

Actuation Design for Loop Snare Operation in Eye Surgery

Computer Integrated Surgery II
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Introduction

- design and realize an actuation system of a snare loop robot
- normally perform a job of grabbing and placing
- snare loop robot will provide a curvature that fits the shape of the eye
- delivering medicine to the backside of the retina can be added

The Problem

- does not exist a matured method in performing the cell therapy that can easily access to the backside of retina.
- Cell therapy is envisioned as a future treatment for degenerative retinal diseases
- The word “cell” indicated that this method will use cell-based method in treating the degenerated retina.

The Solution

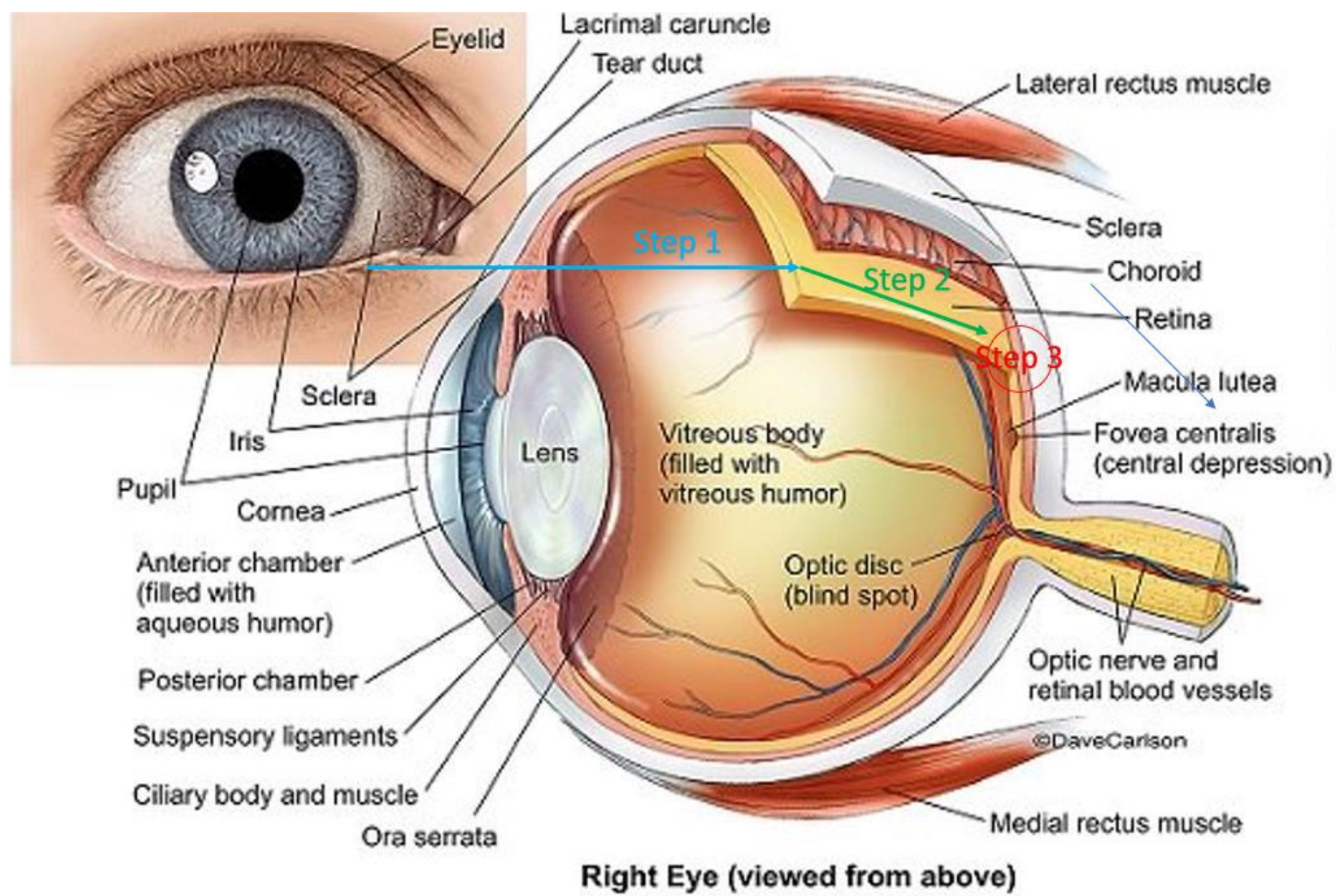


Figure 1. Pathway of finished snare loop robot.

