

Team 15:

Vehicle Guardians



MOVE AROUND
WITH EASE

The Numbers and Problem



30
million

people have
hearing
impairment



23
million

Americans have
vision impairment



3
million

us a wheelchair
full-time

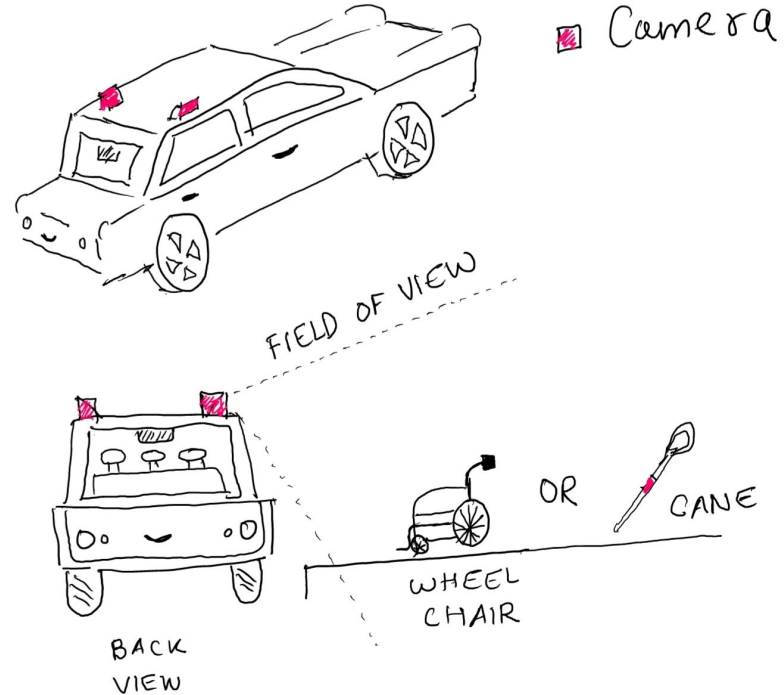
Problem:

Vision, hearing and physically impaired people having trouble getting around using internal communications in vehicles.

The Solution

Pre-boarding

- Cameras mounted on top of the autonomous vehicle
- Image processing disability algorithm detection will be implemented to detect wheelchair and passengers with cane (using a Deep learning algorithm)[1].

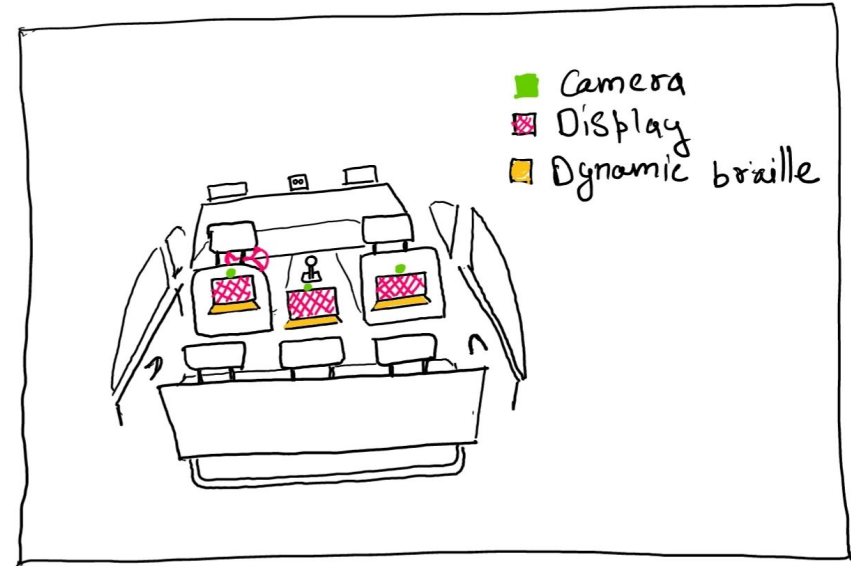
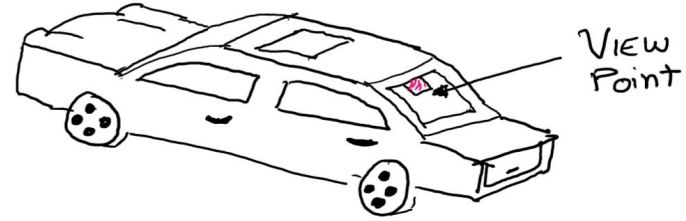


