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## Group Members

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## Group Name

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- UniversalApproximator

## Proposal

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- Scientific question: What form does the brain encode top-down feedback in, and how can we characterize the complexity added by feedback in representation level?
- Brief scientific background: Top-down feedback is a common mechanism in our brain. In a task-specific level, in order to implement this feedback, our brain should express the feedback in the representation form. So the feedback should increase the representational complexity in different brain area. We want to characterize this increased representational complexity.
- Proposed analyses: we have two possible approaches: 1) Train biologically plausible recurrent neural networks for cognitive tasks (HF Song et al. 2016, GR Yang et al. 2019, NY Masse et al. 2019, GR Yang & XJ Wang 2020). Then add top-down feedback to analyze the difference of connectivity, performance, representation dissimilarity matrix generated by feedback. 2) Given some tasks, compare neural network model with or without feedback and brain in terms of behavior and activity dynamics in representation level (Kriegeskorte 2015, Kriegeskorte & Diedrichsen 2016, Yamins & DiCarlo 2016, Paninski & Cunningham 2017).
- Predictions: Feedback should add some complexity in representational level, change representation dissimilarity matrix.
- Dataset: ImageNet, HCP.