EMERGENTISM, ECOSYSTEM, AND EXPERTISE

THEORY OF HUMAN LANGUAGE PROCESSING IN THE ERA OF LARGE LANGUAGE MODELS

17 Sep. 2024 (EDT, GMT-4)
9: 00 am
Zoom
Registration:
https://forms.gle/m5cEgyRaQ3vCez7B9

Prof. Roger Levy

Professor, Department of Brain and Cognitive Sciences,
Massachusetts Institute of Technology

Roger Levy is a professor in the Department of Brain and Cognitive Sciences at the Massachusetts Institute of Technology. His research focuses on theoretical and applied questions in the processing and acquisition of natural language. Linguistic communication involves the resolution of uncertainty over a potentially unbounded set of possible signals and meanings. Professor Levy explores how a fixed set of knowledge and resources can be deployed to manage this uncertainty and how this knowledge is acquired. To address these questions, he combines computational modeling, psycholinguistic experimentation, and analysis of large naturalistic language datasets. His work furthers our understanding of the cognitive underpinnings of language processing and acquisition, and helps design models and algorithms that enable machines to process human language.

ABSTRACT

The question of how human language produce, comprehend, and learn language poses deep scientific challenges in accounting for the capabilities of the human mind. This talk has two goals. First, I review a body of state-of-the-art theory of human language processing as rational, expectation-based probabilistic inference and goal-directed action, covering three closely related proposals I've worked on for many years: surprisal theory, noisy-channel language processing, and Uniform Information Density. Second, I describe how this body of theory can be connected with the spectacularly successful large language model (LLM) technology that has emerged in the past few years. I show how we can use the theory of human language processing to gain insights into the strengths and weaknesses of LLM linguistic capabilities, and also how we can use LLMs as tools within expectation-based theory to deepen our understanding of how humans process language. Looking forward, I will argue that the technological advances offered by LLMs, together with ongoing improvements in data availability, analyses techniques, and open science practices position our field ideally for increasingly rapid advances in our foundational understanding of human language processing, ultimately shedding greater light on the fundamental workings of the human mind.

For this lecture of the **Emergentism, Ecosystem, and Expertise Talk Series**, the Discussants will be the series organizers: Catherine Caldwell-Harris, Arturo Hernandez, Ping Li, and Brian Macwhinney

*Information on upcoming talks in this series can be found at https://psyling.talkbank.org/E*3.*