Seeds “You Choose” Award Application

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Abstract

Advances in human brain imaging data acquisition methodology and computing power have led to exponentially complex data analysis problems. In order to make sense of this new explosion of "big data", cognitive neuroscientists have turned to researchers in other fields with experience in analyzing extremely large data sets. In this context, computer scientists experienced in machine learning and multivariate pattern analysis have made tremendous contributions to neuroimaging analyses by offering new approaches to characterizing brain function. The current proposal seeks to fund the visit of a prominent machine learning expert to UM to foster interdisciplinary discussion and research between cognitive neuroscientists, engineers, and computer scientists in the UM community.

Activity Goals

This award will build on two current initiatives within the UM College of Arts and Sciences. The “Understanding the Brain” initiative has successfully hired a cluster of new faculty to work in the recently built dedicated fMRI research center in the Cox Neuroscience Annex. These researchers aspire to understand the relationship between brain function, behavior, and neuropsychiatric disorders such as autism and anxiety while the “Complexity Science” initiative aims to develop new methods of analyzing and extracting useful information from large data sets. The current proposal will capitalize on the recent hires of fMRI researchers by introducing them to new analytic approaches that will help their labs to extract useful information from extremely large fMRI data sets.

This will be accomplished by inviting a prominent computer scientist or engineer with expertise in applying machine learning to neuroimaging data to the UM campus. The visiting researcher will participate in a colloquium aimed at fostering interdisciplinary discussion between neuroimaging researchers and computer scientists in order to develop new data analytic methods relevant for sophisticated investigations using magnetic resonance imaging data. The visiting researcher will also participate in one-on-one discussions with neuroimaging investigators including faculty, post-docs, and graduate students in order to facilitate the application of new analytic methods into investigators' laboratories.

Ultimately, the goal of the proposal is to bring awareness to the new community of cognitive neuroscientists at UM and to foster interdisciplinary cooperation with computer scientists who are interested in applying “big data” analysis techniques to characterizing brain function. This will help to bridge the gap between cognitive neuroscience and computer science at UM and will also help to bring attention to both research areas and the UM community at large.
**Personal Goals**

As a second year post-doc at UM, I am continually seeking to increase my knowledge of fMRI analysis techniques in order to find better ways to characterize brain function in typical and atypical populations such as individuals with autism spectrum disorders (ASD). I am especially interested in using machine learning to identify brain characteristics that reliably differentiate between normal individuals and individuals with ASD. This SEEDS award will help to facilitate direct communication with a machine learning expert in order to increase my understanding of this promising new analytic approach.

**Budget and Budget Justification**

Flight for invited speaker: $500  
Speaker honorarium: $500  
Hotel stay for 3 nights at the Sonesta in Coconut Grove: $500  
Speaker dinner with six faculty and 6 post-docs/students: $1000  

The funding for the flight, honorarium, and hotel stay will be needed as incentives for the speaker to visit the UM campus and interact with faculty in cognitive neuroscience and computer science. The speaker dinner will help to facilitate more personal interactions between the invited speaker and the cognitive neuroscience laboratories. Below are names of several individuals who would be qualified to hold this workshop: