Abstract

One of the key challenges in cognitive neuroscience is determining the mapping between neural activities and mental representations. The functional magnetic resonance imaging (fMRI) provides measure of brain activity in response to cognitive tasks and proved as one of the most effective tool in brain imaging and studying the brain activities. The complexities involved in fMRI classification are: high dimensionality of fMRI data, smaller size of the dataset, interindividual differences, and dependence on data acquisition techniques. The state-of-the-art machine learning techniques popularly used by neuroimaging community for variety of fMRI data analysis has created exciting possibilities to understand deeply the functioning of inner
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structure of the human brain. In this paper, we present an overview of different stages involved in cognitive state classification and focuses on different machine learning approaches, their worthiness, and potentiality in identifying brain states into pre-specified classes. The machine learning techniques ranges from conventional to recent hybrid techniques which have shown promising result in fMRI classification are discussed here. Further, this paper suggests direction for further research in this area by synergizing with other related fields.

References

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Index Terms
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