



Thesis Project Form

Title (tentative): Validation and Biomechanical Characterization of Broadcast-based Optical Tracking Systems in Professional Sports

Thesis advisor(s): Sanguineti Vittorio, Delzanno Giorgio, Spadaro Cristiano (HUDL Wyscout)

E-mail: Vittorio.Sanguineti@unige.it

Address: Via All'Opera Pia, 13 - 16145 Genova

Phone: (+39) 010 33 56487

Description

Motivation and application domain

Validation of broadcast tracking as a non-invasive tool for monitoring human movement and athlete kinematics in professional sports environments

General objectives and main activities

The thesis aims to conduct a scientific validation of player kinematics extracted from 2D broadcast video feeds, focusing on their biomechanical relevance. The study compares broadcast-derived data against "gold standard" ground truth systems: GPS/GNSS wearables and fixed multi-camera optical installations. The research activities will include:

- Comparative analysis of raw positional data to evaluate the accuracy of reconstructed player trajectories;
- Assessment of derived biomechanical and physical metrics, such as instantaneous speed, acceleration profiles, and metabolic power, ensuring they reflect true physiological demands;
- Investigation of measurement error impact on the estimation of high-intensity locomotor activities. The work aims to establish the reliability of broadcast-based tracking for scientific performance analysis, focusing on the precision of kinematic parameters essential for injury prevention and load monitoring in elite athletes.

Training Objectives (technical/analytical tools, experimental methodologies)

Acquiring expertise in human movement analysis and kinematic data processing. Gaining proficiency in Python for biomechanical signal processing and understanding experimental protocols for validating tracking technologies against medical-grade ground truth.

Place(s) where the thesis work will be carried out: HUDL Wyscout, Chiavari

Additional information

Maximum number of students: 1