Wales
Data Nation
Accelerator

Utilising pose estimation data for biomechanical characterisation in remote rehabilitation assessment

Summary

With growing demand for musculoskeletal healthcare provision, there is an increasing opportunity to explore new options for monitoring patients outside a traditional clinical environment.

The Musculoskeletal Biomechanics Research Facility (MSKBRF) have collaborated with Industry Partner Agile Kinetic (AK) in the development of a pose estimation tool to measure patient range of motion from a smartphone camera.

The team working alongside clinical specialists, have identified clinically relevant outcomes for patient's consistency of movement, joint angular velocity/ acceleration, and activity performance time, to be made available to users and the consulting clinician.

The innovation would provide patients with real-time feedback, support self-care and reduce the need for face-to-face appointments.

Benefits

- Data scientist prototyping work on local dashboards to unlock, interpret and visualise the information. This accelerated the availability for early validation against lab-based systems and continuation of a larger validation project.
- Each dashboard is designed to perform a specific biomechanics calculation and generate meaningful visualisations for the user (clinician/patient) that can be adapted for specific clinical needs.
- Increased knowledge sharing and opportunities for further research.

Further exploitation/next steps

- Development of the platform and its embedded tools can be adapted to specific clinician outcomes based on expertise, patient group and further rehabilitative purposes.
- Platform tools are currently developing motion capture/ video data for assessment of other joints and activities, alongside upper body movements allowing full body rehabilitation assessments.
- Potential development into progressive pipelines for sport-related injury, that leads towards performance-based outputs which could incorporate jump height, kinetic-based joint model predictions and gait measures.
- Digitalisation exploration could be explored by platform developers to increase the user experience by effective data visualisation and avatar creations.

Authors:

Cardiff University: Cathy Holt, Rebecca Hamilton, Zornitza Glavcheva-Laleva, Jenny Williams

Agile Kinetic: Peter Bishop, Yeshwin Anil, Riya Joshy

Project group

Agile Kinetic Ltd. and Cardiff University Musculoskeletal Biomechanics Research Facility