

MVPA

Multivariate Pattern Analysis aka multivoxel pattern analysis aka SVM (Support Vector Machine), aka classifier

A widely used method in neuroscience

fMRI EEG MEG Single-cell recordings Etc., etc.

Analysis of multiple dependent variables (brain signals) simultaneously

First MVPA paper

Haxby et al., Science 2001

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Haxby et al., Science 2001

First SVM paper(s): year 2005

Main principle: 2D

<https://eight2late.wordpress.com/2017/02/07/a-gentle-introduction-to-support-vector-machines-using-r/>

Electrode 2 Voxel 2 Time point 2 Neuron 2

Electrode 1 Voxel 1 Time point 1 Neuron 1

Main principle

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Main principle

https://en.wikipedia.org/wiki/Support-vector_machine

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Simplified example

After multiple trials, a classifier learns the differences in neural activity between the face and the vase trials:

Every time a new trial (the one it did not learn from) is presented, a classifier makes a binary decision about the trial type based on what it previously learned:

The classifier categorizes this as a face trial, and the researcher compares it against ground truth (actual subject's response). If this procedure is repeated many times, you can determine classifier accuracy and compare it with chance level (50%) in our case

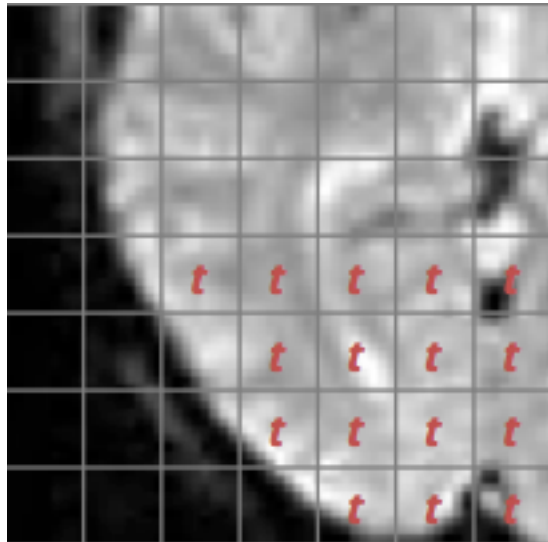


Figure 1: Slide Image

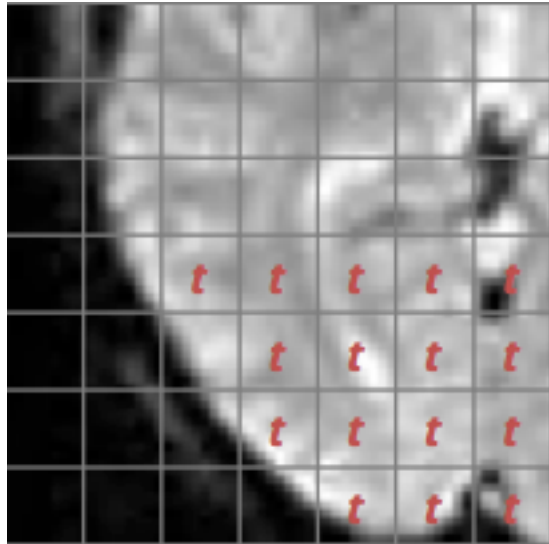


Figure 2: Slide Image