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MoVE-IT : Motion analysis by Video for gait Evaluation with Innovative Technology

BoostUrCAreer will abide by the mobility rule defined for MSCA, the reference date being the call deadline, meaning applicants will only be eligible if they have lived or had their main activity (work, studies etc.) in France for **less than 12 months within the past three years** at the time of recruitment (November 15th). Applicants must have a master's degree or an international equivalent.

Presentation of the PhD topic:

In France, the expenses in physical rehabilitation increased from 7.3 to 8.4 B€ between 2010 and 2015, mainly due to the ageing population, the increase of chronic pathologies such as strokes or Parkinson, and the shortening of the hospitalization time. 70% of the activity of rehabilitation institutions is about gait (first step for the regain of autonomy). Accurate reliable knowledge of gait characteristics at a given time, and even more importantly, monitoring and evaluating them over time, may enable early diagnosis of diseases and their complications and help to find the best treatment. Three-dimensional motion analysis is the gold standard for clinical gait analysis (CGA), particularly in the presence of pathologies that affect walking. Today, less than 1% of the patients benefit from CGA.

The main objective of this project is to develop a method based on an innovative low-cost motion analysis system allowing an accurate quantification of gait deviation parameters during functional tests, including spatiotemporal and full-body kinematic parameters. For that purpose, the recruited student will design novel parametric continuous models providing good representations of walking, with the goal to obtain reliable and robust approximations of all possible walking patterns from noisy point sets obtained via 3D camera acquisitions. By combining techniques from geometric modeling and machine learning adapted to our context, he will devise new fitting algorithms adapted to these models to identify the best instance for a wide range of data sets. He will also participate to the acquisition of medical data (3D CGA) which are mandatory to successfully create and validate the models, and to improve the general performance.

The student involved in this project will benefit from academic expertise and training in the complementary fields of biomechanics, mathematics and computer science. He will be supervised by Raphael Zory who leads the team "Motor deficiencies and physical activity" on the LAMHESS and by Laurent Busé, researcher at Inria Sophia Antipolis – Méditerranée and specialist on algebraic methods and representations for complex shapes. The student will also get experience in technology transfer as this project will be conducted in collaboration with the EKINNOX company. Candidates should have appropriate academic qualifications in Computer Science, Mathematics or biomechanics (motion analysis) and strong background in programming.

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Supervisors:

1. Professor Raphael Zory, LAMHESS (Laboratory of Human Motricity, Expertise, Sport and Health),
2. Researcher Laurent Busé, Aromath, INRIA (French National Institute for Computer Science and Applied Mathematics).

International partners:

Associate professor Katia Turcot, Centre for Interdisciplinary Research in Rehabilitation and Social Integration, Laval University.

Deadline to submit:

12/08/2019 à 05:00 PM UTC+1 (CET)

http://univ-cotedazur.fr/fr/recherche/boosturcareer#.XQeM9YgzbIV

All documents must be sent in English or an English translation has to be provided.
Don't forget to upload all the requested documents:

- a cover letter describing your motivations and professional project
- a curriculum vitae
- an abstract for the project you are applying for,
- grade transcripts for your Bachelor's and Master's degrees
- Bachelor's and Master's diplomas,
- Scientific production (if any)
- Contact information of 2 references

Why should you apply?

- Attractive salary of 2709,00 € (gross salary) per month, as well as, different allowances (between 815 and 1215 euros per month);
- A legal working time is 37 hours per week, with a daily working duration that does not exceed 10 hours;
- Subsidized lunches and monthly pass for public transportation;
- A total amount of yearly vacations of 45 days;
- Paid sick leaves;
- Parental leaves following the birth/adoption of a child;
- Sick and parental leaves add up to the 42-month duration of the contract;
- In addition to their income, the doctoral candidates who have family obligations will receive an extra family allowance of €400 per month. Furthermore, they will benefit for each child of a monthly financial help from the French social security (calculations based on the household income and on the number of children under the age of 20);