Head, Shoulders, Hip and Ball… Hip and Ball! Using Pose Data to Leverage Football Player Orientation
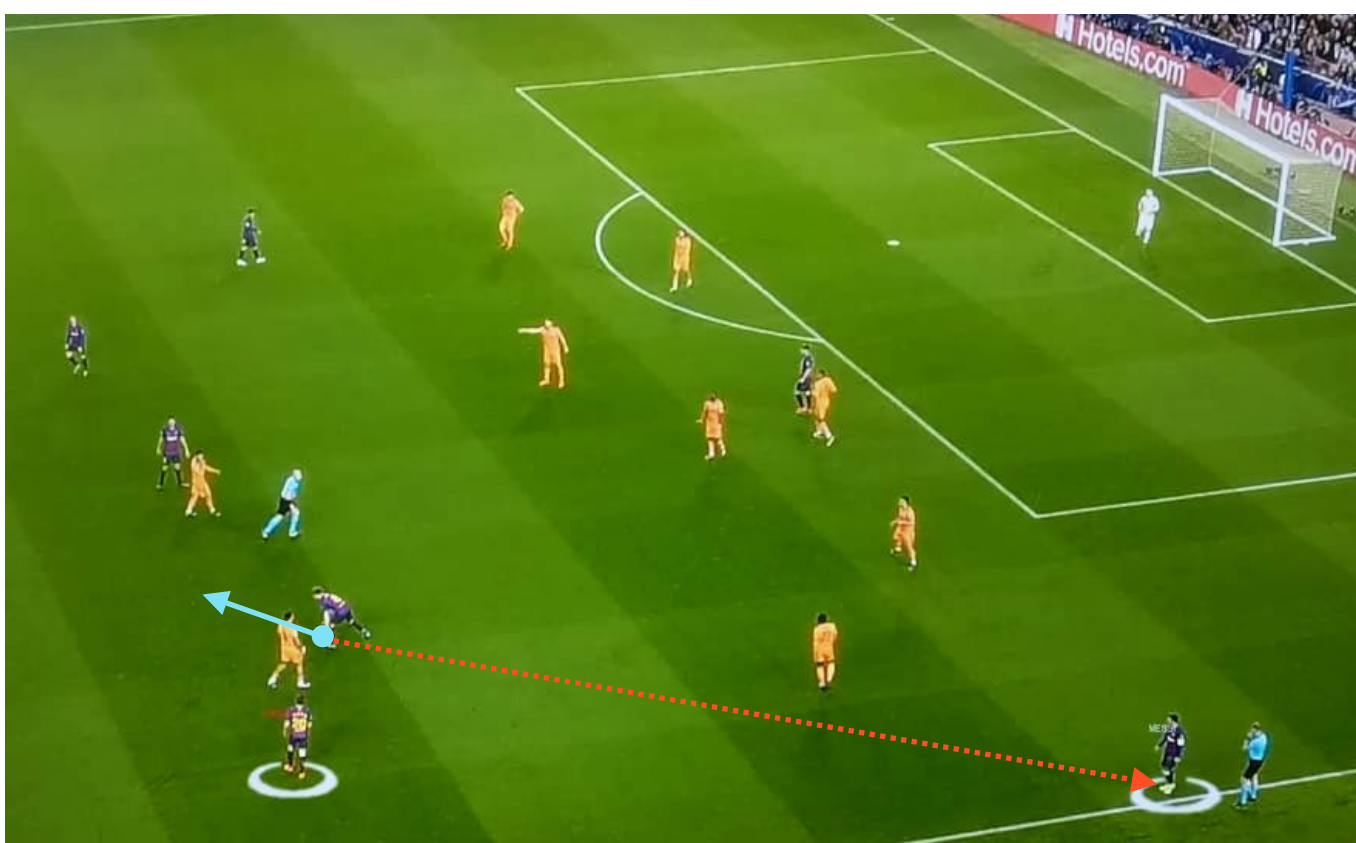
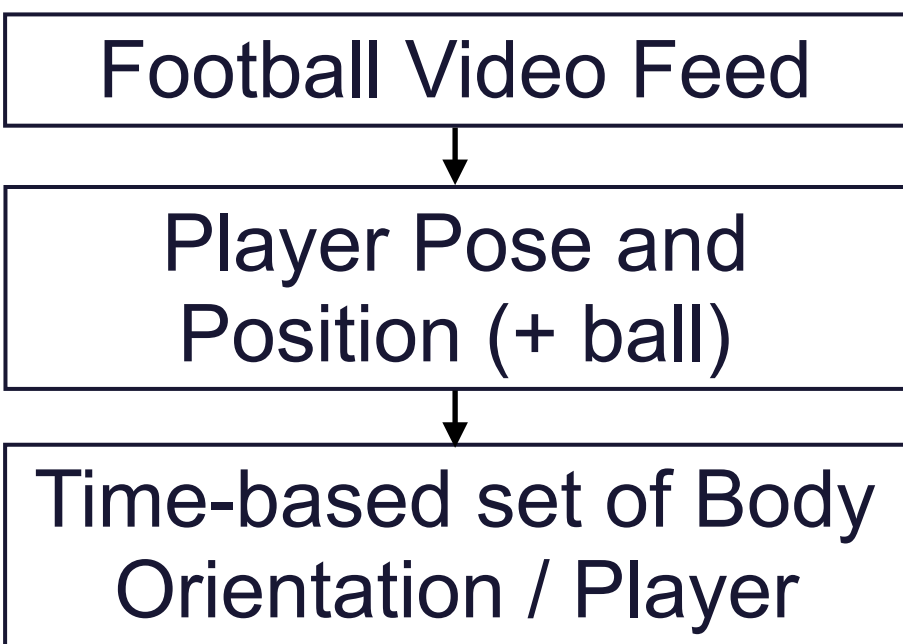Adrià