BOLD5000, a public fMRI dataset

BOLD5000 is a large-scale publicly available dataset of practical study of human FMRI with 5000 real-world images as stimuli, which also accounts for image diversity and overlapping with standard computer vision datasets by incorporating images from the Scene Understanding (SUN), Common Objects in Context (COCO), and ImageNet datasets. As the different stimuli will create different neural signals in the visual cortex and this naturalness along with the large diversity of different stimuli with the neural representation of a wide range of visual features makes BOLD5000 an ideal dataset for the different parameters and with computational models to analyze different stimuli along with correlation in the visual cortex.

DNN BRAIN

DNNBrain is a unifying toolbox to integrate DNN software packages and well-established brain mapping tools for exploring the internal representations of DNNs along with Brains with the Integration of DNN software package and well-established brain imaging tools. Which includes extracting DNN activation, probing, and visualizing DNN representations, and mapping DNN representations onto the brain.

By assembling diverse stimuli, artificial activity data, and biological neural activity data together with custom-designed auxiliary IO files, and using DNNBrain allows users to easily characterize, compare, and visualize representations of DNNs and brains.
The toolbox consist of four modules:

No.	Modules	Works and properties
1.	IO module	Provides facilities for managing file-related input and output operations.
2.	Base module	Defines the base-level classes for array computing and data transforming.

3.	Models module	holds a variety of DNN models.
4.	Algorithm module	defines various algorithms for exploring DNNs and the brain.

The primary aim of DNNBrain is to provide a framework that on implementation provides internal representations of DNNs and brains with similarities between them. For this DNNBrain integrates a diverse range of tools such as encoding/decoding models to reveal stimuli or behavioral relevance of the representations, along with mapping DNNs representations to those of brains, representational similarity analysis (RSA) between DNNs and brains, visualizing DNN representation. This transferred learning will accelerate scientific research by both applying DNNs to model biological neural systems and utilizing paradigms of cognitive neuroscience to unveil the black box of DNNs.