**NEURAL MODEL FOR CONTEXTUAL NAMED ENTITY RETRIEVAL**

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### MOTIVATION

- Entity set expansion depends on both exemplar entity and context.
- Explanation of the retrieved entities helps understanding relevance.

The Florida election recount of 2000 was a period of vote recounting in Florida that occurred during the weeks after Election Day in the 2000 United States presidential election between George W. Bush and Al Gore.

The last presidential candidate who lost an election despite winning the popular vote was Al Gore, and the similarities between them are candidates were always clear. Intellectual introverts unable to connect emotionally with voters. Hillary Clinton AI Gore

### ARCHITECTURE

**Entity similarity**

- $w_e = 32 \times 1$
- $b_e: 32$

**Context similarity**

- $w_c = 32 \times 1$
- $b_c: 32$

**Hidden layer 3 (32):** $h_3$

- $w_e: 64 \times 32$
- $b_e: 64$

**Hidden layer 2 (64):** $h_2$

- $w_c: 256 \times 64$
- $b_c: 256$

**Hidden layer 1 (256):** $h_1$

- $w_f = 1200 \times 256$
- $b_f: 1200$

**Concatenated embedding vector**

E_q C_q E_i C_i

### METHODOLOGY AND EVALUATION

- The dataset consists of a collection of sentences with topically annotated entities. Entities that are the answers to the same list question are grouped together. We randomly pick one query sentence and retrieve other sentences that contain entities similar to the entities of the query sentence.
- MTL takes into account both entity similarity context similarity.
- We applied weak supervision for sentence similarity (Less accuracy may be desired!).
- We trained a Siamese LSTM on SNLI (Stanford) dataset and used that network as a weak supervisor (79% accuracy on validation).
- We have used Fasttext Embedding (Facebook Research): Skipgram model, minimum word count = 5, dimension = 300, number of embedded words = 507,865.
- **Evaluation:** A sentence is relevant if it contains a similar or topically bound entity with respect to the query entity. We pick 10 sentences from 2000 candidate sentences and compute recall@10. We use mean average precision for measuring ranking quality.

### RESULTS

- **Ranking scheme:** $E_i \prec E_j \leftrightarrow \text{SimScore}(E_q, E_i) > \text{SimScore}(E_q, E_j)$

### DATASET & BASELINE

**Dataset:** TREC # 2005 & 2006 List QA

(Train: 268200, Val: 16980, Test: 78920)

**Baseline:** Average Sentence Embedding

- word count = 5, dimension = 300, number of embedded words = 507,865.
- Weak supervision for auxiliary task is effective.
- MTL is effective.
- We trained a Siamese LSTM on SNLI (Stanford) dataset and used that network as a weak supervisor (79% accuracy on validation).

### TAKEAWAYS & FUTURE WORK

- Auxiliary task improves primary objective for contextual entity retrieval.
- Weak supervision for auxiliary task is effective.
- We plan to incorporate RNN and LSTM for capturing sequence in text.
- We will explore selective parameter sharing instead of full parameter sharing.

### REFERENCES
