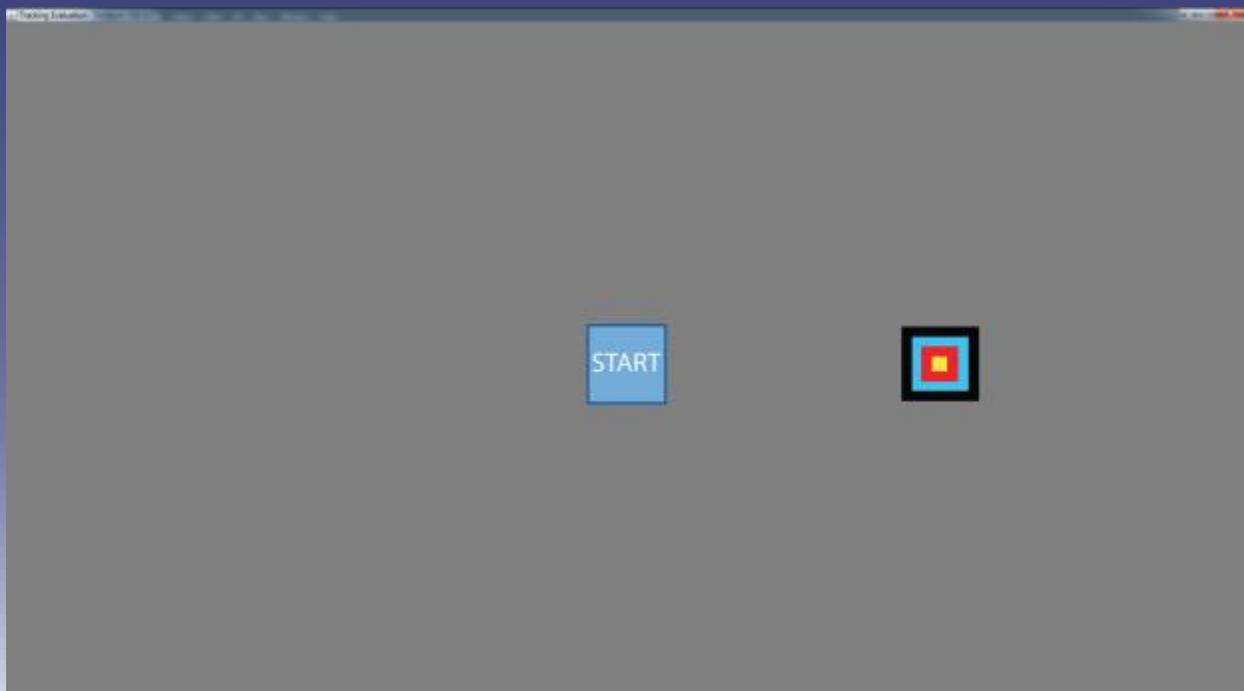


RERC *on* AAC

Evaluation Software for Computer Application

Methods



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Problem Statement

As time goes on, more and more input devices (trackpads, trackballs, head and eye tracking devices, etc.) are being introduced that allow computer users to move the cursor. While most of these devices are fairly cheap, some can cost in the thousands of dollars. The input device our team is interested in is the Intel RealSense SR300, a head and eye tracking input camera. This input device would be used by individuals that suffered from a high spinal-cord injury but are fully functional from the neck up. Since this is a fairly new device, we need to come up with a solution to test its efficiency compared to other input devices.

Methods/Approach/Solutions Considered

There were a few different methods we considered for our testing. One method is having a user use a standard input device and perform an action on the computer. The, have the same user perform the same action using the RealSense SR300 as the input device. We could measure the amount of time it takes using each device and this would let us know what is faster. While time might be a good unit of, we decided we want to gather more statistics. We also decided the path the user takes can be a critical measurement so we needed to come up with a solution that allows us to gather such measurements.

Description of Final Approach and Design

To conquer the problem stated above, our team decided to create a Java computer application. When the application is launched, a 'home' button will appear in the center of the screen. Once the computer mouse is located in the 'home' area, a random target will then

appear. The user then needs to move the mouse to the target and click it for it to disappear. Once the user hits the target, they need to return the mouse to the 'home' area. The target location and size changes every time. Also, the application gathers statistics while the user is hitting targets and exports them to an excel document upon completion of a trial. The statistics gathered include the target axis, size, time to get to the target, the lifespan of the target, times the mouse was clicked, number of times the mouse entered the target, efficiency, max deviation, average deviation, r-squared, total targets hit, and total test time.

Outcome

After a few weeks, our team created the software described above. The software is currently being used to test different input devices and gather statistics.

Cost

The cost to produce the computer application our team created is free. Since this application was created for free, the expected pricing for others is also free!

Significance

The evaluation software we developed is comparable to a software created by Heidi Koester called Compass. More specifically, it is similar to the "Aim" program in the Compass package. Koester's Aim test presents a series of targets appearing one at a time which must be clicked to move forward. Her software returns data for time until click, number of entries into the target area, number of clicks, and error free trials. (1) The software developed is a bit different

than Koester's and that is what makes it significant. First, our project looks at head and eye tracking technology as the method of target selection but allows use of any input device. Koester has currently only tested her Aim software on physically able subjects using a mouse. Secondly, this new program includes a more sophisticated efficiency statistic, which tracks where the mouse is on the screen and uses linear regression to analyze how far off course the cursor strays. Overall, this program allows users to gather in-depth statistics on the input device they are using.

Acknowledgements and References

- (1) Koester HH. (2014). 'Aim' Test Performance for Mouse Users without Impairments. Paper published in Proceedings of RESNA 2014 Annual Conference, Indianapolis, IN. Arlington, VA: RESNA Press.