Arbués-Sangüesa, Gloria Haro, Coloma Ballester, Adrián Martín / Universitat Pompeu Fabra /
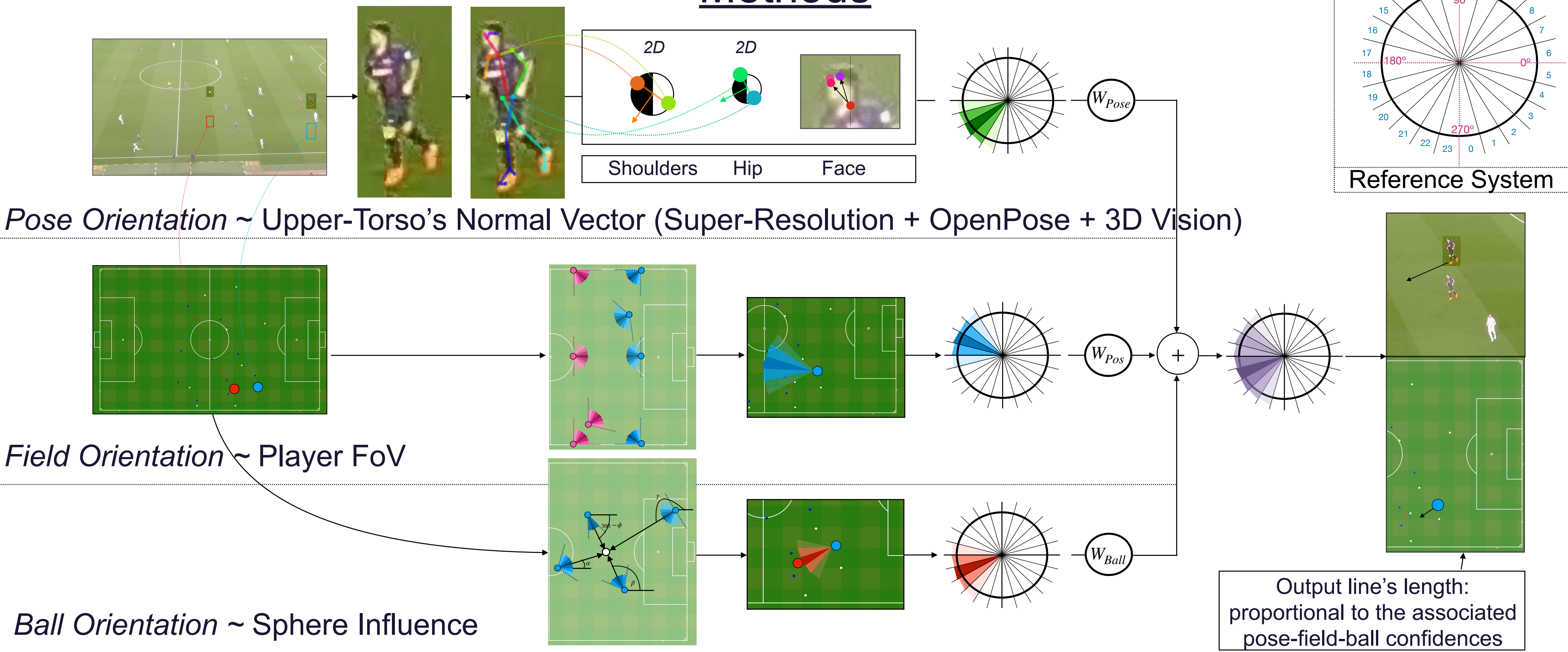adria.arbues@upf.edu

