Content-based fMRI activation maps retrieval

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Summary

1. **Statistical analysis** of fMRI data is used to locate brain activity and generate **brain activation maps**
2. **CB-fMRI** activation maps retrieval **return activation maps** that have similar activation patterns to the given one

Introduction

- **Functional Magnetic Resonance Imaging (fMRI)**
  - To study brain response to tasks
  - Non-invasive
  - Detect **signal changes** in areas of the **brain** where neuronal activity is varying
  - Brain activation statistical maps show brain activity
- **Content-based (CB-) fMRI retrieval**
  - To manage **neuroimaging data sharing**
  - To **retrieve** studies relevant to a «query» **brain activation map**

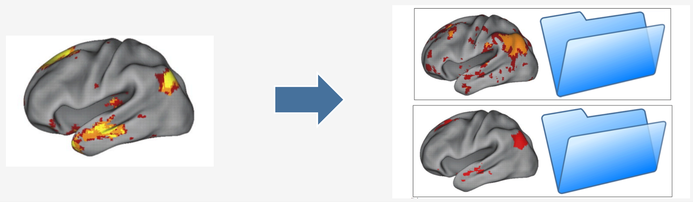


Image collection

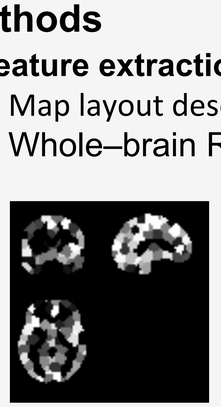
- 8 experiments: morality, recall, romantic, visual, study, house, recallFree, auditory
- 359 subjects in total
- 10 Probabilistic Independent Component Analysis (PICA) components per subject

Conclusions

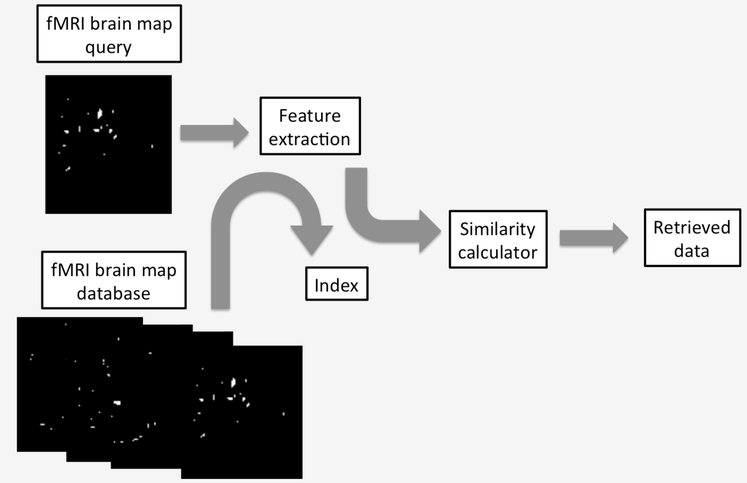
- This poster presents a **novel method** for **fMRI brain activation map retrieval**
- It is **difficult** to **assess** when a fMRI brain activation map is relevant for a given query, therefore the evaluation method has limitations
- The results are promising but there is a big difference between experiments

Methods

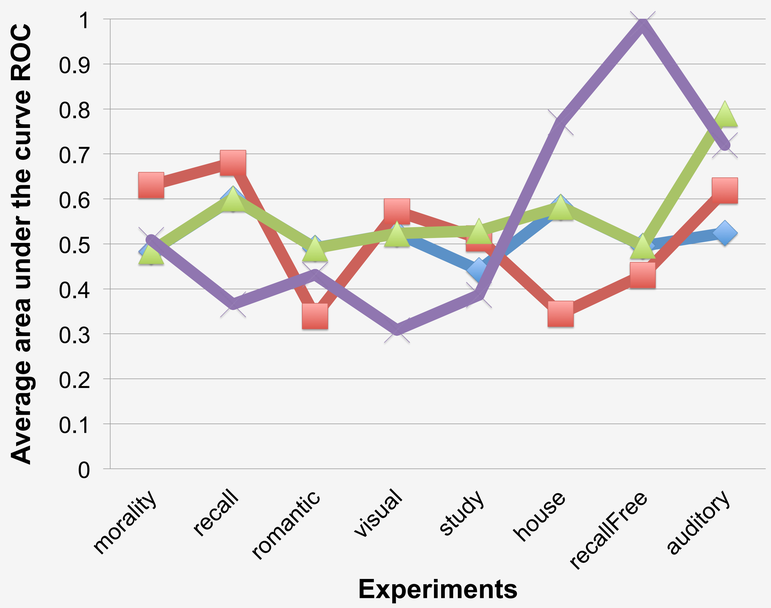
- **Feature extraction**
  - Map layout descriptor
  - Whole–brain ROI–wise



- **Similarity comparison**
  - Euclidean distance
  - Histogram intersection (HI)



Results



- **Evaluation**
  - A retrieved brain map is relevant to a query if they both belong to the same experiment
  - Runs combine features and similarity measures

MapLayout_Euclidean
MapLayout_HI
ROI–Wise_Euclidean
ROI–Wise_HI

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