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Towards Universal Cross-View Brain Decoding

ABSTRACT

- How brain represents the meaning of linguistic stimuli with multiple views is still one of the open questions in neuroscience.
- Does a word(e.g.,***apartment***) appeared in multiple views("***apartment* as word + picture**" vs "***apartment* in a sentence**" vs "***apartment* as in its word cloud with semantically related words**") always have the same representation, or the representation is altered based on each view in the brain?
- Which of the views have richer source of information to decode the linguistic stimuli?

OBJECTIVE

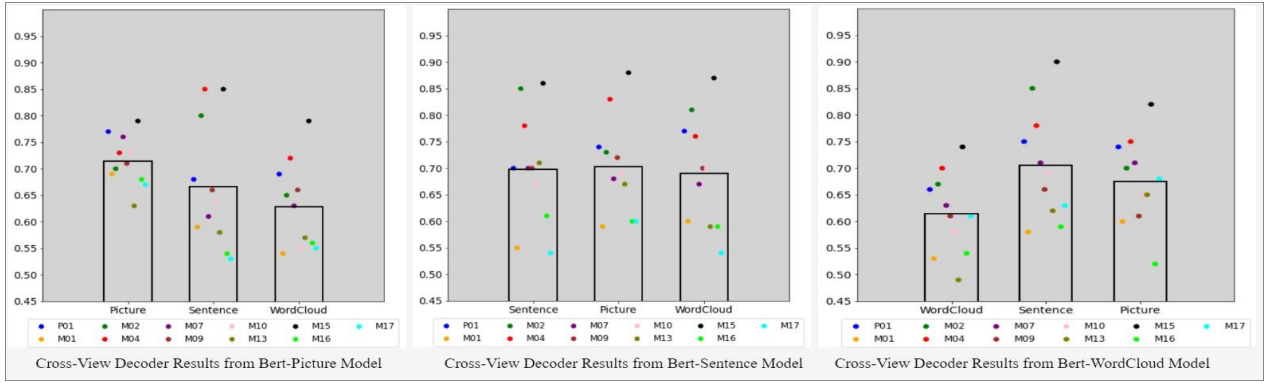
- We propose a cross-view decoder model to associate with brain activations of one view to decode the linguistic stimuli of other views.
- Identify which brain networks contribute in the decoding task and how their contribution varies with views.

METHOD

- We trained a Ridge Regression model on brain activation patterns evoked by 180 individual words and corresponding semantic vectors for one view and tested on brain activation patterns evoked same individual words but from other two views(dataset).

RESULTS

- We find that pictures model is good at decoding the sentence view and sentence view model is able to perform well on word cloud.
- It is also noticed that voxels from visual network contribute the most for the picture view and voxels from Language and DMN network contribute to a great extent for Sentence view.
- The decoding results for cross-view decoder are shown in the plots.



Cross-View Decoder Results from Bert-Picture Model | Cross-View Decoder Results from Bert-Sentence Model | Cross-View Decoder Results from Bert-WordCloud Model

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