Escuela Internacional de Doctorado

EULiST

PhD Thesis Project Offer

(valid during the calendar year 2025)

Provisional Title of the Doctoral Thesis

Applications of Complexity Science to Soccer Data Analysis

Subject area* / Research line

Engineering and Architecture

Summary of the Doctoral Thesis (maximum 300 words)

This PhD thesis project aims to apply methodologies from the complexity science to the advanced analysis of football data. In particular, the development of new indicators and metrics is proposed to quantify and understand the complexity, entropy and temporal and spatial evolution of the collective behaviours of soccer teams during matches. To this end, algorithms will be designed and validated based on complex system tools, such as network metrics, self-organization measures and non-linear analysis, in order to capture emerging patterns in the game, tactical adaptation and dynamics of interaction between players. This approach seeks to provide a deeper and more quantitative vision of modern soccer, offering novel tools both for the academic field and for their practical application in professional sports environments.

Is the development of this thesis associated with the execution of any research project? If so, provide details of the project (title, funding entity, and execution period)

The research to be developed within this PhD thesis is part of the National Plan project entitled "Analysis and prediction of complex systems in space and time: theory, experiments and interdisciplinary applications" (PID2023-147827NB-I00) funded by the Ministry of Science and Technology and which has an execution period of 3 years. Specifically, it focuses on the specific objective that refers to the analysis of team sports as complex systems. Within this objective, metrics on network structure and dynamics will be developed according to the hypothesis of seeing sports as physical systems of continuous interaction.

Academic Profile of the Student (maximum 200 words)

Student with a Bachelor's Degree in Physics, Mathematics or Engineering with knowledge of programming. The student will work by creating theoretical models and analyzing real soccer data. To do this, it is necessary to have knowledge of programming, statistics and systems modeling.

Contact: institutional email of the Supervisor

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*See the Subject Areas at https://www.urjc.es/informacion-practica#oferta-proyectos-de-tesis.
Each project will be included in a single subject area.