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We develop proof-of-principle computational tools to automate aspects of game analysis by modeling in-play decision-making.

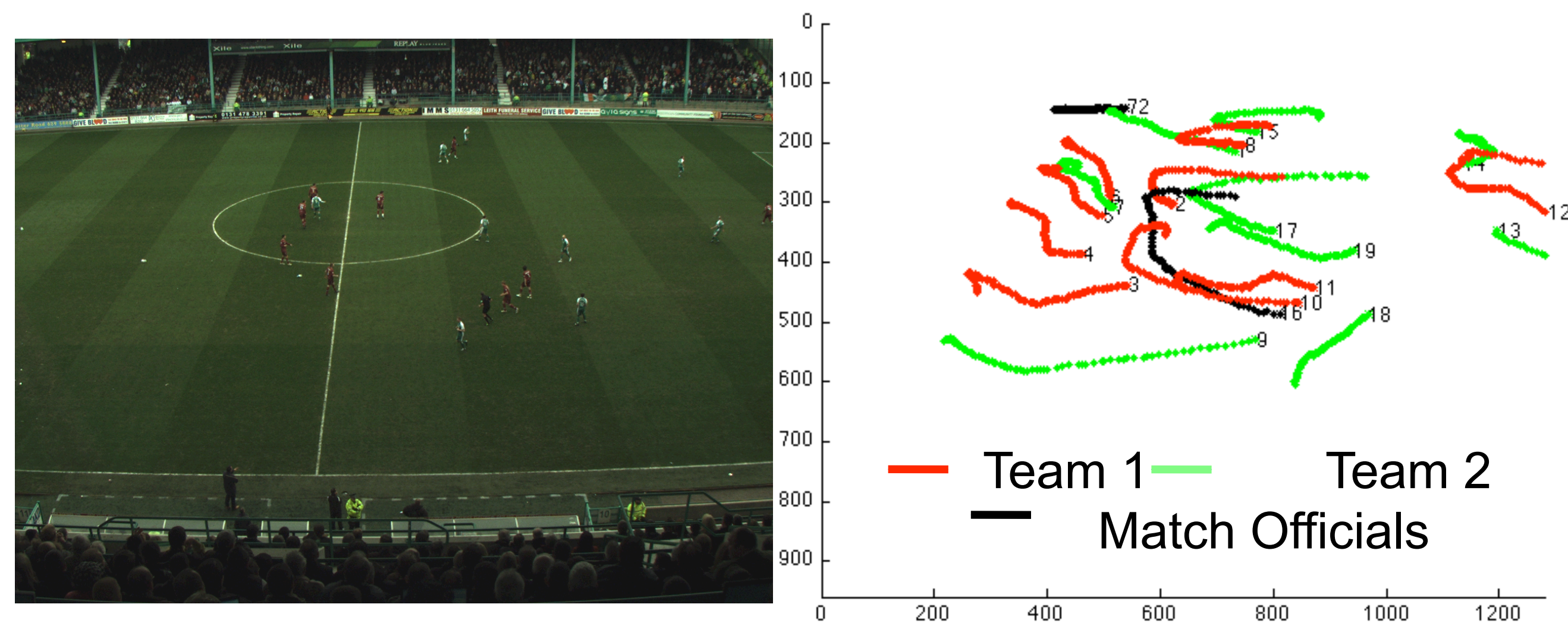
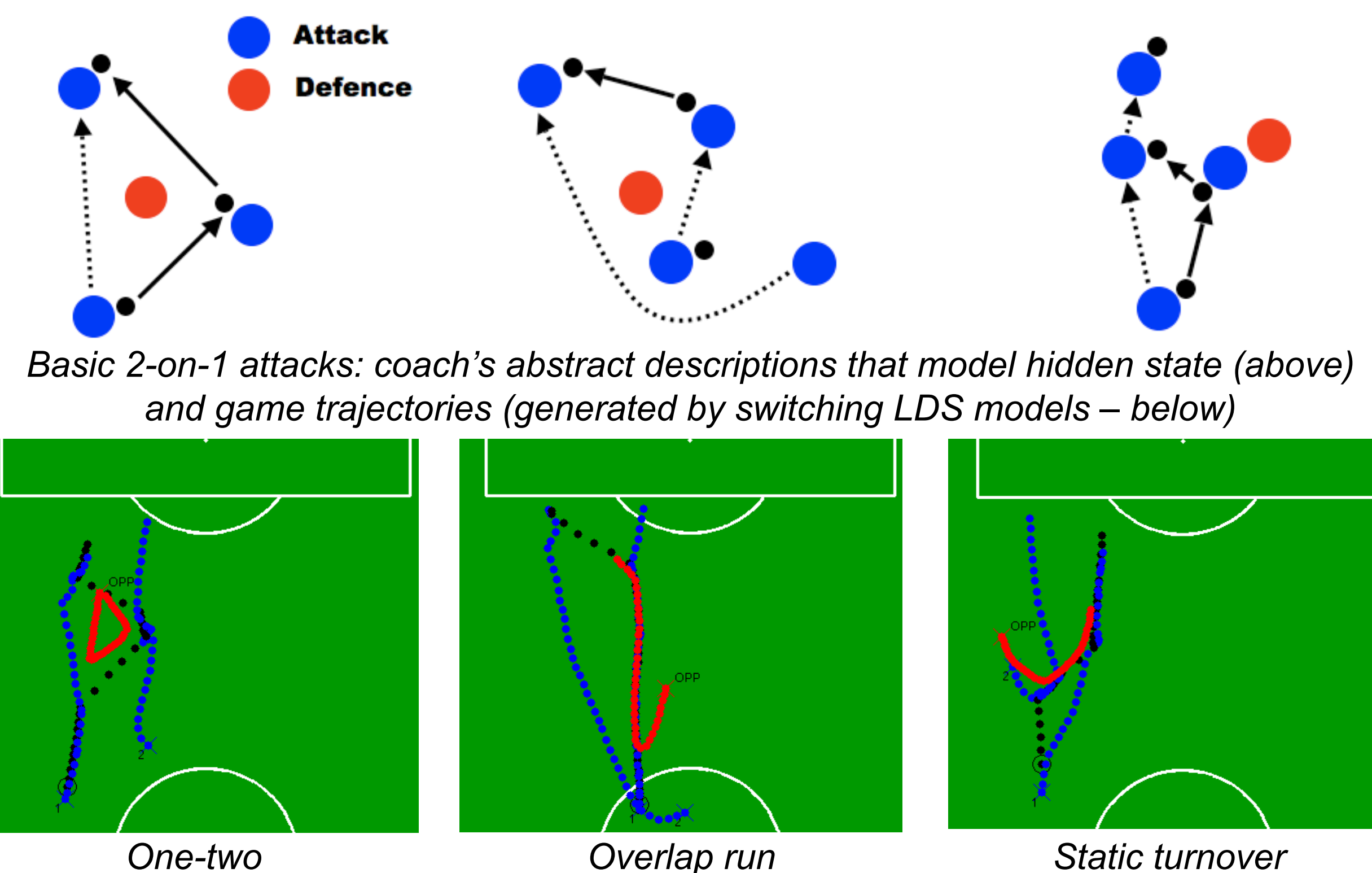
<http://idealab-test.nesc.ed.ac.uk/idea/automating-and-enhancing-team-performance-analysis>

