Ski Faster with Camera-less Fusion Motion Capture

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Professional skiers can now learn how to ski faster with the aid of a new system used to capture 3D motion of athletic movements – Fusion Motion Capture (FMC). Featured in Wiley-Blackwell's journal, *Sports Technology*, this is the first time the study of FMC has been published in a journal.

This pilot study "Fusion Motion Capture: a Prototype System using Inertial Measurement Units and GPS for the Biomechanical Analysis of Ski Racing" uses FMC to capture 3D kinetics and kinematics of alpine ski racing and shows how this new technology can overcome the technological difficulties associated with athlete performance monitoring in an alpine environment.

FMC is a system which uses small sensors attached to the athlete's limbs, helmet and soles to generate raw data from the athlete's movement. The numbers are then crunched with the aid of a computer to reproduce accurate estimates of the position, velocity and acceleration of the athlete's limb segments.

Lead author, Matthew Brodie, Massey University, says "With FMC, it is possible to capture motion and dynamics of alpine ski racing throughout the ski run while maintaining high resolution. This is the first time full body motion of an athlete skiing an entire course can be captured with results returned as soon as the run is completed."

FMC is developed to capture motion in large spaces which is impractical

for video motion capture. While video analysis requires several weeks to measure only a few turns, FMC is able to collect and analyze several hundred turns in a single day.

Mr. Brodie adds. "FMC enabled biomechanical analysis which provides insights into how technique, race strategy and equipment changes can increase the athlete's speed. It is now possible to measure how ski friction, wind drag, gravity and ground reaction forces affect performance and see how variability in technique is beneficial to race time."

Source: Wiley