Multi-scale Neural Computations and Exploitation/exploration in Human Behaviors

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What is the unique nature of information processing in the human brain? Importance of this question is growing given the recent developments of AI and Machine Learning technologies. Is there still some kind of computations beyond the reach of artificial systems? There seem not be a simple answer to this difficult question. One place to look for the answer might be neuroscience. In neuroscience, the ideas from artificial systems have had large influence in its research endeavor. In more recent studies, however, there are reports of deviations or "anomaly" to such frameworks of artificial systems. In this review, I would like to explain my own studies about the "anomalies" in decision neuroscience. The observed phenomena include history-dependent biases in decision making and learning and long-term predictive decisions in the experimental paradigms of foraging decisions, which mimic the situations of foraging behavior of animals in the wild. By integrating these findings with relevant literature, I would like to propose that computations in the human and animal brains proceed in both local and global scales in time and space. I will discuss the relationship between these "meta"-scale computations and exploitation/exploration in human and animal behaviors

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