## 1. Team decision-making

Each team player must act as a function of the current game situation (moment of play), and his or her own role in it. This recognition and reasoning task can be viewed as hidden state estimation in the dynamical process of the game.

## 2. Tactics extraction

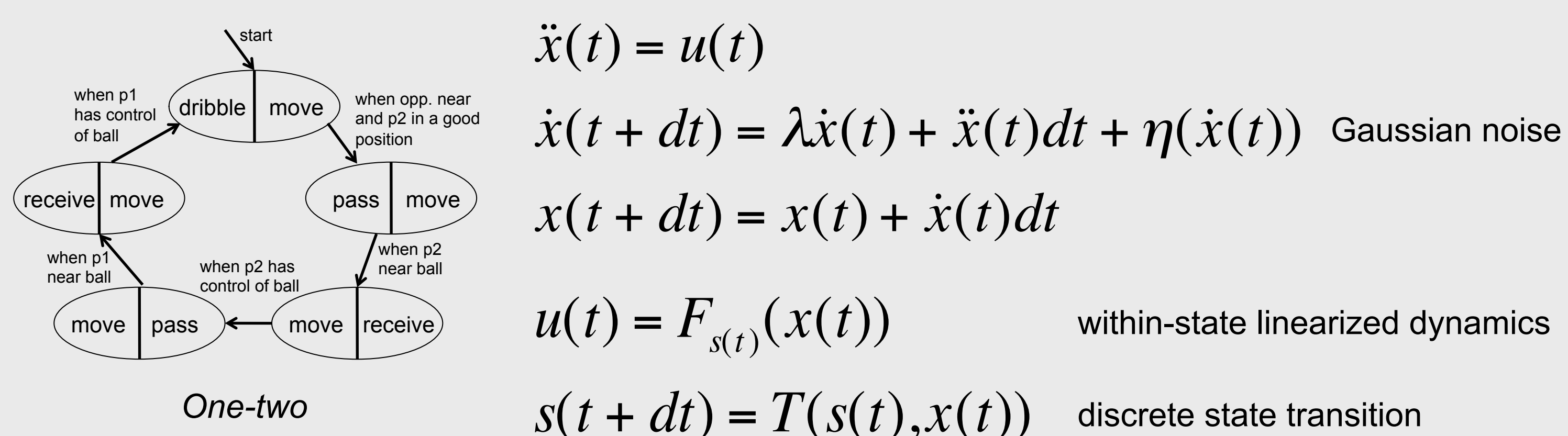
We model game tactics as hidden-state-driven processes that generate observed trajectories of play. These models can then be extracted – inferred – from annotated match recordings.



