

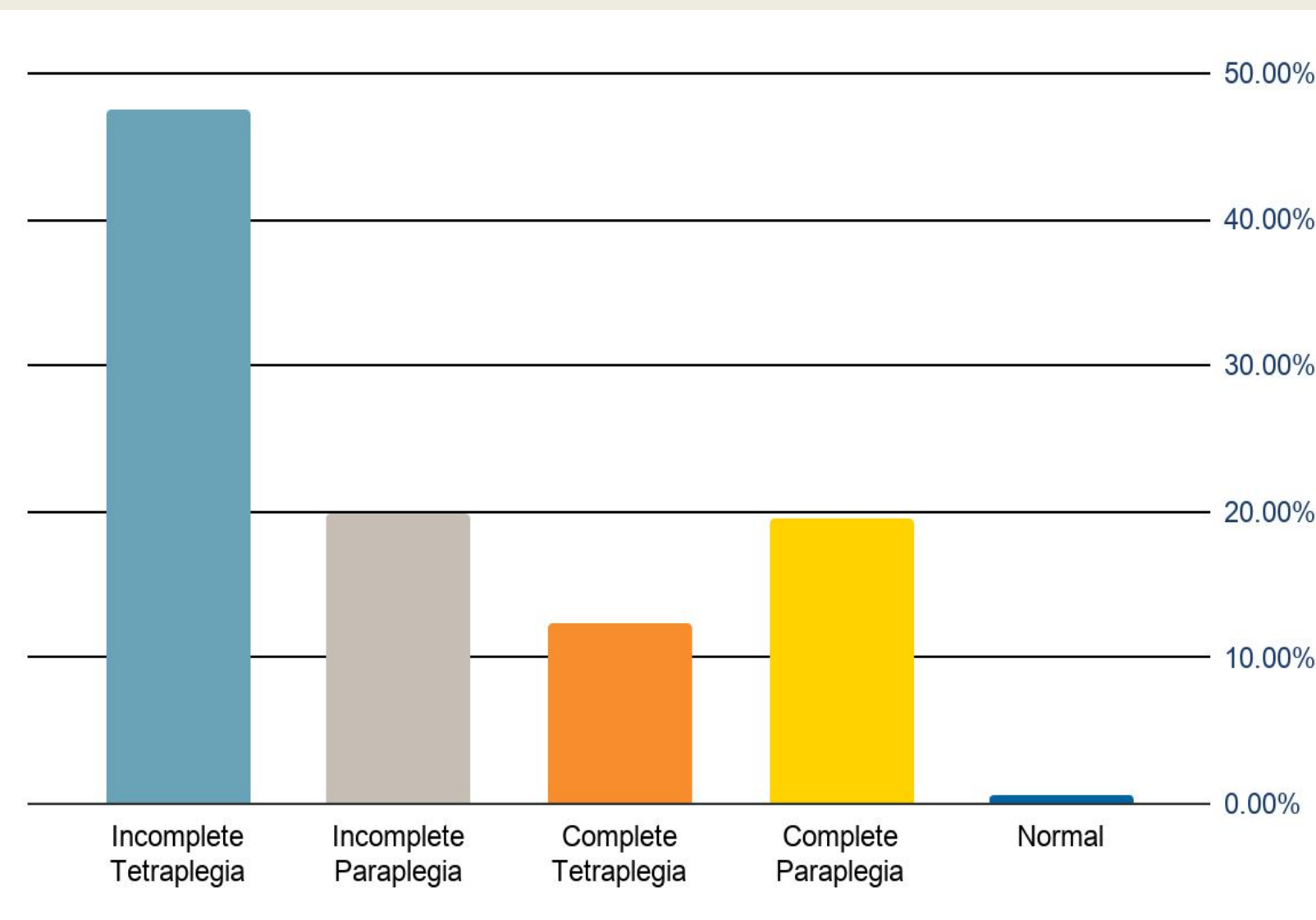


EyeDrive

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Background

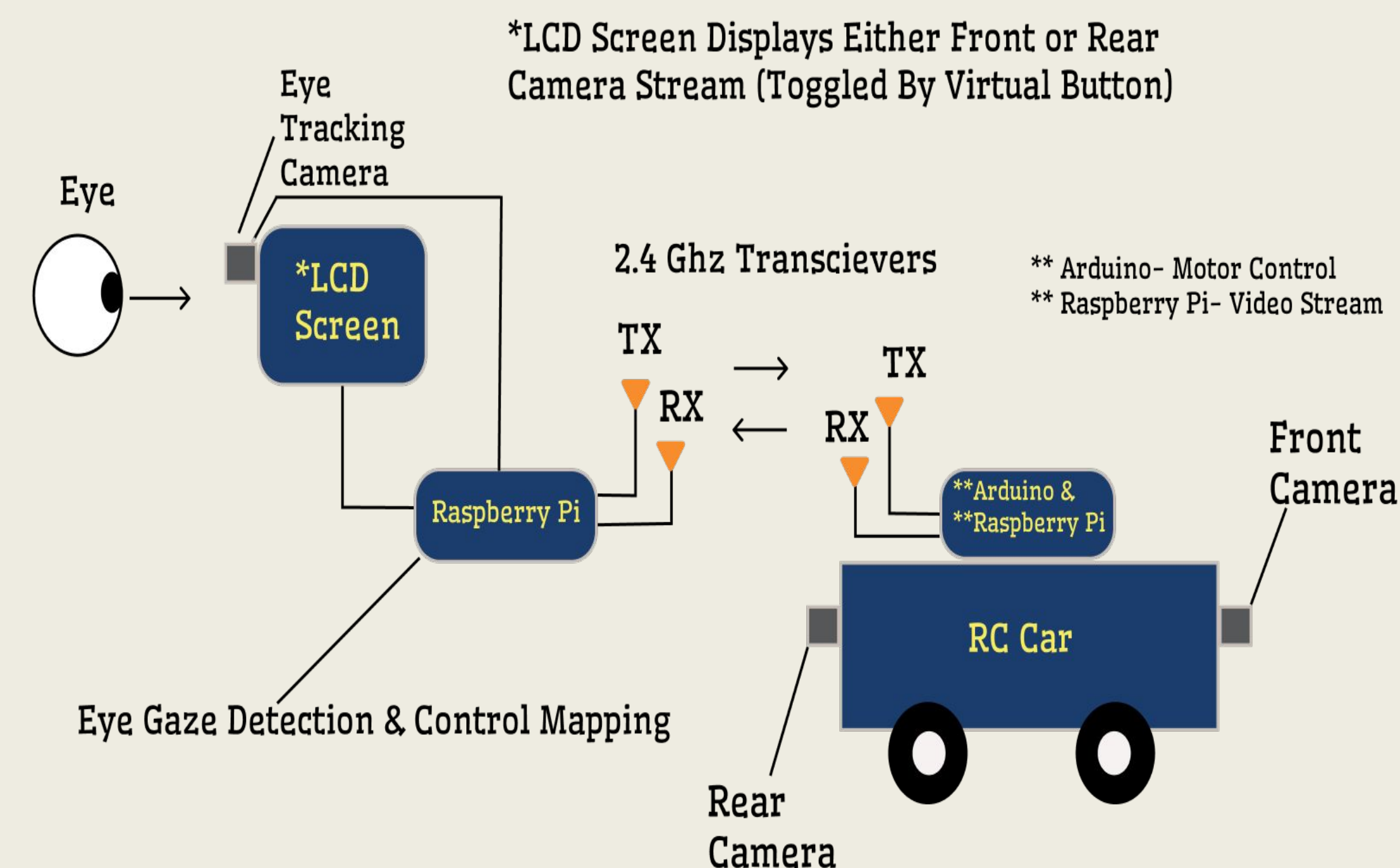
According to the National Spinal Cord Injury Statistical Center (NSCISC), every year there are approximately 17,730 new incidences of spinal cord injuries in the US. Around 60% of these incidences result in either complete or incomplete tetraplegia, both of which make it extremely difficult, if not impossible, for the affected to live mobile lives---particularly if financially constrained.



Objective

Our goal is to create an affordable, reliable system that will enable paralyzed patients to pilot an RC car (modeling a wheelchair) with nothing but their eyes: helping them regain mobility

