Semantics at Scale and the Duality of Language Understanding

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Truth-Conditional Semantics

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$$\mathbb{P}(t \mid s)$$

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- Also need:
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  - Not tractable!

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Amortised Variational Inference

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  - $\mathbb{P}(s \mid t)$ inference model
- Grudging realisation:
  - Not just a computational trick, but rather semantically fundamental

Duality of Language Understanding

- $\mathbb{P}(t \mid s)$ truth-conditional semantics
- $\mathbb{P}(s \mid t)$ “world-inferential” semantics

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- We also need: “Semantics with no treatment of world inference is not semantics”

Proposal

- Technical side:
  - $\mathbb{P}(t|s)$ and $\mathbb{P}(s|t)$ on equal footing: each performs approximate inference for the other
    (cf. Jámbor and Huszár, 2021: `inference.vc/beta-vae`)

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- Linguistic side:
  - Use a dual model to explain semantic/pragmatic phenomena

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- Erk: “habitual listener” (vs. “literal listener”)

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- Reframe the problem:
  - How do context-dependent world inference and context-independent truth conditions interact?

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- $\mathbb{P}(t|s)$: can you recognise a lowercase G?
- Alignment between $\mathbb{P}(s|t)$ and $\mathbb{P}(t|s)$ cannot be perfect

Summary

- Semantics at scale: need duality
- Potential for new insights
  (and hopefully funding, too)