Dynocog

A cognitive science research unit focused on the application of advanced statistical & deep learning methodology to deconvolve human cognition.

On the Variation in Cognitive Performance, Learning & Attention.

A Bayesian Reinforcement Learning Paradigm to Capture the Variation across Cognitive Executive Functions.

Team of experts

Dr Jonathan Shock	Deep Reinforcement Learning
Dr Ben Cowley	Neuropsychology
Dr Allan Clark	Bayesian Statistics
Zach Wolpe	Statistical/Machine Learning

Experimental Design

We've selected a task battery of neuropsychological experiements, chosen to measure the interaction between executive functions.

Task battery selected:

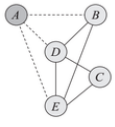
- Wisconsin card sorting task
- Navon task
- Corsi block task
- N-back task
- Fitts task

Machine Learning Paradigm

The appropriate model constitutes a mutlitude of advanced statistical idea. Reinforcement learning is utilised to mimic human value approximation; A graphical model structure is leveraged to understand the dependency between covariates; & Hierarchical Bayesian methods are used to capture variation across individuals.

Implementation

The experiments are implemented through PsyToolkit, & the machine learning instance is developed in Python: heavily dependent on Pyro (probabilistic inference) & PyTorch (gradient based optimisation).



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