Post-doctoral Fellowship -- Automatic Detection of Epileptic Seizures Using Brain Activity Data

Post-doctoral grand funded by FAPESP (current grand values in http://www.fapesp.br/3162)
Field of knowledge: Computer Engineering; Machine Learning
FAPESP process # 2013/07559-3
Project title: BRAINN - The Brazilian Institute of Neuroscience and Neurotechnology
Working topics: Supervised Learning; Feature Extraction; Pattern Classification
Number of places: 1
Starting date: March 15th 2019
Principal investigator: Fernando J. Von Zuben
Institution: School of Electrical and Computer Engineering (UNICAMP) – Campinas, SP – Brazil
Data of announcement: February 1st 2019
Deadline for submissions: February 22nd 2019
Address: Av. Albert Einstein, 400 – Campus Zeferino Vaz, Campinas – SP, Brazil
E-mail for proposal submission: vonzuben@dca.fee.unicamp.br
Please, use as e-mail subject: [POSTDOC – BRAINN: Detection of Epileptic Seizures]

Summary

The Laboratory of Bioinformatics and Bioinspired Computing (LBiC) of the School of Electrical and Computer Engineering - Unicamp is looking for a highly qualified candidate for a post-doctoral fellowship to work on the automatic detection of epileptic seizures using data analytics and machine learning techniques. The fellowship is granted by the Sao Paulo Research Foundation -- FAPESP for a period of 24 months, with exclusive dedication (40 hours per week). **The proposal submission deadline is February 22th 2019.**

Job Requirements and Primary Responsibilities

The selected candidate will work on the project entitled "BRAINN - The Brazilian Institute of Neuroscience and Neurotechnology", more specifically in the subproject "Multi-view multi-task learning methods to improve detection of epileptic seizures in multiple-patient datasets characterized by rare seizure events". This project aims at investigating the impact of methodologies with multiple tasks (multiple patients) and multiple views (multiple feature extractions) to improve the quality of detection of epileptic seizures dealing with cases of scarcity or absence of occurrences of epileptic seizure events in the recorded data.

Primary responsibilities include but are not limited to:
- Development of machine learning methodologies capable of improving the performance in the detection of epileptic seizures, aiming at becoming the state-of-the-art in the field when dealing with scarce data, multiple patients and multiple feature sets.
- Development and possible improvement of methodologies of feature extraction in EEG data, including the use of techniques of representation learning, usually associated with deep architectures in artificial neural networks.

- Involvement in task-forces devoted to managing, integrating, analyzing, and interpreting brain activity datasets, thus converting raw data into a more informative representation capable of helping decision making.
- Validation of the proposed solutions in clinical conditions.
- Production of high-impact technical and scientific papers, patents and prototypes with socioeconomic potential value.
- Active participation in the training of human resources in the research area.
- Composition of reports and documentations associated with the project.

Skills and experience

- Ph.D. in Electrical Engineering, Computer Engineering, Computer Science, Data Science, Statistics, or Applied Mathematics;
- Experience in advanced solutions for machine learning is required.
- Previous contact with medical datasets (mainly EEG), multitask learning, datasets with unbalanced data and multi-view learning is desirable but not mandatory.
- Testified ability to perform statistical or mathematical formulation and proficiency in solving optimization problems is required.
- Complete understanding of at least one computer language widely used in machine learning (e.g. Python, C, Matlab or R) is mandatory.
- Proficiency in statistical or mathematical formulation environments (e.g. Matlab, R, SciPy, Gurobi, Sklearn and CVXOPT) is desirable but not mandatory.

Personal skills

- Strong motivation to work independently and as part of a multidisciplinary team.
- Good skills in communication and in the establishment of partnerships with other research groups with common interests, including those composing CEPID / BRAINN.
- Proactive and leadership spirit.

Languages

Communication and writing skills in English are required;

How to apply

Submissions and questions should be directed to Fernando J. Von Zuben's e-mail: [vonzuben@dca.fee.unicamp.br]. Foreign applicants are welcome to apply.
Please, use [POSTDOC – BRAINN: Detection of Epileptic Seizures] as the subject of the e-mail and attach:
(1) Curriculum vitae.
(2) Names of two references with contact information.
(3) A two-page summary of past research and relevant qualifications.
(4) A link to a personal Web page, if available, where further information can be found.