Advanced Soccer Analytics Proposals

Context and Objective: The collaboration between IRI and Kognia Sports offers a cutting-edge technological ecosystem for the development of Master's Theses (TFM) focused on spatiotemporal data analysis and computer vision. The fundamental goal is to transform tracking data and player poses into high-level tactical insights.

Proposed Areas of Study:
- Predictive Modeling via Diffusion Models: A line oriented toward advanced research exploring the use of generative models for predicting future movements and poses. This approach seeks to model uncertainty and anticipate match dynamics, allowing for the simulation of probable biomechanical trajectories in high-competition scenarios.
- Event Detection and Tactical Narrative via VLMs: This line integrates event detection with semantic interpretation. It proposes the fine-tuning of Vision-Language Models (VLM) to identify and describe key actions (passes, shots, fouls). To overcome the limitations of current architectures, the project will focus on optimizing the processing of long sequences through extended context window techniques (sliding window with overlap), ensuring a deep temporal understanding that transforms visual data into coherent textual narratives.

Flexibility and Student Proposals: These lines are presented as open and non-exclusive frameworks. Students are actively encouraged to suggest variations, combine these approaches, or propose new methodologies that leverage the Kognia Sports dataset. The goal is for students to define their own projects, contributing innovative ideas in areas such as deep learning, temporal sequence analysis, or multimodal model architecture.