Natural Language Inference: Overview

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CS224u: Natural language understanding

Associated materials

1. Code
   a. `nli.py`
   b. `nli_01_task_and_data.ipynb`
   c. `nli_02_models.ipynb`

2. Homework and bakeoff: `hw_wordentail.ipynb`

3. Core readings: Bowman et al. 2015; Williams et al. 2018; Nie et al. 2019; Rocktäschel et al. 2016

4. Auxiliary readings: Goldberg 2015; Dagan et al. 2006; MacCartney and Manning 2008; Gururangan et al. 2018

Simple examples

Premise	Relation	Hypothesis
A turtle danced.	entails	A turtle moved.
turtle	contradicts	linguist
Every reptile danced.	neutral	A turtle ate.
Some turtles walk.	contradicts	No turtles move.
James Byron Dean refused to move without blue jeans.	entails	James Dean didn't dance without pants.
Mitsubishi Motors Corp's new vehicle sales in the US fell 46 percent in June.	contradicts	Mitsubishi's sales rose 46 percent.
Acme Corporation reported that its CEO resigned.	entails	Acme's CEO resigned.

NLI task formulation

Does the premise justify an inference to the hypothesis?

- Commonsense reasoning, rather than strict logic.
- Focus on local inference steps, rather than long deductive chains.
- Emphasis on variability of linguistic expression.

Perspectives

- Zaenen et al. (2005): Local textual inference: can it be defined or circumscribed?
- Manning (2006): Local textual inference: it's hard to circumscribe, but you know it when you see it – and NLP needs it.
- Crouch et al. (2006): Circumscribing is not excluding: a reply to Manning.

Connections to other tasks

Dagan et al. (2006)

It seems that major inferences, as needed by multiple applications, can indeed be cast in terms of textual entailment.

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Consequently, we hypothesize that textual entailment recognition is a suitable generic task for evaluating and comparing applied semantic inference models. Eventually, such efforts can promote the development of entailment recognition "engines" which may provide useful generic modules across applications.
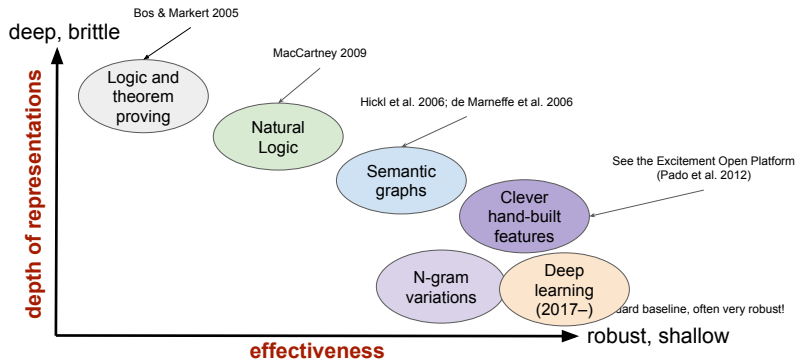
Connections to other tasks

Task	NLI framing
Paraphrase	text $\equiv$ paraphrase
Summarization	text $\sqsubset$ summary
Information retrieval	query $\sqsupset$ document
Question answering	question $\sqsupset$ answer
	Who left? $\Rightarrow$ Someone left
	Someone left $\sqsupset$ Sandy left

Models for NLI
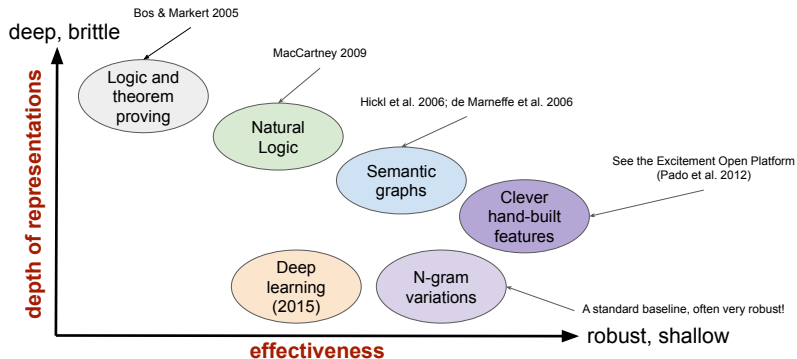
Models for NLI

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