



De l'invention à l'innovation

Postdoctoral position
ENS Cachan and Université Paris Descartes (France)
(CDD 18 mois)

*Statistical signal processing and machine learning
Study of locomotion and running with wireless and wearable sensors*

PRACTICAL INFORMATIONS

- Location: The work will be conducted essentially at the CMLA (CNRS & ENS Cachan) and sites where data are collected (Université Paris-Descartes, Hôpital du Val-de-Grâce,...)
- Starting : from January 2016 with 18 month contract
- Net income: approximately 2400€/month (before taxes)

CONTEXT

Since the breakthrough of self-quantified applications, extracting various health-related data from wearable sensors has become a real subject of interest. There exist many software applications on the market that use the sensors embedded in smart phones to calculate the number of steps, the traveled distance, the average speed... and to provide all kinds of statistics on weight loss, energy spent... Our first aim is to develop algorithms and technologies in order to perform such tasks in a medical context, by extracting robust and reliable parameters that can be used for longitudinal follow-up and diagnostic assistance. Our second aim is to design, create and study large databases of physiological signals that can be used for example to conduct medical research.

TEAM

An interdisciplinary team of mathematicians, computer scientists, clinicians, and neurophysiologists involving two CNRS labs and several hospital divisions has developed a methodology to implement a virtuous loop in which sensor signals feed structured databases on which state-of-the-art algorithms from signal processing and machine learning are executed to support interfaces for smooth observation, quantification and assessment by experts. This methodology aims at addressing key questions for clinical and ethomics research.

OBJECTIVES

This project is focused on the study of locomotion and running with wireless and wearable sensors. The candidates will participate in the protocol definition for data collection, data organization, functional data exploration, development of statistical methodologies for longitudinal follow-up and machine learning algorithms leading to operational prototypes tested in operational environments. Typical issues that arise along the projects are :

- Low-level signals processing and feature engineering
- Robust signal indexation and event detection
- Supervised and unsupervised machine learning algorithms, including multi-view learning

SKILLS

Applications from candidates with top-notch scientific background with specific knowledge in data mining, data science, applied statistics, signal processing, or machine learning are welcome. Furthermore, technical and human qualities are also expected :

- Keen to interdisciplinary research and interaction
- Taste for numerical experimentation
- Interest for sensor technologies
- Desire to produce live demos and contribute to prototype solutions
- Creativity
- Excellent communication skills
- Strong programming skills
- Enjoy teamwork

Candidates should email a letter of application, a detailed CV including a complete list of publications, and source code showcasing programming skills to Nicolas Vayatis (CMLA, ENS Cachan) : vayatis@cmla.ens-cachan.fr