Postdoc position in machine learning and neuroimage analysis (University of Texas Southwestern Medical Center, Dallas USA)

Background: The laboratory of Albert Montillo (http://www.utsouthwestern.edu/labs/montillo) in the Bioinformatics Department at the UT Southwestern Medical Center is an interactive and collaborative team conducting cutting-edge research to advance the theory and application of machine learning for medical image analysis. We address unmet clinical needs by forming predictive models that make diagnoses and prognoses more precise and advance neuroscience by furthering the understanding of mechanisms in disease and intervention. Medical image analysis software the lab has developed include machine learning-based methods for labeling structures throughout the brain (parcellation), versions of which are used worldwide and FDA approved. The lab has built deep learning methods to label networks in resting state fMRI and detect artifacts in MEG. The lab has pioneered deep learning decision forests that increase prediction accuracy while reducing prediction time and outcome prediction methods using structural and functional connectomics. Building off these capabilities, we plan to develop novel modeling and outcome prediction tools for mental & neurodevelopmental disorders, and neurodegenerative diseases.

In the pursuit of this research, two postdoctoral positions are available in the Montillo lab. Applications are invited for a 2 to 3-year computational postdoctoral research position. The researchers will develop novel deep learning models to predict diagnoses and outcomes from patient data including imaging (fMRI, diffusion MRI, MEG/EEG, PET/SPECT) and corresponding genomic, metabolic and clinical data. Potential projects include theoretical or applied method development. Theoretical projects target the development of 1) improved visualization of network learned abstractions, and 2) streamlined network parameter optimization. Applied projects include advancing the state-of-the-art in methods for: 1) discovering image-based biomarkers, including advanced brain connectivity measures, and differentially expressed metabolic markers and genes for disease diagnosis, and treatment outcome prediction in mental & neurodevelopmental disorders and neurodegenerative diseases. And 2) optimizing non-invasive brain stimulation therapies.

Ideal applicants will have:

- Ph.D. degree in Computer Science, Electrical or Biomedical Engineering, or related field.
- Experience in medical image analysis algorithms including familiarity with at least 1 image data type: MRI, PET/SPECT, CT, MEG/EEG.
- Solid computational modeling skills and practical experience in machine learning in one or more of the following: deep learning: neural nets (RNN,CNN,DNN, UNet/VNet), DCGAN, deep RL, transfer learning, autoencoders; shallow learning: SVM, random forest, ensemble methods; probabilistic graphical models, RBM, GMM; optimization; image recognition & registration.
- Strong programming skills:
    - Solid understanding of CS data structures.
    - Experience in at least 1 ML Python library: Keras, scikit-learn, TensorFlow, PyTorch, Nilearn, PyMVPA.
    - Optional but helpful: Experience in C/C++ (ITK library), cMake
- At least 2 first author papers published and writing skills in English.

Salary compensation is very competitive and enhanced by the low cost of living in Dallas. Benefits include health insurance. The candidate will also benefit from membership in vibrant national and international research communities through our on-going collaborations with UCLA, UCSF, UPenn, Stanford, Philips and Siemens Research, as well as large local neuroscience communities through

UTSW's O'Donnell Brain Institute, and UTD's Centers for Vital Longevity, Brain Health, and Brain Performance. UTSW ranked in the Top 25 Best Places to Work for Postdocs (The Scientist).

Please apply by email to Dr. Montillo [Albert.Montillo@UTSouthwestern.edu] and include your CV, names and addresses of three references, statement of research accomplishments and future goals, preferably as one single PDF-document. Use the subject line "PostdocApplicant: <your name>".

The Montillo lab is co-located within the Bioinformatics Department on UT Southwestern's south campus and embedded in the Radiology Department on north campus. We are an integral part of the Advanced Imaging Research Center, and work closely with research groups within Neuroscience, Neurology, Psychiatry, Radiation Oncology, and Surgery. Lab members have access to extensive computational resources, including the >6,800-core cluster with >8 Petabyte of storage available through UTSW's high-performance infrastructure (https://portal.biohpc.swmed.edu). Members have access to multiple research-dedicated scanners (such as 7T and 3T MRI) and the opportunity to work on a range of image analysis, machine learning and modeling projects on interdisciplinary teams, and participate in all aspects of method development and data analysis with collaborators.

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