Linguistics and Asian/ Middle Eastern Languages 47TH ANNUAL COLLOQUIUM

Friday, April 26, 2024

Room SH-119

12:30 PM Student Presentations
1:45 PM Keynote Speaker
3:00 PM Reception on the Patio

LEARNING LANGUAGE WITH FIWGAN

There are many ways to model language -- with rules, exemplars, finite state machines, or Bayesian approaches. In this talk, I propose a way to model language in a fully unsupervised way from raw speech: as a dependency between latent space and generated data in generative AI models called GANs. I argue that such modeling has implications both for the understanding of language acquisition and for the understanding of how deep neural networks learn internal representations. I propose an extension of the GAN architecture (fiwGAN) in which meaningful linguistic properties emerge from two networks learning to exchange information. FiwGAN captures the perception-production loop of human speech and, unlike most other deep learning architectures, has traces of communicative intent. I further propose a technique to identify latent variables in deep convolutional networks that represent linguistically meaningful units in a causal, disentangled, and interpretable way. We can thus uncover symbolic-like representations at the phonetic, phonological, syntactic and lexical semantic levels, analyze how learning biases in GANs match human learning biases in behavioral experiments, how speech processing in the brain compares to intermediate representations in deep neural networks, and what GANs' innovative outputs can teach us about productivity in human language.

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Gasper Begus is an Assistant Professor at the Department of Linguistics at UC Berkeley where he directs the Berkeley Speech and Computation Lab. He is also the Linguistics Lead at Project CETI and a Member of Berkeley's Institute of Cognitive and Brain Sciences. Previously, he was an Assistant Professor at the University of Washington. Before that, he graduated with a Ph.D. from Harvard. His research focuses on developing deep learning models for speech data. Gasper combines machine learning and statistical models with neuroimaging and behavioral experiments to better understand how deep neural networks learn internal representations and how humans learn to speak.

Annual Colloquium

Our annual colloquium is a series of talks from students, faculty, and invited guest speakers. It provides an opportunity for students to present their original research and to learn about current work in the various subfields of linguistics.

This event is sponsored by the Department of Linguistics and Asian/Middle Eastern Languages and is supported by the College of Arts & Letters Instructionally Related Activities Fund.

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