Statistical Script Learning with Recurrent Neural Networks

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Simplifying Events to Make Event Co-occurrence Learnable

• Scripts [Schank & Abelson 1975] are an influential early encoding of situation-specific world event

![Scripts](https://example.com/scripts.png)

• In order to learn scripts automatically from data, one must simplify events:
  - [Chambers & Jurafsky 2008]: (verb, dependency) pairs (e.g. (receive, subject))
  - [Pichotta & Mooney 2014]: n-ary verb-with-arguments relations (e.g. (receive, X, Y))
  - Build statistical models of event co-occurrence from large corpus of documents.

RNN Event Co-occurrence Models

[Pichotta & Mooney 2016a]

• Use an LSTM sequence model to model sequences of events in text.

• To infer events, input document events and use beam search over next event’s components.

• Evaluate using a cloze test: hold an event out and try to infer it, given other events.

Systems:
- Unigram: Always guess most common events.
- Bigram: Smoothed event-level bigram Language Model
- LSTM: RNN event sequence model.

![RNN Event Co-occurrence Models](https://example.com/rnn_models.png)

Modeling and Predicting Raw Text

[Pichotta & Mooney 2016b]

• What if we simply use raw text as our representation?

• Use the skip-thought approach [Kiros et al. 2015]: sentence-level encoder/decoder of raw text sequences.

• Train LSTM sequence-to-sequence model to decode whole sentences.

• Predict text, parse into events.

• No parser needed.

• Can evaluate on ability to predict either events (accuracy) or raw text (BLEU).

Future Work

• The competitiveness of the raw-text models indicates we should investigate other extrinsic evaluations.

• Modeling event sequences in documents and in the world are different tasks.

• How to enrich event representation?

• How to enrich co-occurrence structure?

References


