CS 772: Context based QnA

Team Id: 25

Ashish Aggarwal (203050015)

Debabrata Biswal (203050024)

Keshav Agarwal (203050039)

Problem Statement

- Input:
  - Context Paragraph
  - Question related to Context

- Output:
  - A phrase from the context as answer

- Example

Context:	Nikola Tesla (10 July 1856 – 7 January 1943) was a Serbian American inventor, electrical engineer, mechanical engineer, physicist, and futurist best known for his contributions to the design of the modern alternating current (AC) electricity supply system.
Question:	In what year was Nikola Tesla born?
Answer:	1856

Basic Paper

- Seo, Minjoon, et al. "Bidirectional attention flow for machine comprehension." *arXiv preprint arXiv:1611.01603* (2016).

- Other References
  - Yoon Kim. Convolutional neural networks for sentence classification. In EMNLP, 2014.
  - Pranav Rajpurkar, Jian Zhang, Konstantin Lopyrev, and Percy Liang. Squad: 100,000+ questions for machine comprehension of text. In EMNLP, 2016.

Data

- Description:

  - SQuAD 1.1: 100k+ question-answer pairs on 500+ Wikipedia articles.

  - Multiple questions from same context.

  - Answers are segment from the context.
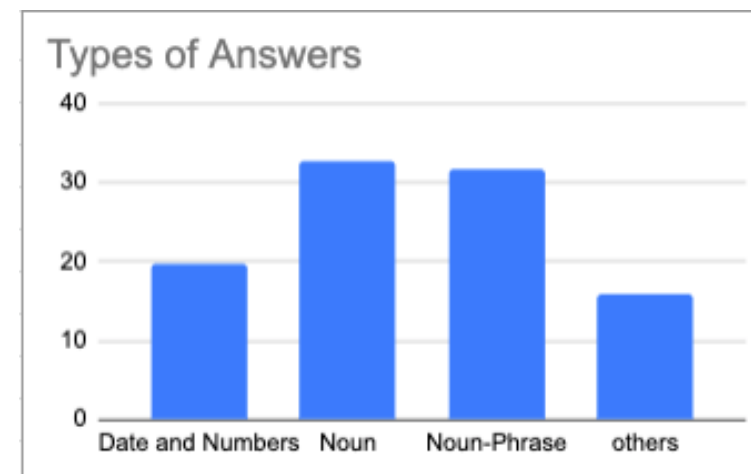
  - Train-Dev-Test split: 80-10-10

- URL:

  - https://rajpurkar.github.io/SQuAD-explorer/

- Statistics:

Train Set	Dev Set
- Articles: 442	- Articles: 48
- Contexts: 18896	- Contexts: 2066
- Questions: 97599	- Questions: 10569
- Answer: 1 per question	- Answer: 1-3 per question

