Kinesiology / Movement Tracking Experts

Talk with PhD student in Kinesiology Building (Adam Taggart):

Best use case is in helping with kinesiology research studies. Tool/software that track a patient/test subject's movements, gives the patient/test subject live augmented feedback on how to perform the movement correctly if they are not, and provides researcher with data on the movement-raw data and general accuracy/complexity scores- (all independently without an overseer present)

* Stratasys
* Coacheseye
* Augmented feedback

Professor Timothy Hale:

I haven’t used anything like what you describe in my projects. The only thing that I am familiar with that is similar to what you describe are companies working in the physical therapy space that are using camera systems like the Xbox Kinect to track body movements and give patients feedback on performing their exercises.

One company working on this in the past is Reflexion Health out in San Diego. I just looked and it appears they have gone out of business or merged with another company. I think the Xbox Kinect is no longer produced or marketed.

There could be value in this depending on exactly the problem or business need you are trying to solve.

Reflexion Health was trying to promoted at home, remotely, telephysical therapy. Probably too far ahead of the curve and the technology was expensive and bulky using the Xbox.

Professor Matt Hanks:

Thanks for the email. The short answer to your question(s) is, yes. My research now and in the past has used several types of equipment to measure/monitor/track an individual’s movement, with an emphasis on shoulder motion during a task. With my research, I have used (1) optical motion capture systems that use sophisticated cameras with very high sampling rates (such as Vicon, Optitrack, and Qualisys), (2) electromagnetic capture systems that use accelerometers and gyroscopes with very high sampling rates (such as Flock of Birds by Ascension Technologies), (3) equipment instrumented with load cells to measure forces and torques (such as AMTI or Bertec force plates), and (4) electromyography sensors to measure muscle activity (such as Delsys and Noraxon electrodes) all to measure/monitor/track an individual’s movement. Proprietary software developed by some of these manufacturers are capable of measuring/monitoring/tracking the individual’s movement and providing feedback in real-time, whereas others require post-processing and modeling of motion data at a later time to make sense of it.

In many cases, the feedback the individual receives regarding their movement comes from someone observing the movement and the real-time data (i.e., a researcher, clinician, therapist, or coach), rather than a physiological stimulus or cue (like a shock or a beep) to alter their movement. (However, there is likely research that has done or does this.)

These types of equipment and software are typically considered the gold-standard in most biomechanics research laboratories, and they have also been utilized in Hollywood to make many animated movies and video games.

Professor Manuel Hernandez:

email:

Thank you for the clarification. We had an MD/PhD student working on developing a low-cost device to provide biofeedback during at-home physical therapy exercises. There are a few solutions in the market using video, or exergames that provide some basic feedback on number of repetitions, but otherwise haven't come across other solutions at the present time.

Over zoom:

* Startup: Navigation Solutions LLC, wirless foot tracking device
* Ontrack -> at home exercises
* Exercise games where you get movement info
* Issue: The variability of movements would be hard to adapt to for the software
* Issue with last student: didn’t have population to test on to measure effectiveness

Traci Heller (physical therapist):

I have not used software of this sort but definitely could see them as having some benefit.

Professor Laura Rice:

Sorry for my delayed response. Yes, I’ve been involved in a few projects using Kinect cameras to assess transfer skills of individuals who use wheelchairs. It has moderate promise in being a helpful technology – I see some barriers to implementing in a home or clinical setting, but as the technology improves, there is a higher potential.

Professor Ahuja:

* Open pose
* peloton