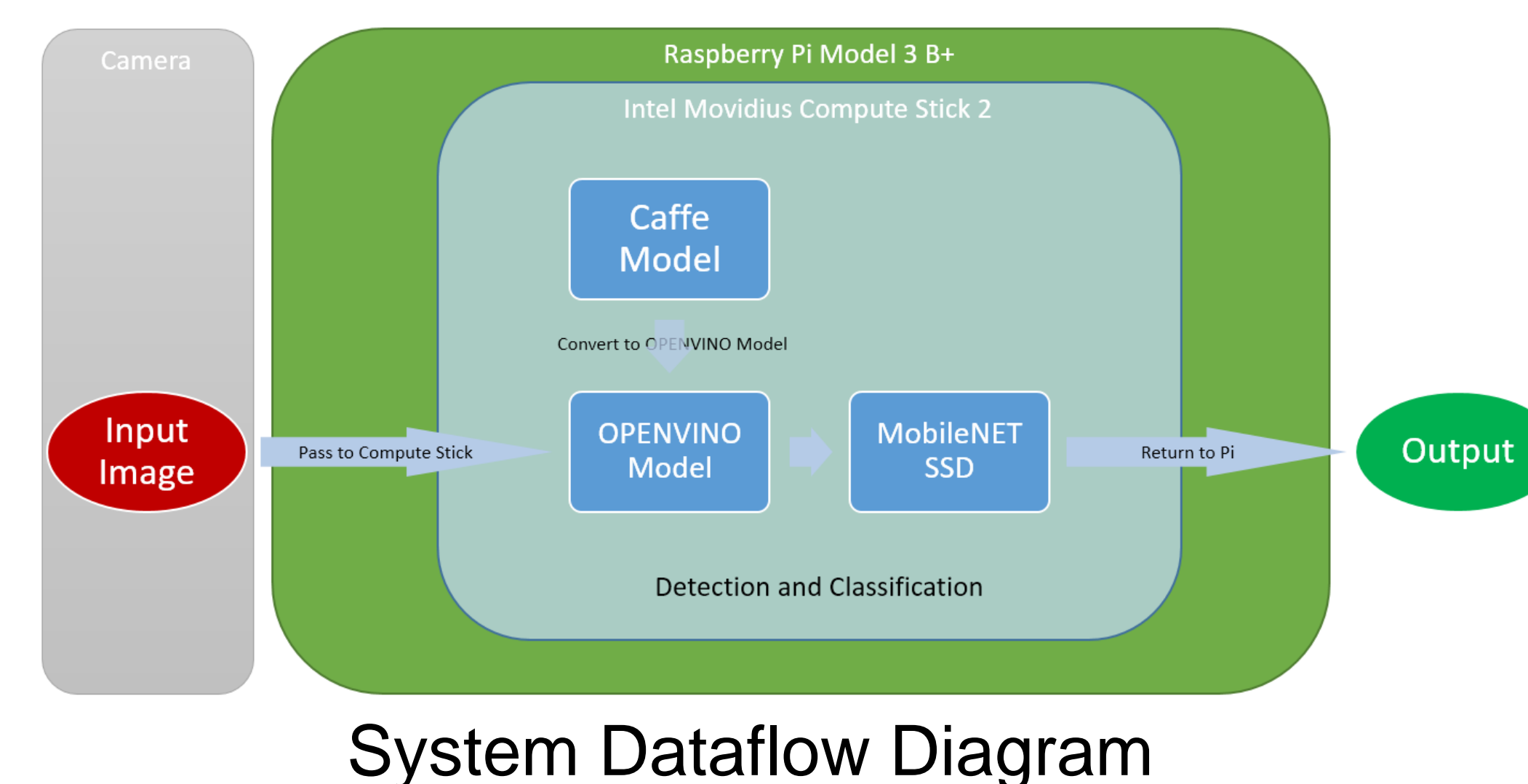
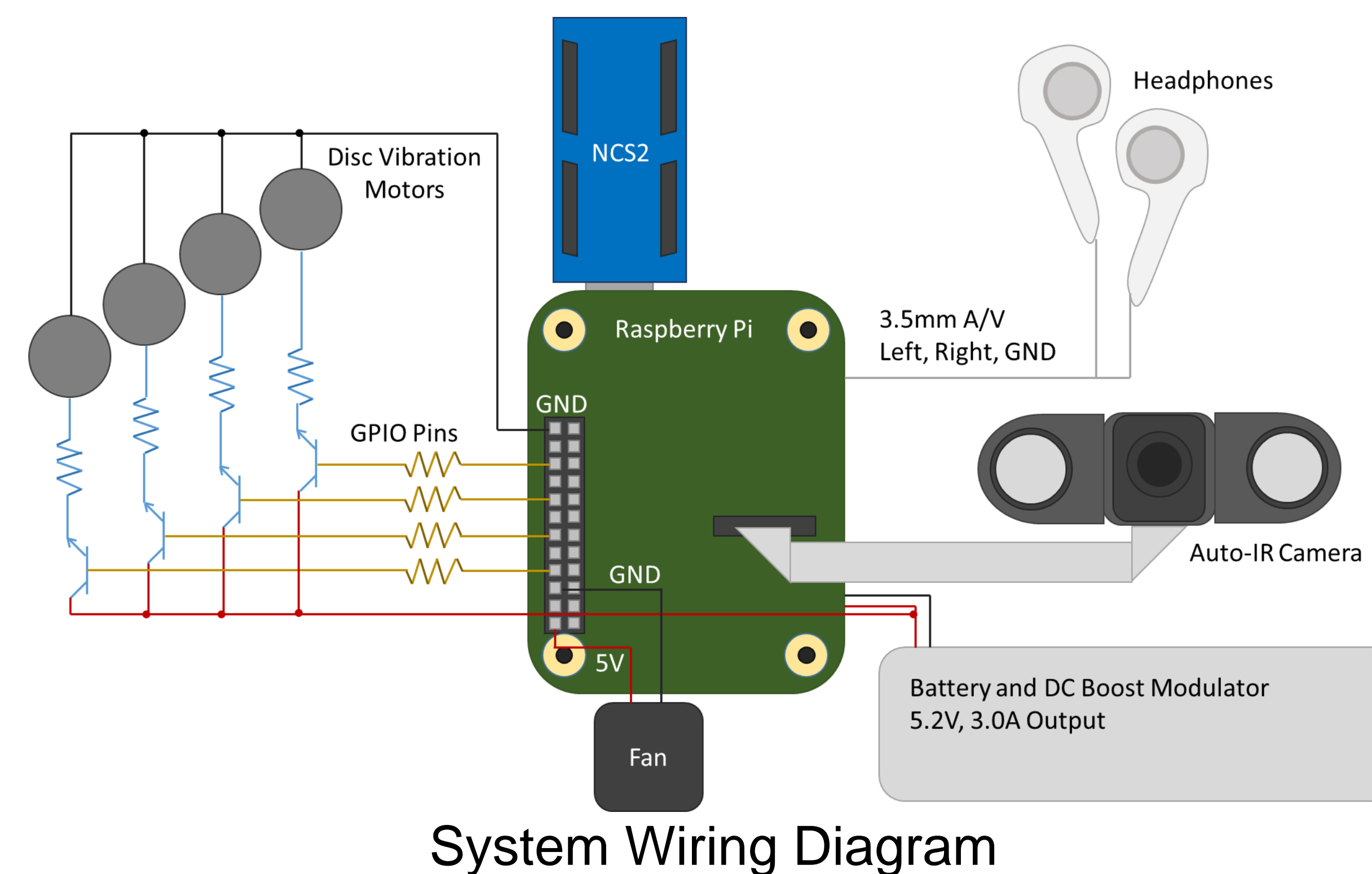
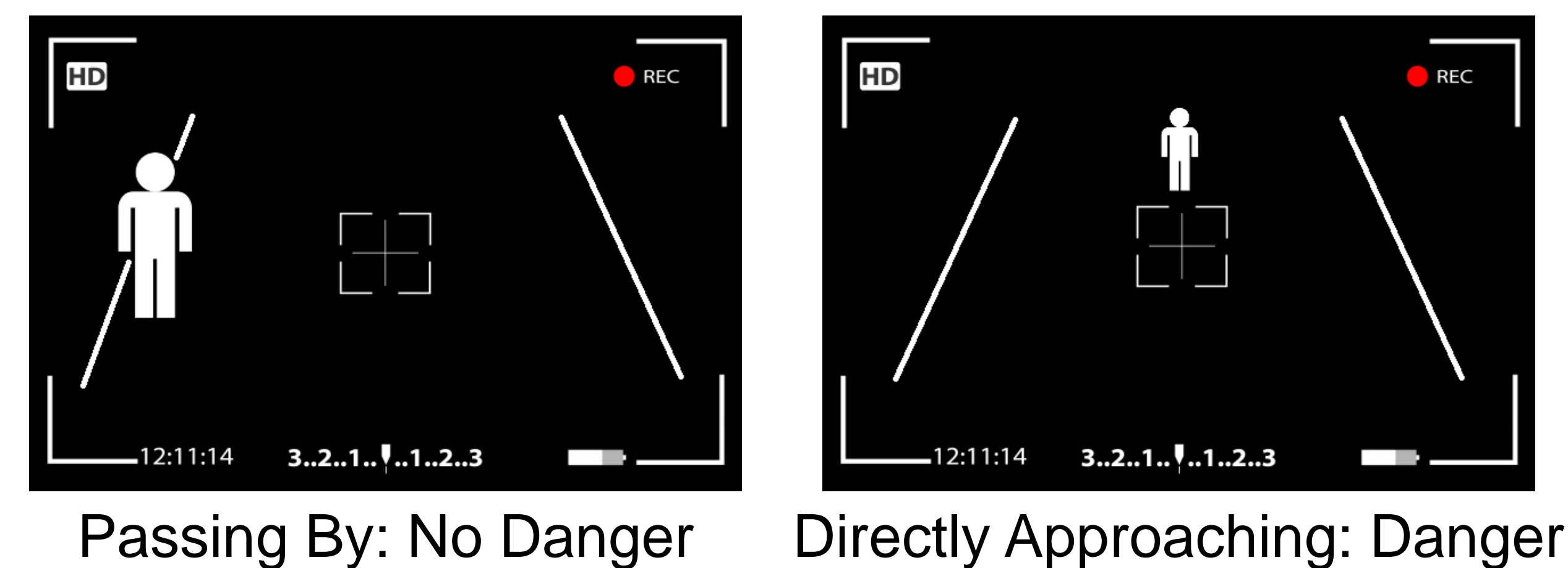
Introduction/Motivation

- Assaults, theft, and danger from vehicles affect pedestrians while commuting
- For pedestrians in US, third highest cause of injury and highest cause of fatal injury is being struck by a car
- Pedestrians could benefit from being more aware of surroundings while on or near busy streets



Methodology

- Use Computer Vision to increase the situational awareness of pedestrians and bicyclists
- Consider how a human evaluates scenarios and convert to repeatable software (example below)



Results

- Detection distance (day, head-on):
- Human: 48 ft.
 - Car: 50 ft.
 - Bicyclist: 20 ft.
- Detection distance (night, head-on):
- Human: 10 ft.
 - Car: 10 ft.
 - Bicyclist: 10 ft.
- Product battery life:
- Day: 8 hours
 - Night: 5 hours

Recommendations

- Improve power delivery system
- Use camera sensor with better low-light performance to eliminate need for IR LEDs
- Make product water proof
- Implement additional use-case scenarios

References and Acknowledgements

- http://www.pedbikeinfo.org/factsfigures/facts_safety.cfm
- <https://github.com/PINTO0309>
- **Special thanks to the UD Vision Lab for all its input and support**