From Science To Screen – The Application Of Motion Capture In Healthcare

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Have you ever been watching a movie or playing your favourite game and wondered how do we look and move so realistically?

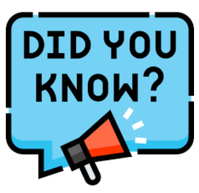
Well the answer is…

Motion Capture !

The technology?

Motion capture is a cutting-edge way to record real-life movement of humans and objects using a variety of sensors and cameras linked to a computer. It can involve different technologies to record these movements ranging from image based systems (markerless) to marker based systems.

Record movement with camera system → Create a 3-dimensional model of the movements performed → Calculate the movement of the underlying bones and their joint interactions → Manipulate the data to create the characters and movements you see on screen!



The origins of motion capture actually began in **healthcare**, specifically the field of **biomechanics** which involves **the application of mechanical principles such as force, motion and energy to biological systems**.

How it is used in Healthcare?

Motion capture systems are used within a specialised healthcare environment known as a gait laboratory (Figure 1). In this environment healthcare scientists and clinicians use their expertise to obtain a better understanding of:

- A service users gait i.e. how they walk.
- How their medical condition impacts their gait.
- How interventions such as surgery improve their gait.

Service users can range from those who have suffered brain/spinal cord injuries to those with conditions that affect their bones, muscles and joints including amputees.

The laboratory also combines other technologies to assess service users including:

- Force plates which measure the forces (weight) when walking and how these forces make the body move.
- Sensors that measure the activity of the muscles of the leg.

Figure 1. A typical gait analysis laboratory

The Role of a Healthcare Scientist?

- They undergo extensive STEM related education/training and are highly specialised in their field.
- They have first hand use of the various technologies used to capture the data and assist in its analysis and interpretation, allowing clinicians to make informed treatment decisions.
- They are responsible for implementing cutting edge technology into healthcare to help change service users lives.

The Future?

It is an exciting time to be a Healthcare Scientist within Gait Analysis!

They will be responsible for implementing new upcoming technologies which will aid our understanding of human movement and how conditions affect movement. This will significantly improve the experiences of our service users as well as their outcomes. Some of the varied applications and systems of the future will include:

- Artificial Intelligence
- Markerless Systems
- Wearable Systems
- Computer Assisted Rehabilitation Environments (Figure 2)

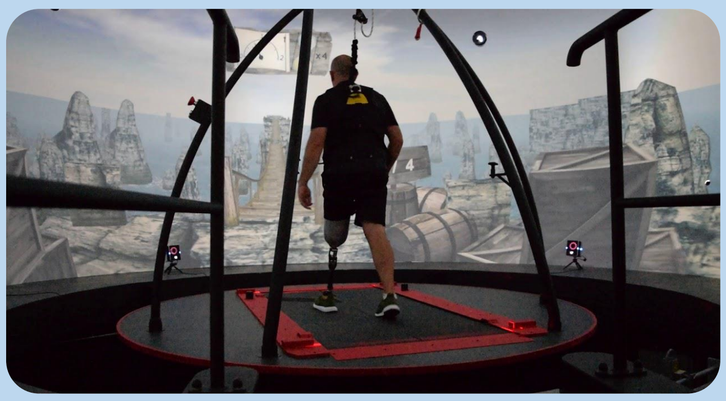


Figure 2. A computer assisted rehabilitation environment

Healthcare Science

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