POST-BOARDING

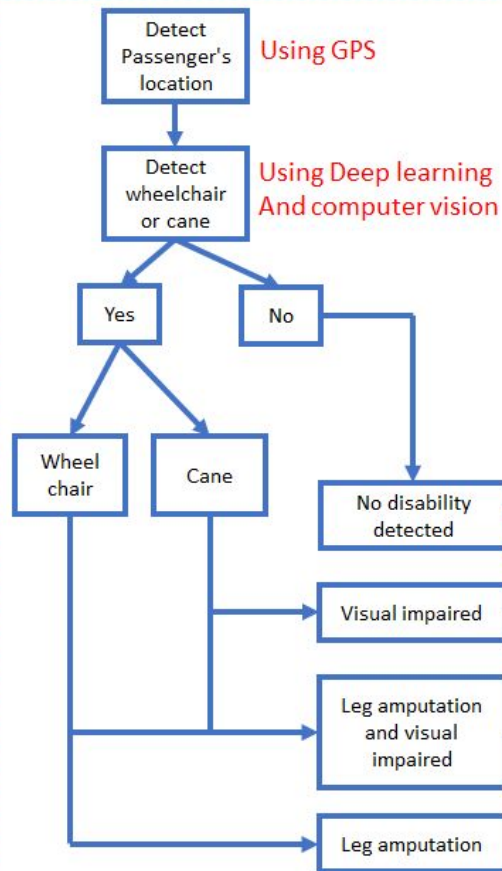
The Solution

Post- boarding

- Display
- Dynamic Braille [2]
- Camera (computer vision and image processing algorithm [3])
- Speaker
- Microphone (using speech recognition [4])
- Oscillator/Piezoelectric (vibration)
- Virtual guardian assist

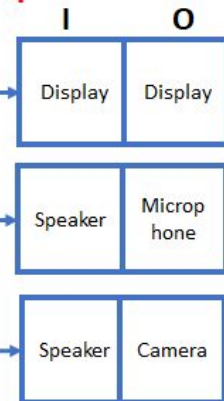


Pre-boarding Procedure

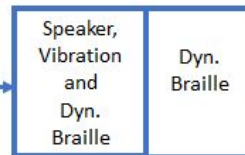
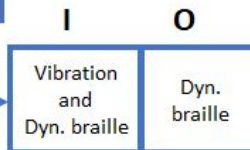


Post-boarding Procedure

Communication preference?



Delay



Destination input and internal communication

Economics: Cost of our solution

Items	Quantity	Price (per)
Dynamic Braille tablet	3	\$500
Camera	5	\$150
Speaker (optional)	1	\$100
Mic	1	\$70
Processor	1	\$99
SSD	1	\$100
Total		\$1019

Next steps



BUILD

Implement the devices and run the algorithms in AV.

Pilot program in US to refine our algorithms which will be implemented in the AV

PILOT



LAUNCH

Expand across the US after beta testing

Spread our internal communication solution to other countries

SPREAD

Competitors and Market Uniqueness



• **A P T I V** •



Audi

Our diverse and driven team



Lama Moukheiber
Biomedical
Engineer



Rishabh Sharma
Engineering Sciences
specialization in Robotics



Akhil Reddy
Artificial
intelligence &
Robotics



Saurabh Mahindre
Data Science



**Krishna
Sudarshana**
Computer Science &
Engineering

Mentors: Randall Duchesneau
Alexander Ding

MOVE AROUND
with ease

References

- [1] Erhan, Dumitru, et al. "Scalable object detection using deep neural networks." *Proceedings of the IEEE conference on computer vision and pattern recognition*. 2014.
- [2] <https://blitab.com/>
- [3] I. Imagawa, H. Matsuo, R. Taniguchi, D. Arita, Shan Lu and S. Igi, "Recognition of local features for camera-based sign language recognition system," *Proceedings 15th International Conference on Pattern Recognition. ICPR-2000*, Barcelona, Spain, 2000, pp. 849-853 vol.4, doi: 10.1109/ICPR.2000.903050.
- [4] Scagliola, Carlo. "Language models and search algorithms for real-time speech recognition." *International Journal of Man-Machine Studies* 22.5 (1985): 523-547.