Deep Learning for Medical Imaging Post Doc Open Position at the University of California, San Francisco (UCSF)

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Academic (PostDoc, Specialist)

The Musculoskeletal Quantitative Imaging Research Group at the University of California San Francisco is opening a position for a Postdoctoral Scholar to work in an emerging new area on Deep Learning techniques being applied to study joint degenerative diseases such as Osteoarthritis.

We are seeking to develop algorithms for advanced computer vision and machine learning for improving the usage of non-invasive imaging as diagnostic and prognostic tools. The Post Doc will develop analytics to model the complex interactions between morphological, biochemical and biomechanical aspects of the knee and hip joints as a whole. He/she will develop deep learning convolutional neural networks for musculoskeletal tissue segmentation and for the extraction of salient features from MRI and quantitative MRI for a comprehensive study of the joints. The ultimate goal will be to develop completely data-driven models which are able to extract imaging features and use them to identify risk factors and predict outcomes.

Dealing with signals such as speech, images, or video in 1D, 2D and 3D Euclidean domains, respectively, has been the main focus of research in deep learning for the past decade, and our group is a leading one in the translation of those techniques in the field of musculoskeletal imaging.

![Deep Learning for Medical Imaging](image)

Training on 39,093 x-rays. DenseNet models used for the ensemble learning for OA severity staging (KL grading):

| OA Classification | Training Confusion | OA Testing Classification | Test Confusion | AUC 0.801
|-------------------|--------------------|---------------------------|----------------|-----------
| 16253             | 475 17 4          | 252 917 4                 | 23 183 545 40 | 68.98%   |
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| 0 33 202          | 0 33 202          | 0 33 202                  | 0 33 202      | 85.95%   |

However, in the recent years, more and more fields have to deal with data residing on non-Euclidean geometric domains. In addition to conventional deep learning models applied to Image Euclidean space we will be developing novel graph-based approaches as topological data analysis and geometric non-euclidean deep learning approaches to analyze complex data structure. We are looking for a candidate with strong computational background and previous experience in Deep Learning applied to Medical Imaging. Engineering/Computer Science, Physics, Math or Statistics PhD. Proficient in Python and MATLAB programming and experienced in using Deep Learning Frameworks (TensorFlow, Pytorch etc).

Please send your CV and research interests to: valentina.pedoia@ucsf.edu