MeltingPotQA: Multi-hop question answering
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PROBLEM

- Reading comprehension requires model innovations
- Baseline model is designed to work on single context document, with no methodology to focus on more relevant documents
- Hypothesis: understanding which documents are more likely to be relevant to a question will guide the model in the right direction

HOTPOTQA – MULTI-HOP QUESTION ANSWERING

Paragraph 1:
[1] Return to Olympus is the only album by the alternative rock band Malfunkshun. [2] It was released after the band had broken up and after lead singer Andrew Wood (later of Mother Love Bone) had died of a drug overdose in 1990. [3] Stone Gossard, of Pearl Jam, had compiled the songs and released the album on his label, Loosegroove Records.

Paragraph 2:

Question: What was the former band of the member of Mother Love Bone who died just before the release of “Apple”?

Answer: Malfunkshun

Supporting facts: 1, 2, 4, 6, 7

- SQuAD contains single paragraph question, with an answer derived from a single span
- HotPotQA focuses on reading comprehension task – synthesizing disparate sources of information

APPRAOH: RELEVANT PARAGRAPHS

- Document Embeddings (doc2vec)
  - Averaging
  - Per-word paragraph embeddings
- Supervised Document Embeddings
- Other improvements to the baseline model

RESULTS

<table>
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<tr>
<th></th>
<th>F1</th>
<th>EM</th>
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<tbody>
<tr>
<td>Baseline</td>
<td>54.93</td>
<td>40.90</td>
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<td>Baseline, patience 7</td>
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<tr>
<td>Supervised Emb. (clean data, patience 7)</td>
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<td>47.37</td>
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<td>Supervised Emb. (Step 6700*)</td>
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<tr>
<td>Doc2Vec50</td>
<td>55.03</td>
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ANALYSIS

- Preprocessing
  - Before: Greisen = –OOV– Kuzmin limit –OOV– The Greisen limit (GZK limit) is a theoretical upper limit on the energy of cosmic rays (high energy charged particles from space) coming from "distant" sources. –OOV– The limit is , or about 8 –OOV– joules.
  - After: Greisen = –OOV– Kuzmin limit, (GZK limit) is a theoretical upper limit on the energy of cosmic rays (high energy charged particles from space) coming from "distant" sources. –OOV– The limit is , or about 8 –OOV– joules.

Supervised document embeddings
- Cross-entropy vs. weighted cross entropy
- Are the embeddings actually useful? Autoencoder/train the learned parameters in the full model
- Margin ranking loss

CONCLUSION

- Document embeddings are promising additions to the model and can have an even bigger impact in the full-wiki setting
- Hyperparameter tuning makes a big difference
- Properly cleaned data makes an even bigger difference

REFERENCES