ARCHERY TRAINING IN AR WITH FULL BODY TRACKING

CSE 493V

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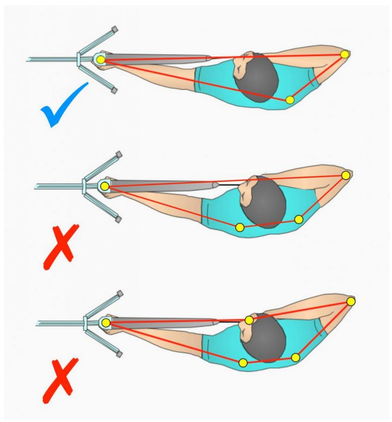
Problem

- Learning archery form is difficult and takes lots of practice to get consistent
- When shooting a bow, it's difficult to visualize your form
- Most archers use video analysis or coaching, both of which happen after shooting

Proper Archery Form

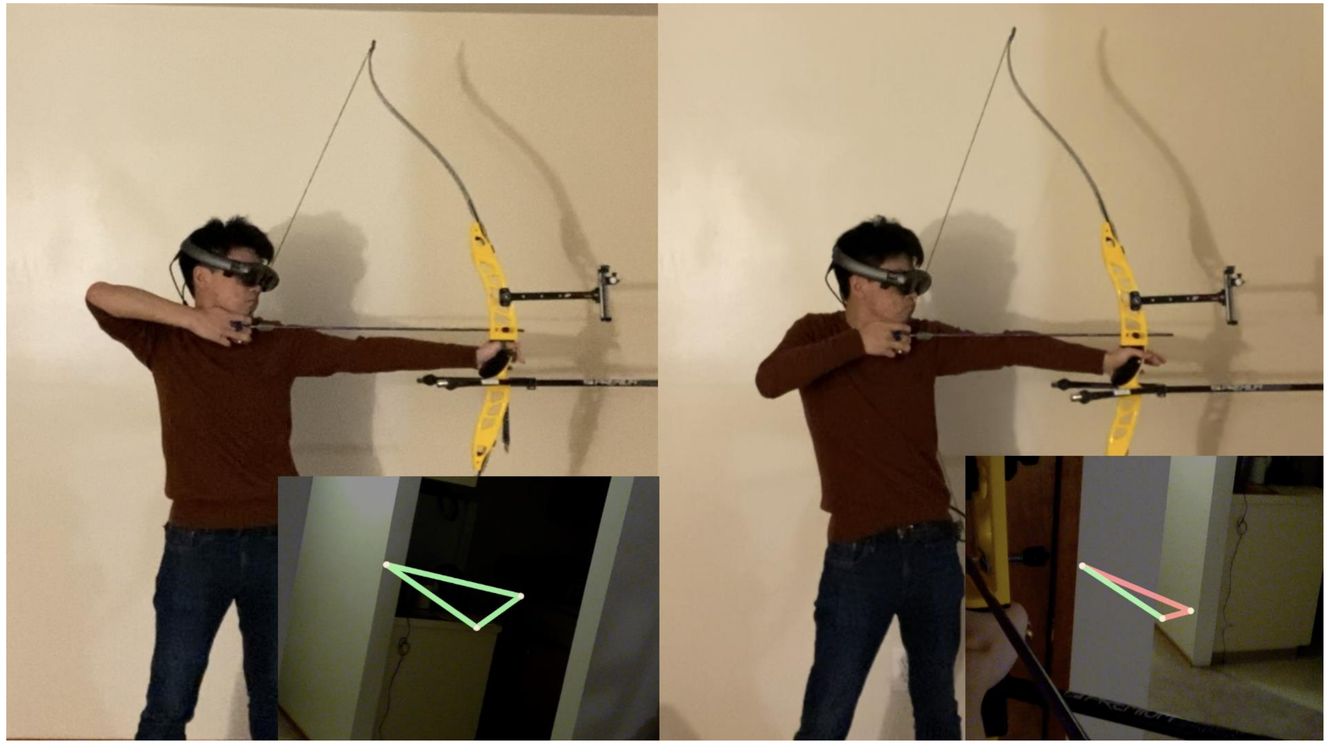


Project Inspiration

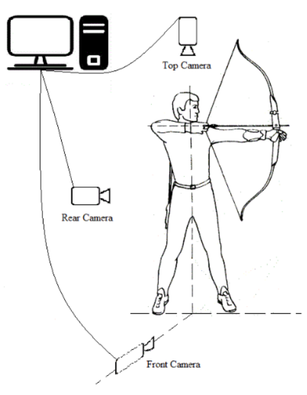
Archery is a difficult sport to improve at especially without coaching or external tools. Archers are often unaware of mistakes in their form while they shoot. In this project I sought to create an augmented reality tool to provide visual indicators of correct form while shooting.

Method

- Get full body trackers from Kinect sensor
- Transmit trackers from Kinect to Magic Leap headset
- Process necessary body trackers and translate to proper world/view space
- Render form visualization in AR headset



Related Work



Previously designed AR archery system feeds three camera views to the archer to so that they can correct their form (2015).

Hardware & Implementation

- Magic Leap 1 AR Headset
- Utilizes Microsoft Kinect 360 and Amethyst Kinect2VR for full body tracking
- Body trackers transmitted over LAN to headset
- Body trackers utilized to estimate form and deviation from correct form.
- Form visualizer is rendered in Unity and locked into the user's view
- Line color indicates correct positioning.
- Red lines indicate a mistake in alignment.
- Green lines indicate correct positioning

Future Work

- Improve body tracker number and accuracy
- Improve the detail of the form visualizer, make 3D depth more obvious
- Attach animated rig to provide better visualization of alignment and target form

References

Zafer Bozyer. 2015. Augmented Reality in Sports: Today and Tomorrow. In International Journal of Science Culture and Sport (Special Issue 4). International Journal of Science Culture and Sport, 322–323.

K2VR Team. 2022. Amethyst Docs. https://docs.k2vr.tech/en/

Developer portal: Magic leap. Developer Portal | Magic Leap. (n.d.). https://ml1-developer.magicleap.com/en-us/home