

MS Thesis Defense

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Title: *Mining the Mind: Data Mining Techniques and Their Application to the Study of Meditation*

Abstract

Over the last decade, meditation and its apparent long and short term effects on the brain have gained increased attention both in popular culture and the scientific literature. Many studies suggest that meditation could be an effective tool to treat depression, anxiety, and a variety of other neurological disorders. While meditation is routinely advocated to relieve stress and improve concentration, little progress has been made in understanding the actual brain state during meditation. In this thesis, we combine data mining techniques and the solution of the Magnetoencephalography (MEG) inverse problem using measurements from expert meditators to help answer two fundamental questions: Can we detect changes in the brain during mindfulness meditation and focused attention sessions that would support the claim that meditation changes the brain, and if so, can we identify brain regions that display significant changes during meditation? The research carried out for this thesis suggests that it is possible to distinguish the activation pattern of a meditating brain from that of a brain at rest, therefore positively answering the first question. Moreover, this thesis makes progress towards identifying the brain regions relevant to meditation, thus getting us closer to answering the second question.