Interdisciplinary project

Game data analysis in Soccer German Bundesliga

Game analysis is an important part of coaching in football. Observation and analysis of tactical behavior make it possible to derive tips for your own training control and to develop strategies for competition. For some years now, technological innovations - especially advances in the field of position detection - have presented new challenges in the way this data is analyzed and interpreted. In the context of the chair's research activities in this area, the following IDP is to be awarded.

Project

In previous projects, various methods for the automatic detection of game events in position data of the Bundesliga were developed (standard situations, passes, shots on goal). In this project, these are to be expanded by further processes:

- Estimation of the 3D position of the ball from the positions of players
- Detection of game interruptions (after foul, ball out, etc.) by the position of the ball and the players

This requires a careful analysis of the underlying data and performing a suitability analysis with existing algorithms from the machine learning area (DBSCAN, Random Forest or similar).

Finally, the proposed solution has to be implemented in C#, depending on the effort, manually or using an FFI according to Python.

Courses

Participation in the following courses is recommended:

- Grundlagen der Trainingswissenschaft 1 (V, 2 SWS) (german)
- Grundlagen der Trainingswissenschaft 2 (V, 2 SWS) (german)
  or
- Methods of Action Detection (S, 2 SWS) (english)
- Methods of Position Detection (S, 2 SWS) (english)
Framework

It is recommended to have previous knowledge in the following areas:

- .NET development with C#
- Python development with numpy, scipy, seaborn, pandas, tensorflow
- Density-based clustering, decision trees, regression analysis
- Data science workflow

Of course, it is unlikely to have experience in all areas. The least we expect is motivation to learn and be interested in the topic, because we offer an unique opportunity to work on extremely clean data that come from real games of the German Bundesliga.

Support

The project is advertised by the Chair of Performance Analysis and Sports Informatics and is supervised in cooperation with the Chair for Middleware and Distributed Systems (I13). A mentor from both chairs is available for supervision.

Date to start

Work on the project can begin at any time. After a kickoff meeting in which the work is specified and a project plan is drawn up, the independent development phase begins with the opportunity to bring in your own creativity. It is expressly desired to come up with your own solution proposals, since both questions have so far not been answered in science.

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