Due to the curvature nature of the eye, curved snare loop can provide needed curvature to access the backside of the eye.

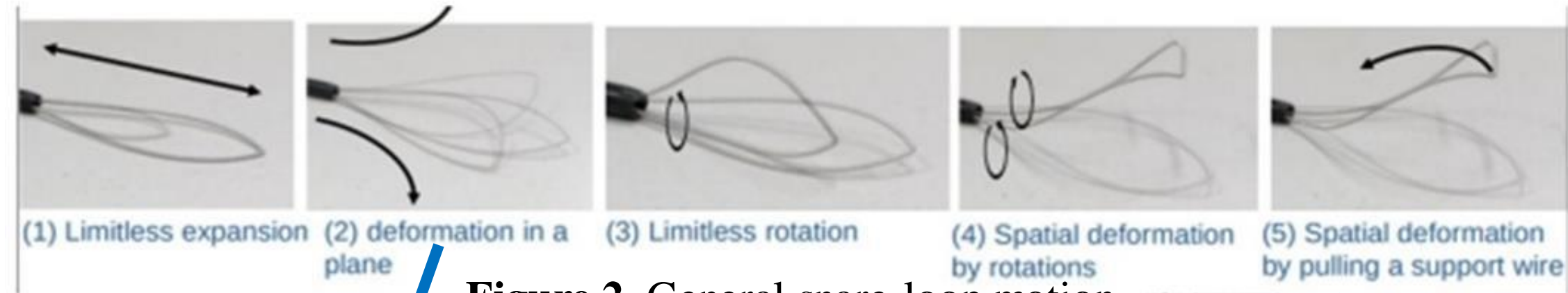


Figure 2. General snare loop motion.

Outcomes and Results

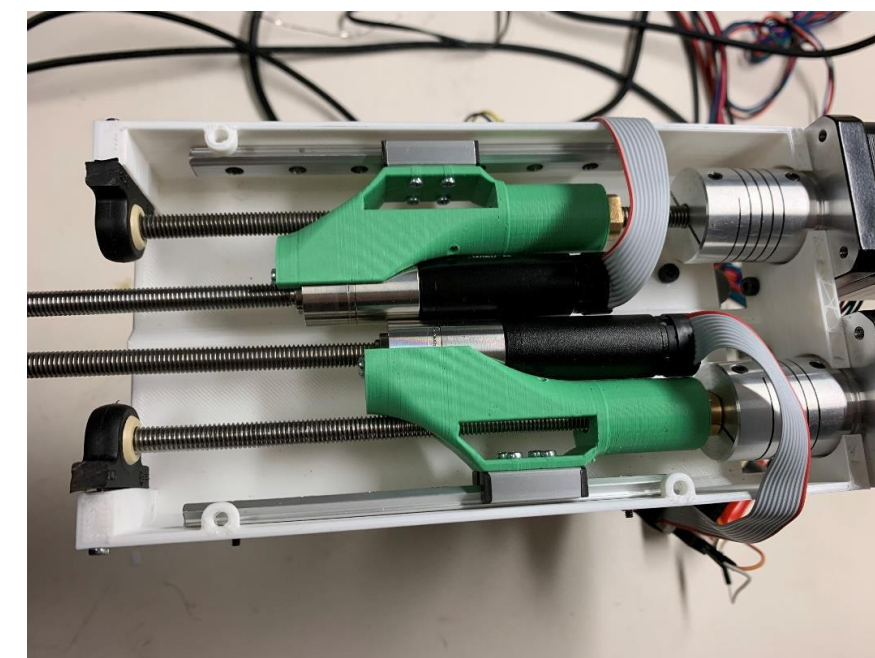


Figure 3. Controlled actuators.

Future Work

- A real time controller should be used for commanding the loop to move left and right.
- Use smaller linear actuators to minimize the physical design.
- Implement further functions into the package, including graphic ability of demonstration the curvature.

Lessons Learned

- The documentation will provide the future groups with all the information they need for understanding the technical approach and the developed codes.
- Create weekly plan will contribute a lot during the project management.

