

# Adjacency Matrix representation for the Brain

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## Abstract

A recently developed semantic theory explains the relationship between knowledge and its representation in connectionist systems. The theory requires a mathematical model of the brain, i.e. a natural neural network. The goal of this project is to conceptualize and lay the groundwork for the development of an adjacency matrix representation of the human and rat brains. Recent data from neuroscience research has shown that the brain can be studied as a neural network that contains sub-networks, each of whose functionalities combine to become the knowledge representation capability of the entire network. We look at the brain in terms of modules and sub-modules, at varying levels of 'granularity'. While a network can be represented as an adjacency matrix, this hierarchical structure is captured by extending the notion of adjacency matrices into a layered set of matrices, with each layer corresponding to the adjacencies of a given 'granularity'. The report details how the brain sub-networks have been organized as modules and how the layered matrix has been implemented. Finally, a metaphoric visualization for the structure has been proposed.