



INTERNSHIP PROPOSITION (M2) – H[AI]DING PROJECT

Biomechanical understanding of football heading through video analysis from a performance perspective

This research internship proposition aims to deepen the biomechanical understanding of football heading from an optimization viewpoint. It adopts a multidisciplinary approach at the crossroads of biomechanics, movement analysis, sports science, and advanced computer vision to capture the dynamics of multi-segmental movement with a focus on head-neck movement and ball impact under real match conditions.

Your responsibilities

This internship is a collaboration between FFF and Institut de Biomécanique Humaine Georges Charpak at Arts et Métiers Institute of Technology. It will take place mainly at Arts et Métiers (70%). Several visits at the Centre National du Football at Clairefontaine and FFF headquarters (Paris 15) are planned. The goal is to generate new insights to enhance player performance while contributing to the development of evidence-based training frameworks related to heading in football. Furthermore, it investigates sex-based technical differences in heading execution, with the aim of informing tailored training and prevention strategies.

Main objectives:

- Development of a **3D motion and posture analysis** solution combined with ball tracking and impact detection using video analysis, **AI-based image processing** and a labelled internal database.
- **Analysis of complex football player movements** with the goal of characterizing and optimizing performance through enhanced video analysis.
- **Personalized biomechanical modeling (2D–3D)** of the whole body.
- Scientific and technological literature review

Ultimately, these tasks should enable us to:

- Enhance the value of data by processing and visualizing it in a meaningful way, enabling the extraction of information that is useful for conducting performance projects.
- Contribute to the completion of research projects and the analysis and provision of data necessary for the publication of scientific articles.

Desired profile

We are looking for an intern who meets the following profile:

- You are a second year Master's student in either Biomedical Engineering / Biomechanics /Sports Science/ Computer vision
- Knowledge and/or experience in motion analysis
- Software/languages: Ms Office, Python, knowledge of Github
- Scientific curiosity and ability to collaborate closely with the FFF Research Center on scientific research projects
- Ability to adapt to the context of high-level sport
- Rigorous, methodical, organized, adaptable, and autonomous
- Excellent interpersonal skills
- Languages: English (read, spoken, written)

Contacts & Application : Send your CV and motivation letter to :

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