2025 SHOT Open Panel Proposal

Learning, Limits, Logic: Epistemological Tensions in the History of Machine Learning

Abstract

This panel explores the epistemological tensions embedded in the notion of *learning* within the history of machine learning (ML), tracing these tensions from early cybernetics to contemporary artificial intelligence (AI). The session interrogates the limits of formal logic in computational systems and the recurring paradoxes that arise when learning is constrained by rigid logical frameworks. How have these tensions, which once defined the aspirations of cybernetics, shaped the development of ML technologies? This inquiry also considers the broader cultural and political implications of learning within AI systems, particularly in light of the technocratic promises of self-revision and "adaptive resilience" (Halpern and Mitchell) in modern ML. Further, the panel examines the ethical dimensions of AI and the future of learning, questioning the capacity of AI systems to transcend their own limitations and whether true learning is possible within computational frameworks.

This panel seeks to critically engage with the intellectual genealogies of ML while reflecting on how past challenges continue to shape the field's present and future. We invite papers that grapple with these enduring paradoxes in ML history, including (but not limited to) the following themes:

- The limits of formal logic in computational systems and the tensions between machine learning and human cognition
- The cultural and political ramifications of learning models in AI, including issues of control, governance, and power dynamics
- Ethical considerations surrounding AI's role in learning and its potential future trajectory
- Historical and contemporary critiques of learning systems, from early cybernetics to today's AI technologies

Session Organizer:
Won Jeon
University of California, Santa Cruz
wojeon@ucsc.edu