Types of Answers

Technique used

- Deep Learning

- Attention Mechanism

- Dynamic Programming

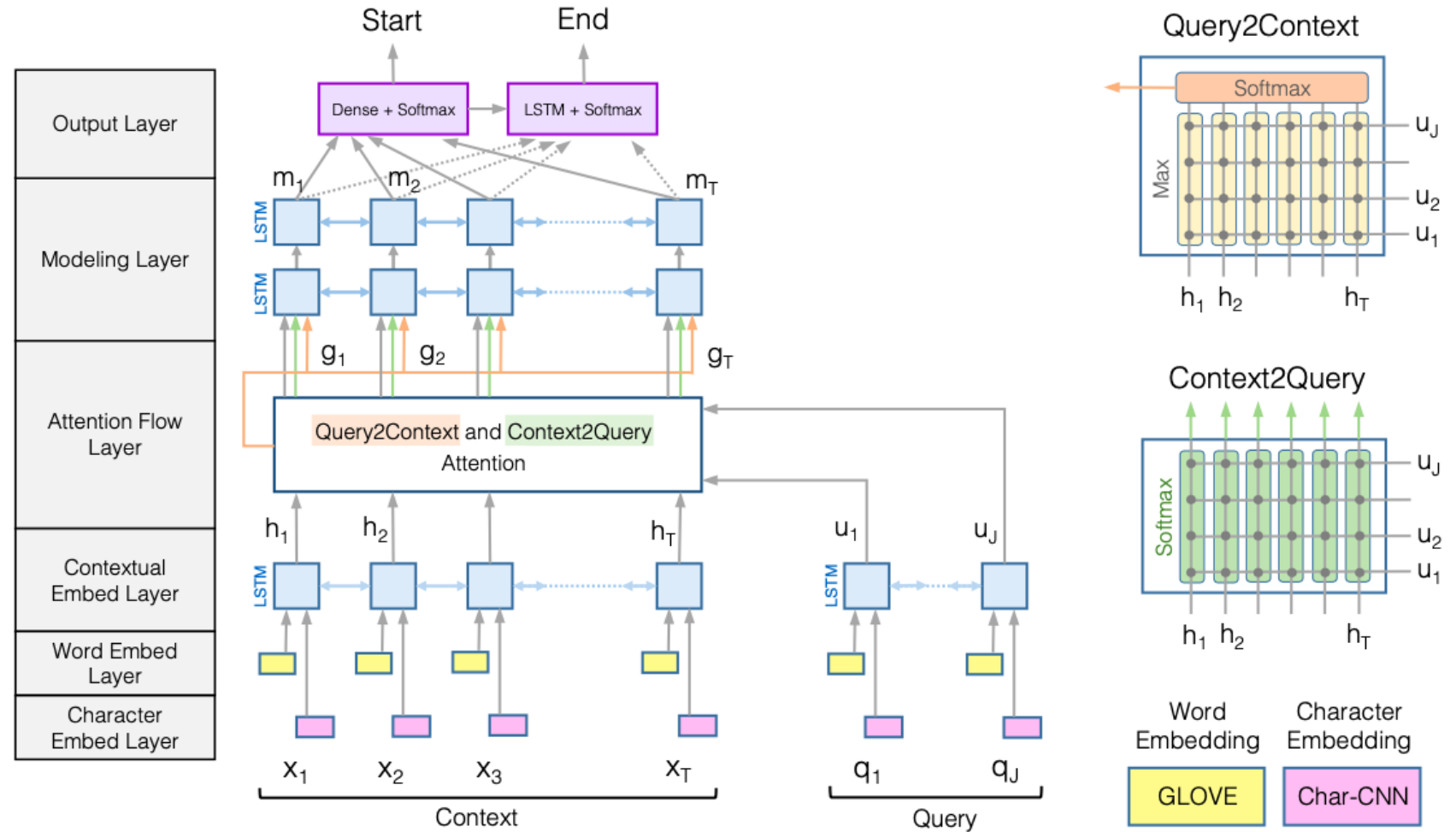

Figure 1: BiDirectional Attention Flow Model *(best viewed in color)*

Results

- Metrics used
  - Exact Match (EM) between prediction and ground truth
  - F1 score

Model	Exact Match	F1-score
Baseline Model	67.7	77.3
Our Implementation	62.2	73.2

Demo and Case Study

- My name is Debabrata. I am a good boy. My last name is Biswal. My best friend's name is Ashish. His last name is Aggarwal. Ashish also has a friend Keshav.

- Question1: What is my best friend's name?
  Answer: Ashish

- Question2: Who is Ashish's friend?
  Answer: Keshav

- Question3: What is my last name?
  Answer: Aggarwal

- Q1 and Q2 are correct but Q3 gave a wrong answer

- Confusion in coreference resolution

Conclusion

- Reproduced comparable result with constrained computation power
- Added attention to start index to calculate end index
- Model is too slow because of multiple LSTM layers

Future Work

- Parallelize the model for faster computations
- Ablation study on explicit attention to start index to calculate end index
- Try exponential moving average of saved weights of each epoch