

Post-doctoral researcher

Generalizing Deep Learning for Magnetic Resonance Image Analysis

Location:

Lausanne University Hospital (CHUV)
Centre de recherche en Radiologie
Rue Centrale 7, 4^{ème} étage
CH-1003 Lausanne, Switzerland

Starting/Duration:

As of April 2022, annual renewal

Machine learning and specifically **deep learning** techniques are promising tools in medical image analysis and they have demonstrated very good performances in many tasks, such as image segmentation. These techniques are though data demanding and as such they need large-scale cohorts, often multi-centric datasets. In this context, **Domain Adaptation** (DA) has recently raised strong interests in the medical imaging community as the **generalization of algorithms** to unseen data (domain shift), different input data domains (missing modalities) and the **uncertainty** of the networks output due to domain shift are still open problems. Nevertheless, all these aspects are crucial in order to translate AI models for medical image analysis methods to be evaluated in large-scale heterogenous imaging acquired in clinical practice.

In this context, we are looking for a full-time post-doctoral researcher to join the CIBM Signal Processing CHUV-UNIL section. The researcher will focus on domain adaptation, federated learning and other generalization solutions for AI-based reconstruction, segmentation and classification for Magnetic Resonance Imaging (MRI) analysis. This position aims also to investigate different aspects of explainable AI linked to domain shifts. The research will be conducted in the context of AI segmentation and classification models for assessment of advanced imaging biomarkers in Multiple Sclerosis.

The candidate will benefit from ongoing collaboration with multidisciplinary International Multiple Sclerosis Analysis Network (IMSANE) including many hospitals and research centers (in Switzerland, Belgium and United States) and from a rich research environment in MRI and signal processing provided by faculty and researchers of the CIBM founding institutions including, but not limited to, Prof. Matthias Stuber (CHUV, UNIL), Prof. François Lazeyras (HUG, UNIGE) Prof. Michael Unser (EPFL), Prof. Jean-Philippe Thiran (EPFL, CHUV, UNIL), and Prof. Dimitri Van de Ville (EPFL, UNIGE).

Your profile

- A PhD degree in engineering, electrical engineering, computer science, physics or related fields
- Strong background in image processing and deep learning techniques is a must, with published papers in key journals (TMI, MedIA, etc) and conferences in the field (MICCAI, MIDL, NEURIPS, CVPR, etc).
- Demonstrated previous experience in different aspects of domain adaptation in reconstruction/segmentation or classification problems is required.
- Experience in neuroimage analysis is a plus.
- You certify proficiency in programming (Python, PyTorch/Keras, Javascript, bash, etc)
- You are eager to supervise and transfer your knowledge to master and PhD students and promoting a collaborative environment within CIBM sections.
- You have excellent written and oral communication skills in English; French is a plus.
- Rigorous work habits, a curious and critical mind, and a good sense of initiative.
- A high-level perseverance and a strong personal commitment are expected.

Your responsibilities

- Conduct novel research at the intersection of machine learning and medical imaging (magnetic resonance imaging).
- Drive the development of advanced AI tools that provide robust and accurate measures of the biomarkers of interest in multiple sclerosis and explore other clinically relevant applications (eg. fetal brain MRI).
- Publish and present scientific results in international conferences, workshops, and journals.
- Participate in the supervision of Master's and Ph.D. students.

We offer

- A multidisciplinary project between cutting-edge brain imaging and advanced image processing, machine learning, and clinical applications.
- A dynamic, interdisciplinary, and international team of very motivated people.
- A stimulating working environment.
- Access to cutting-edge technology and state-of-the-art resources.

How to apply

Please send your CV, two references and a motivation letter to Dr. Meritxell Bach Cuadra (meritxell.bachcuadra@unil.ch).

About CIBM

The CIBM Center for Biomedical Imaging was founded in 2004 and is the result of a major research and teaching initiative of the partners in the Science-Vie-Société (SVS) project between the Ecole Polytechnique Fédérale de Lausanne (EPFL), the Université de Lausanne (UNIL), Université de Genève (UNIGE), the Hôpitaux Universitaires de Genève (HUG) and the Centre Hospitalier Universitaire Vaudois (CHUV), with the generous support from the Fondation Leenaards and Fondation Louis-Jeantet.

CIBM brings together highly qualified, diverse, complementary and multidisciplinary groups of people with common interest in biomedical imaging.

We welcome you in joining the CIBM Community.

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