Approach

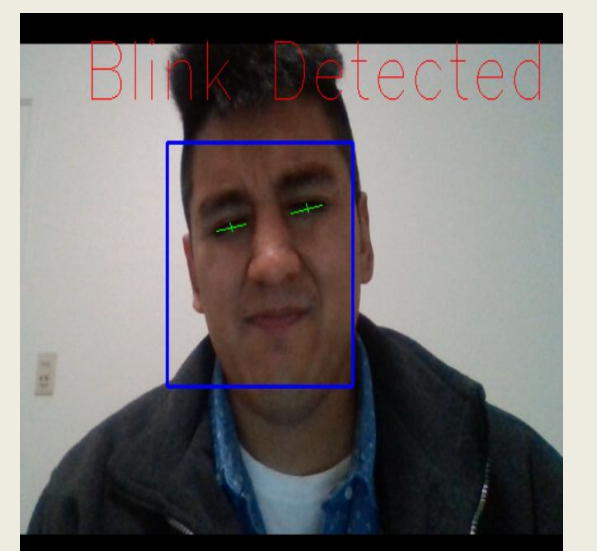
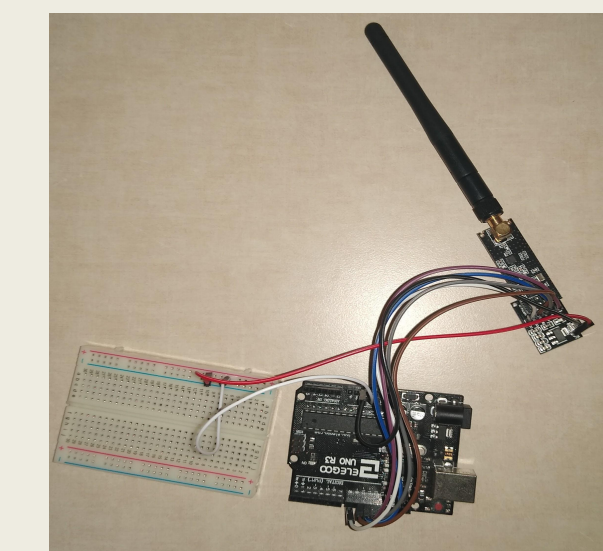
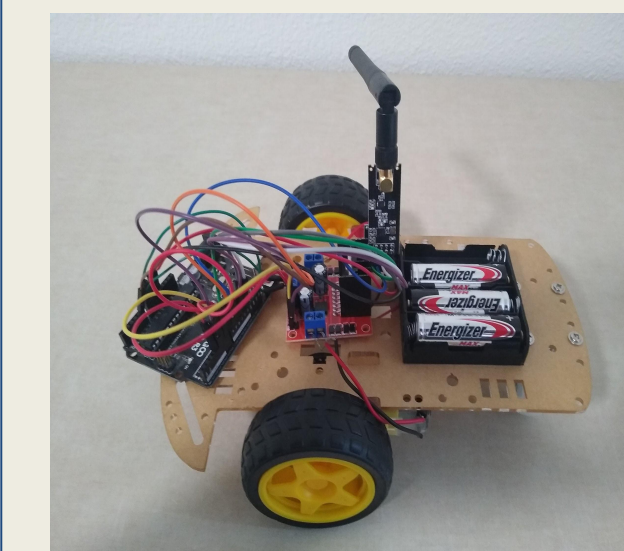


Milestones

- | | |
|--|----------|
| 1. Design/Implement Eye Tracking Algorithm | COMPLETE |
| 2. Construct and Test RC Car | COMPLETE |
| 3. Create Control Map for Eye Gaze | 11/28/19 |
| 4. Complete Integration | 11/30/19 |
| 5. Design and 3D Print Head Mount | NEXT QTR |
| 6. Design and Simulate RF Transceiver | NEXT QTR |
| 7. Print PCBs and Test Systems | ONGOING |

Materials

- | | | |
|---------------------------|-----|---------|
| 1. FPV Cameras | --- | • ~\$25 |
| 2. LCD Screen | --- | • ~\$50 |
| 3. Raspberry Pi | --- | • ~\$48 |
| 4. Arduino Uno & Nano | --- | • ~\$15 |
| 5. Transmitters/Receivers | --- | • ~\$20 |
| 6. RC Car Chassis/Driver | --- | • ~\$15 |
| 7. Stabilizing Helmet | --- | • ~\$23 |



References

- A. Kar and P. Corcoran, "A Review and Analysis of Eye-Gaze Estimation Systems, Algorithms and Performance Evaluation Methods in Consumer Platforms," in *IEEE Access*, vol. 5, pp. 16495-16519, 2017.
- D. Gêgo, C. Carreto and L. Figueiredo, "Teleoperation of a mobile robot based on eye-gaze tracking," *2017 12th Iberian Conference on Information Systems and Technologies (CISTI)*, Lisbon, 2017.
- H. Nakayama, N. Yabuki, H. Inoue, Y. Sumi and T. Tsukutani, "A control system for electrical appliances using eye-gaze input," *2012 International Symposium on Intelligent Signal Processing and Communications Systems*, Taipei, 2012.
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