The raw data: annotated player trajectories

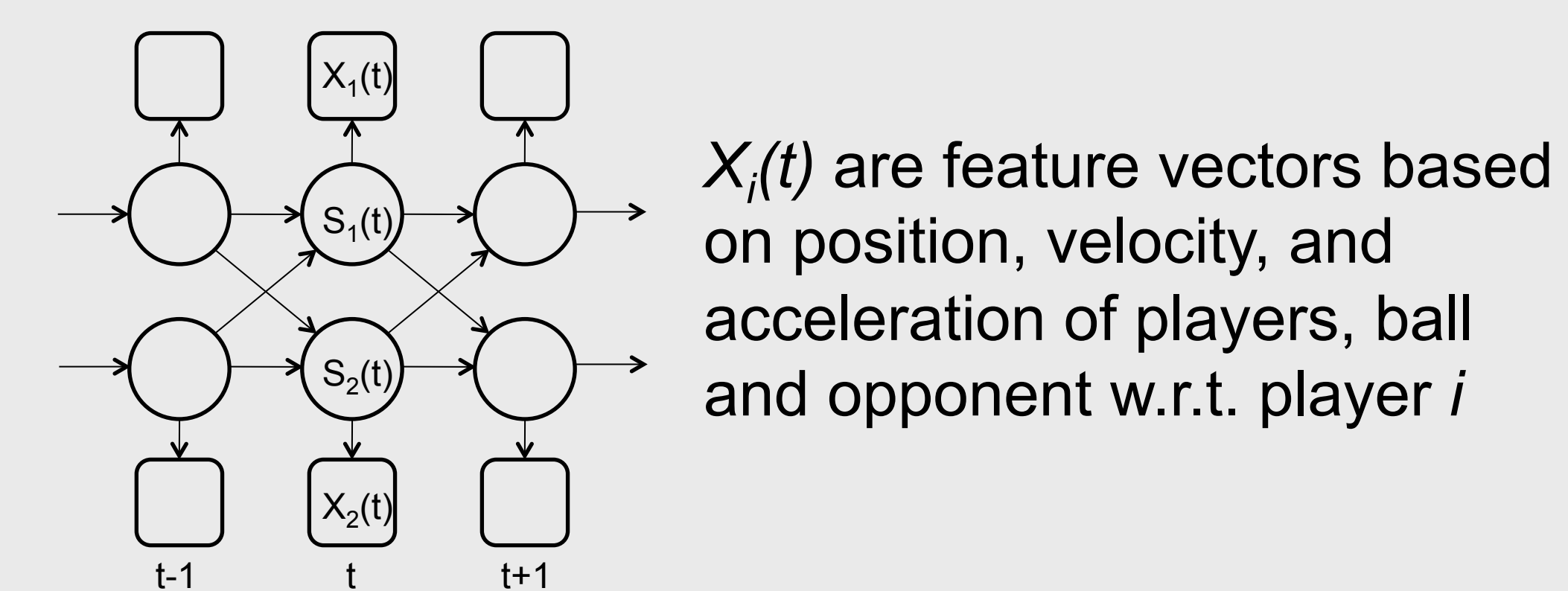
## 4. Representation methods

### Switching Linear Dynamical System (LDS) models



Problem: how to learn F and T

### Coupled Hidden Markov Models



Problem: feature selection, dynamics

## 5. Future research and opportunities

- Proposals for computational modeling of decision-making in team sports
  - to measure effectiveness of intervention
  - to compare decision-making in novice vs. expert teams, in adult vs. child teams
- RoboCup 2011 University of Edinburgh team – use tactic models to generate play
- Software to help coaches and team sports performance analysts – automatic extraction of tactics, strategic goals and sequences

