Announcement:

Post-doc in analysis of complex interaction networks

Project title : GraphScore-2 - Notation of subgraphs extracted from complex knowledge graphs upon biomarker mechanism exploration in heart failure.

Submitted by Marie-Dominique.Devignes@loria.fr

Duration : One year (extendable)

Starting date : 29 July 2019.

City : Nancy, France

Laboratory : Loria (Laboratoire Lorrain de Recherche en Informatique et ses Applications), UMR7503 (CNRS-University of Lorraine and Inria)

Adress : Campus de la Faculté des Sciences et des Technologies, BP239, 54500 Vandoeuvre les Nancy, France

Contact Name : Devignes Marie-Dominique

Contact Email : marie-dominique.devignes@loria.fr

Application deadline : 30/06/2019

Announcement validity on the web site : 31/07 /2019

Context :

The Centre Hospitalier Regional Universitaire (CHRU) of Nancy supports collaborations with research organisms through Interface Contracts, during which permanent scientists come and work with clinicians to share their skills and contribute to research efforts with new analyses methods. These Interface Contracts benefit from associated post-doctoral fellowships.

This post-doc offer is associated with MD Devignes's interface contract. MD Devignes is a CNRS scientist at the LORIA, member of the Capsid team. The general context of her research is heterogeneous data integration and mining using knowledge-based methods and applied to biomedical data for decision support. In particular, this post-doc offer is part of the hospitalo-university research project FIGHT-HF in which a workpackage (coordinated by MD Devignes) is dedicated to complex networks analysis, in order to improve the classification and interpretation of various types of heart failure.

Job description :

The post-doctoral project concerns the analysis of complex interaction networks. The main ressource at our disposal is a huge heterogeneous graph database (provided by EdgeLeap for the FIGHT-HF program) that represents various types of interactions between various groups of elements : proteins, diseases, drugs, etc. One objective of the FIGHT-HF project is to exploit this ressource to identify new biomarkers characteristics of certain heart-failure mechanisms.

The queries on the main graph database most often return subgraphs such as the shortest paths between proteins or drugs of interest and a disease. In order to avoid manual inspection of all these subgraphs, some graph scoring should be defined in order to rank the subgraphs according to given points of view and to analyze first the most relevant ones. The graph scoring method should combine graph topological properties and any other properties attached as attributes to the graph nodes and edges, these latter properties being expressed in controlled vocabularies or ontologies.

Several graph scoring methods will be defined with the help of bioinformaticians, biostatisticiens et FIGHT-HF clinicians. The post-doctoral scientist will develop score calculation, and design and run evaluation studies, based for instance on already known biomarkers.

Expected Profile :

PhD thesis in Computer Science or Applied Mathematics dealing with complex graph analysis or mining.

Computer Science skills: relational database (ex : MySQL), graph-oriented databases (ex : Neo4J), knowledge bases, safety of information systems, programming languages (bash, python, R, php, java, others…), knowledge in statistics and in supervised or unsupervised classification/machine learning.

Some knowledge about biological databases, information retrieval and/or high-performance computing.

An experience in working in an inter-disciplinary environment related to health or biology will be appreciated.

Benefits :

- Gross monthly salary: from 2500 to 3000 euros depending on experience and qualifications.
- Health insurance is included in the gross salary.
- 45 days vacation per year
- There will be substantial financial support for conference travel and international outreach.
- Life in Nancy (France) is relatively cheap with a one-person flat available starting from 500 euros.

Application requirements: The candidate should send by e-mail :

– a motivation letter,

– a detailed CV

– the PhD thesis abstract, date of obtention and jury composition,

– the coordinates (e-mail and tel.) of one or two reference persons

to : Marie-Dominique.Devignes@loria.fr before June 30th, 2019.