EPOS motor velocity

Command by encoder position: implement some angle control

Control Buttons

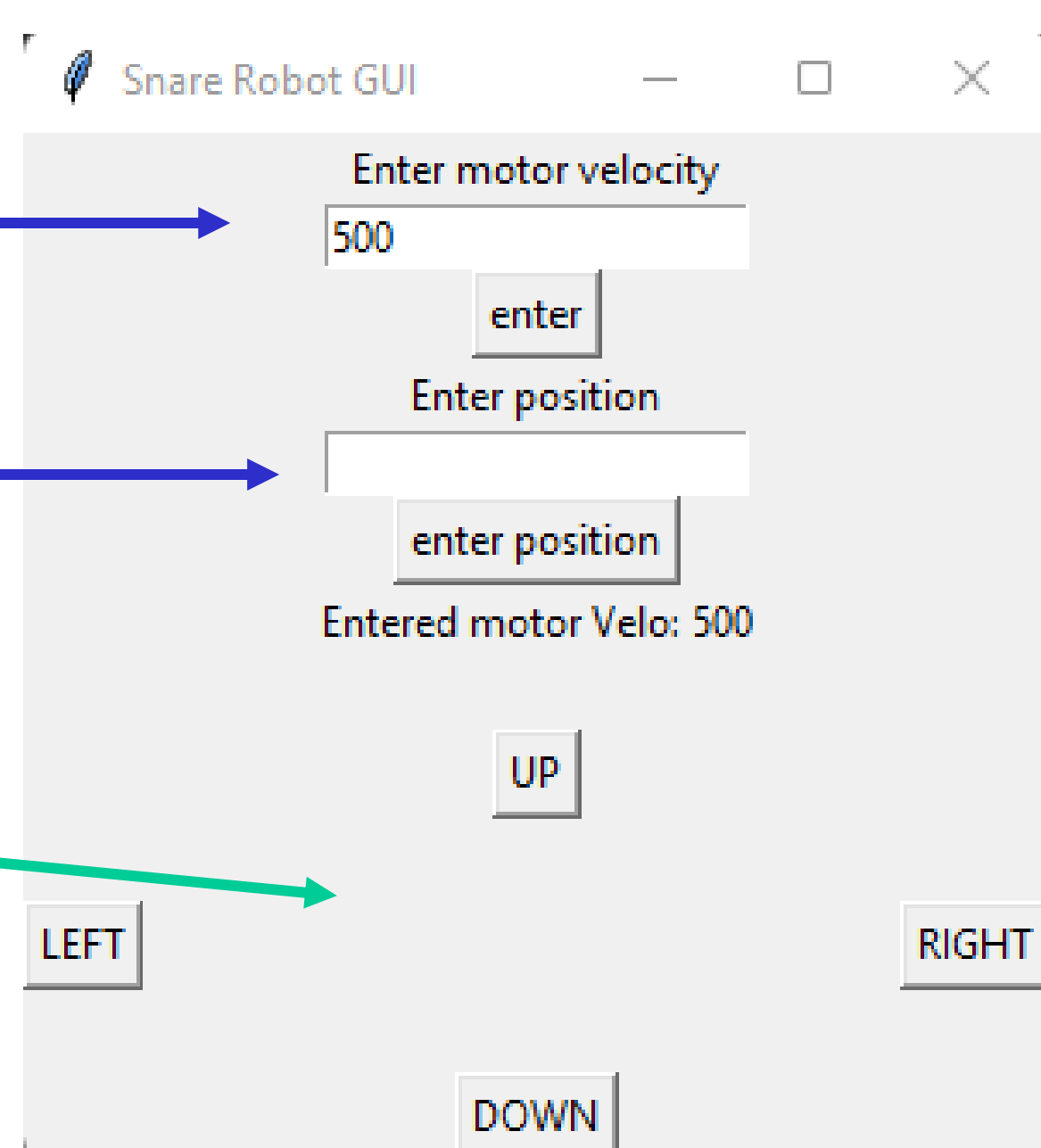


Figure 4. GUI developed in package.

Credits

Cehajic-Kapetanovic J, Singh MS, Zrenner E, MacLaren RE. Bioengineering strategies for restoring vision. Nature biomedical engineering. January 2022. doi:10.1038/s41551-021-00836-4

