Entity Structure Within and Throughout: 
Modeling Mention Dependencies for Document-Level Relation Extraction

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Introduction

- Entities, as the essential elements in relation extraction tasks, exhibit certain structure. We formulate such structure as distinctive dependencies between mention pairs, and propose SSAN to incorporate them within the standard self-attention mechanism and throughout the overall encoding stage.
- Specifically, we design two alternative transformation modules inside each self-attention building block to produce attentive biases so as to adaptively regularize its attention flow.
- We achieve new state-of-the-art results on three popular document-level relation extraction datasets and the visualization shows how entity structure guides the model for better relation extraction.

Motivating Example

Various dependencies indicate rich interactions among entity mentions, and thereby provide informative priors for relation extraction, e.g.:
- Blue line: reside in the same sentence and depend on local context
- Red line: coreference to each other
- Green line: no direct connection, but might be associated via multiple hops

Approach

How to formulate the structure of entities?

- Co-occurrence structure distinguishes intra-sentential interactions that depend on local context from inter-sentential ones that require cross sentence reasoning.
- Coreference structure distinguishes coreferential mention pairs from related (under the schema) mention pairs

Results

Ablation

Visualization of produced structural biases w.r.t. each dependency in each layer

Dependency

Intra-coref
Intra-coref
Intra-relate
Intra-relate
Intra-NIE

How to model entity structure?

- Vanilla self-attention
- Biaffine Transformation
- Decomposed Linear Transformation

Ablation on entity structure formulation
Ablation on Transformation modules

CDR & GDA

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