# Spatio-temporal data in soccer

Peter O'Donoghue

HÁSKÓLINN Í REYKJAVÍK | REYKJAVIK UNIVERSITY



## Chyronhego data from 2020

- One English FA Championship team and their opponents
- 41 out of 48 matches included
- The ball and all players were tracked
- X and Y co-ordinates
- 25 samples per second
- Team in possession and whether ball is in play is recorded



## Use of spatio-temporal data in soccer



#### Typical use

- Distance covered
- Distance covered at different speed zones
- Accelerations and decelerations
- Heat maps
- Monitoring player load over time

#### **Tactical analysis**

- Tactical movement
- Co-ordination with team-mates
- Movement in relation to opponents
- Movement in relation to the ball



• Integration with match actions

• Applying machine learning / Al





Determining basic match events (passes etc) before integrating with tracking data



- What are the relative advantages and disadvantages of 3 alternative approaches.
  - 1. Tag the matches yourself and use the tagged events with ChyronHego tracking data
  - 2. Use Opta data for events with ChyronHego tracking data
  - 3. Use the ChyronHego data only, with pre-processing to identify events, then use the pre-processed events with ChyronHego tracking data



### Identifying basic events (Matlab program)



# Validation against video observation



Kappa = 0.814 Very good agreement

Event	System	Observer 1	Observer 2
Corner	12	12	12
Dribble	96	117	111
Free kick	51	49	55
Pass	683	428	417
Receive	200	106	137
Throw in	49	49	49
Touch	175	334	351
		Kappa = 0.469 Moderate agreement	Kappa = 0.404 Moderate agreement