Conceptual Abstraction and Analogy in Natural and Artificial Intelligence

AAAI Fall Symposium, November 13-14, 2020

Agenda

Friday November 13
All times are EST

10:45am Welcome to the symposium, logistics

11:00am *Organizer talk:* Melanie Mitchell, Santa Fe Institute, Abstraction and Analogy in Natural and Artificial Intelligence

11:30am *Organizer talk:* François Chollet, Google, Abstraction & reasoning: What Deep Learning Can Do, What It Can't, and What We Can Try Next

12:00pm 15 min break

12:15pm *Invited talk:* Felix Hill, Google DeepMind, Grounded Language Learning and a Developmental Pathway to Human-Like Intelligence in Machines

1:00pm *Invited talk:* Yejin Choi, University of Washington and Allen Institute for AI, On Abstraction and Analogy in Neuro-Symbolic Commonsense Models

1:45pm 15 min break

2:00pm *Contributed talks:*
> Fluid and Flexible: Investigating Human Patterns of Novel Rule Induction in Abstraction Reasoning Tasks (Aysja Johnson, Wai Keen Vong, Todd Gureckis, and Brenden Lake)
>
> Vector Symbolic Visual Analogies (Navneedh Maudgalya, Bruno Olshausen, and Spencer Kent)
>
> Understanding Analogy and Abstraction through the Lens of Relational Generalization (Ruairidh Battleday and Tom Griffiths)

3:15pm *Poster session 1*
> Concept Grounding of ARC with Iterated Human Communications (Sam Acquaviva, Yewen Pu, Catherine Wong, M.H. Tessler, and Maxwell Nye)
>
> Modular Identity Detectors for Relational Learning and Universal Generalization in Neural Networks (Kenneth Kurtz)
>
> Neural Analogical Matching (Maxwell Crouse)

Concreteness and Specificity for AI (Marianna Bolognesi and Tommaso Caselli)

Autonomous Navigation, Freespace, and Behavioral Priors in Unknown Worlds (Susan Epstein, Raj Korpan)

Enhancing Distant Analogical Retrieval via Generating Abstract Redescriptions of the Target (Veronica D'Angelo and Máximo Trench)

Assessment of Analogical Abilities Through Close Variations (Prashanth Thattai Ravikumar)

4:30pm 15 min break

4:45pm *Invited talk*: Alison Gopnik, UC Berkeley, Wizards in Wonderland: Learning and Reasoning about Novel Abstract Causal Relations,

5:30pm *Invited talk*: Josh Bongard, University of Vermont, Which Body is Best for Language Grounding?

6:15pm Adjourn

Saturday November 14
All times are EST

11:00am *Organizer talk:* Kevin Ellis, MIT and Cornell, DreamCoder: Growing Generalizable, Interpretable Knowledge with Wake-Sleep Bayesian Program Learning

11:30am *Contributed talks:*

Leveraging Natural Language for Program Search and Abstraction Learning (Catherine Wong, Kevin Ellis, Jacob Andreas, and Joshua Tenenbaum)

Inventing Abstractions by Refactoring Knowledge (Sebastijan Dumancic and Andrew Cropper)

12:20pm 10 min break

12:30pm *Invited talk*: Liz Spelke, Harvard, The Original Blessing of Abstraction

1:15pm *Invited talk*: Noah Goodman, Stanford, The Slow Route to Abstraction: Generic Language and Cultural Knowledge Transmission

2:00pm 15 min break

2:15pm *Contributed talks:*

[The Value of a Rationalist Approach in AI](#) (Antonio Norelli, Luca Moschella, Simone Melzi, Giorgio Mariani, Marco Fumero, Arianna Rampini, Michele Mancusi, Luca Cosmo and Emanuele Rodolà)

[Analogy and the Continuum of Knowledge Hypothesis](#) (Kenneth Forbus)

[Representing Abstract Semantic Relations in Minds, Brains, and Machines](#) (Hongjing Lu, Nicholas Ichien, and Keith Holyoak)

3:30pm *Poster session 2*

[Learning a Deep Generative Model like a Program](#) (Eli Sennesh)

[Improving Reasoning and Systematicity with System 2](#) (Maxwell Nye, Joshua Tenenbaum, and Brenden Lake)

[Automating Abstraction: Semi-Supervised Concept Discovery](#) (Jeremy Nixon, Jeremih Liu and David Berthelot)

[Evaluating the Compositionality Gap in Productive Concept Learning](#) (Ramakrishna Vedantam, Arthur Szlam, Maximilian Nickel, Ari Morcos, and Brenden Lake)

[Semantic Factors That Promote Conceptual Abstraction: Evidence from Psycholinguistic Studies on Metaphor Comprehension](#) (Hamad Al-Azary and Albert Katz)

[Automatic Schematization of Biological Mechanisms Via Alignment and Abstraction of Causal Relations Among Domain Specific Causal Pathways](#) (Harrison Pielke-Lombardo)

4:45 pm 15 min break

5:00pm *Panel discussion*

5:45pm Adjourn