TITLE: USE OF AI AND BIOMECHANICS ANALYSIS TO CREATE A HURLING TRAINING PROGRAM IN IRELAND

ABSTRACT: The quantitative and qualitative analysis of technique in sporting movements is critical to maximise performance and reduce incidence of injury. Quantitative analysis is conducted by means of tracking 3Djoint positions to understand angular kinetics and kinematics. Furthermore, qualitative analysis employs video analysis to assess sporting movements through observation. This project proposes to study sportsmotion of Hurling players via tracking 3D joint positions and video footage of competitive Hurling players(i.e. Fitzgibbon Cup) from Institute of Technology Carlow (IT Carlow) and Waterford Institute of technology (WIT).

The examination of the movements of the Hurling players will enable the creation of a database of the most effective and efficient technique to maximum performance in this sport. In order to develop this database, the student will examine the body of literature for the selection of the most effective machine learning algorithm for analysing 3D movement of sporting techniques. The main goal of this project is toenable the student to develop the knowledge of biomechanically assessing sports motion and apply machine learning through motion analysis methods to improve sports motion techniques in Hurling.

IT Carlow possesses specific hardware and software (XSENS system and BTS bioengineering), which will allow for the development of a protocol to generate the required data. Therefore, the student will develop the knowledge and practical skills in the use of software to analyse video footage in relation to these sporting movements that can work in tandem with 3D motion analysis. The analysis of sporting movements will be stored in this created database containing the combination of movements that comprise the most effective and efficient technique for playing Hurling. The database will be used to design effective hurling biomechanical and conditioning training plans for future students to enhance sporting performance and reduce injury risk, as is being performed already for hockey, baseball andother sports around the world.

The student will work with the supervisory team comprising of two from IT Carlow faculty members: one experienced faculty member of the Science and Health department (healthCore) and one of the new researchers from the Aerospace, Mechanical & Electronic Engineering department (engCore) with expertise in Biomechanics; together with one expert in Biomechanics from WIT. Both, WIT and IT Carlowhave a strong reputation in the area of sports science, and this will position both institutions as key players in the use of cutting-edge technology to enhance Hurling performance in Ireland.

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