A PROBABILISTIC TEMPORAL CONTEXT MODEL FOR TRACKING MENTAL CONTEXT USING NEURAL AND BEHAVIORAL DATA

INTRODUCTION

Despite developing sophisticated behavioral models, memory researchers are struggling to understand the neural underpinnings of episodic memory.

Renegade “computer scientists” work feverishly to develop machine learners to quickly & efficiently process huge text corpora.

Meanwhile in a windowless office hidden deep within the bowels of Princeton...

I can understand lag-crfps and spcs, but what’s happening in the brain?!

TOPICS; each mixture of words in the vocabulary; each document as a distribution of topics.

E Voxel noise parameter
Y Brain image during trial t
W Source j’s weight during trial t
C Source j’s center location
T Number of trials
J Number of sources
K Number of topics

Each TOPIC is a latent distribution over words in the Vocabulary, each word assigned to a distribution of

Latent Dirichlet Allocation

Decoder: Life’s New Neural Computation

The unstoppable brain-blob grows in statistical power; its thirst for evil knows no evidence lower bounds!

I observe everything; no variable remains hidden to me. Infinite power is mine—mwhahahaha!

The amazing “Context Tracker”

The context tracker provides a moment-by-moment estimate of the state of mental context during an experiment.

This allows researchers to measure how context drifts in response to each presented stimulus, and to observe how mental context behaves just prior to recall.

We can use this framework to resolve ambiguities in the behavioral data and to study the neural bases of context and episodic memory.

References & Acknowledgements

Next Year...

If one could somehow harness the power of the flux context-tracker...

The HOLY GRAIL

Bugs initialization

The amazing “context tracker”

Temporal Context Model - Topographic Latent Source Analysis: TCM-TLSA

Topographic Latent Source Analysis: TCM-TLSA

Temporal Context Model

The Unstoppable brain-blob grows in [statistical] power; its thirst for evil knows no [evidence lower] bounds!

Temporal Context Model

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