**LIMITLESS – Initial Demonstration**

**Introduction**

Limitless device aims to provide telehealth services to stroke patients and fitness programs to enthusiasts by leveraging the technology of Machine Learning and Artificial Intelligence. The device intends to use a depth sensing camera to identify the person and locate joints using a skeleton tracking program. For demonstration purpose a simple ‘shoulder opener’ stroke exercise was recorded and compared to a live action feed. The skeletal tracking program is currently under development with multiple updates intended.

A picture containing person, person, outdoor, sport

Description automatically generated

Figure Shoulder Openers[[1]](#footnote-1)

**Device & Software**

Device: Intel RealSense D435 depth sensing camera

Software: NUITRACK Skeletal Tracking SDK[[2]](#footnote-2); Python Programming Language

**Demonstration**

A shoulder opener exercise was recorded using the camera and the joints data was extracted into a database file to be compared to a live-action video. The following picture shows the joint location of the exercise being performed:

A picture containing wall, indoor, person, toy

Description automatically generated

Figure Picture file of a Recorded Exercise

Data points for the head joint were stored in the database and compared to the previosly recorded exercise video. As observed from the below picture, the data point at the location of head is coloured in red denoting that the location is misplaced compared to the recorded exercise.

A picture containing wall, person, indoor

Description automatically generated

Figure Picture file of a Live Action Exercise

**Intended Result**

Limitless aims to provide guidance to stroke patients and fitness enthusiasts through their exercise regime and support them in their development process. The device intends to indicate any mistakes the person performs during their exercise course and guide them to correct their posture. The following video intends to provide a basic understanding of the functioning of the device.

Video Link to the Demonstration File:

[Skeletal Tracking](https://1drv.ms/v/s!Am6DVpxufqzkhYUSIhntVKzCZ8vUUA?e=qZlCPr)

1. (neofect n.d.) [↑](#footnote-ref-1)
2. (NUITRACK n.d.) [↑](#footnote-ref-2)