Problem Statement

Edler people claim that:
- *Yesteryear football:*
  1. Control 2. Look 3. Pass
- *Today's faster football:*
  1. **Orient** 2. Control 3. Pass

Source: sportsdiscourse.com

Yet an unexplored field of research

Goal

Football Video Feed

↓

Player Pose and Position (+ ball)

↓

Time-based set of Body Orientation / Player

Methods

Reference System

Pose Orientation ~ Upper-Torso's Normal Vector (Super-Resolution + OpenPose + 3D Vision)

Shoulders Hip Face

W_{Pose}

Field Orientation ~ Player FoV

W_{Pos}

Ball Orientation ~ Sphere Influence

W_{Ball}

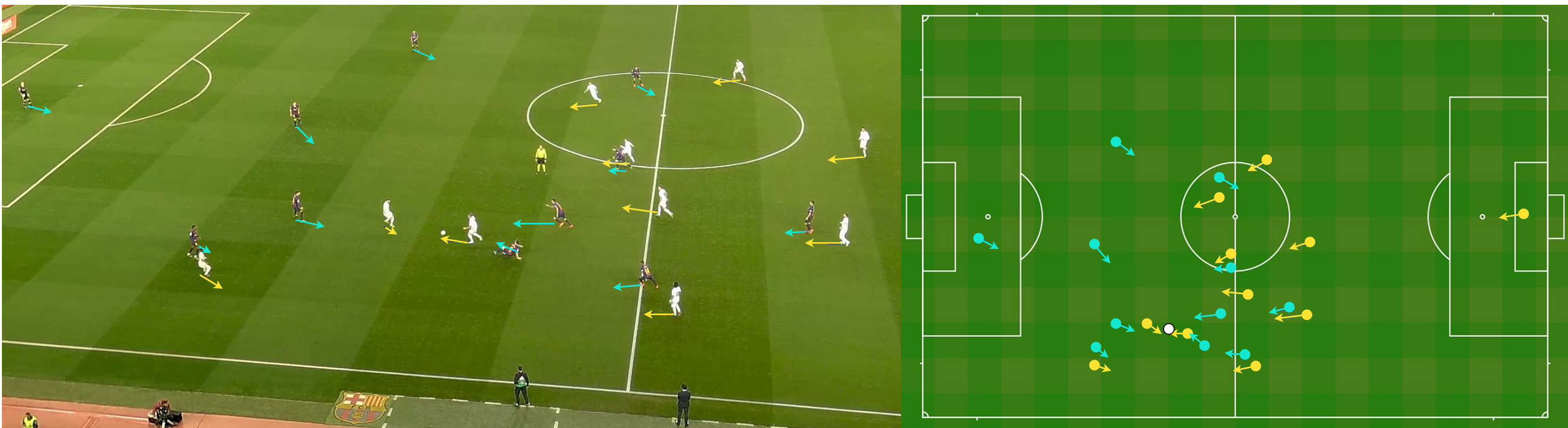Output line's length: proportional to the associated pose-field-ball confidences

Results

Validation through EPTS devices in youth games. In the presented experiments: $W_{Pose} = 0.25$ $W_{Pos} = 0.15$ $W_{Ball} = 0.6$

Detection Rate: 89.69 %	LR-Side Deviation: 92.43 %	Mean Absolute Error: 40.00º	Median Absolute Error: 34.07º

Practical Applications

Orientation Assessment through Video	Refining Pass-Probability / Pitch-Control Models
Evaluation of On-Ball and Off-Ball Direction	Reaction Time Measurement