Review of: "Deep Learning Modeling for Prediction of Cognitive Task Related Features from Resting-state fMRI Data"

Ata Akin[1]

1 Acibadem University

It might be useful to explain the hypothesis that links resting brain connectivity to cognitive performance at the introduction. Why should we expect to see some sort of an indication of the resting brain connectivity and any cognitive performance. Since the primary function of the brain is to keep the body running, why should there be a cognition related connectivity at rest?

It would be nice if the equations has Equation numbers so that they can be referenced easily within the manuscript.

There could be a typo in the MSE equation. The subscript of the second "y" should be "i"

I could not follow what "y" variable stands for with respect to "x"

Was there any conversion of the correlation coefficients when the group-mean FC was estimated like R^2 of Fisher transformation, or were the raw FC matrices with correlation coefficients averaged?

The occlusion approach seems to be very innovative. It is I believe similar to finding the best features through a grid search approach (attribute search) yet on a more fundamental level. So I think the question that this method tries to answer is: What if we did not include the "following" time series in the analysis? This type of approach will eventually answer several questions: 1. Which channels are most important (hub determination), 2. How does FC change when a hub is removed

What do the The thickness of the lines in Figure 4 represent? Connectivity strength?

Overall this paper provides quite an innovative approach to rs-FC analysis which can be applied in other fields. The occlusion method can be generalized to provide a framework analysis very similar to "leave-one-out" approach to ML studies. The presence of any time series will effect the rest of the analysis that rely on relative strength of connectivity value. Hence this approach provide an answer to the "what if" question. It also has a relevance to stroke type of studies where actually no time series data can be captured from a region.

I still could not understand how the ML and deep learning approach helped the study. Could all this work be done without it? What added value did deep learning bring to this research? It would be entertaining to say a few words that "belittle" the abundant use of such techniques:)

The methodology was a bit difficult to follow for me. I thank the reviewers for providing the codes but still being a more MATLAB person I had difficulty deciphering the codes. Maybe some pointers within the manuscript can be added to point to the specific code lines for people like me.

Yet the main question still remains: why should be expect to see a correlation between resting state metrics and cognitive performance? And why should we work on this when we have the chance to collect data during cognitive activity?

Well, I have a quick answer to that: This type of approach can be useful in early childhood, dementia, MCI prediction, and perhaps early prediction of IQ and talents.