Question Answering with SQuAD 2.0
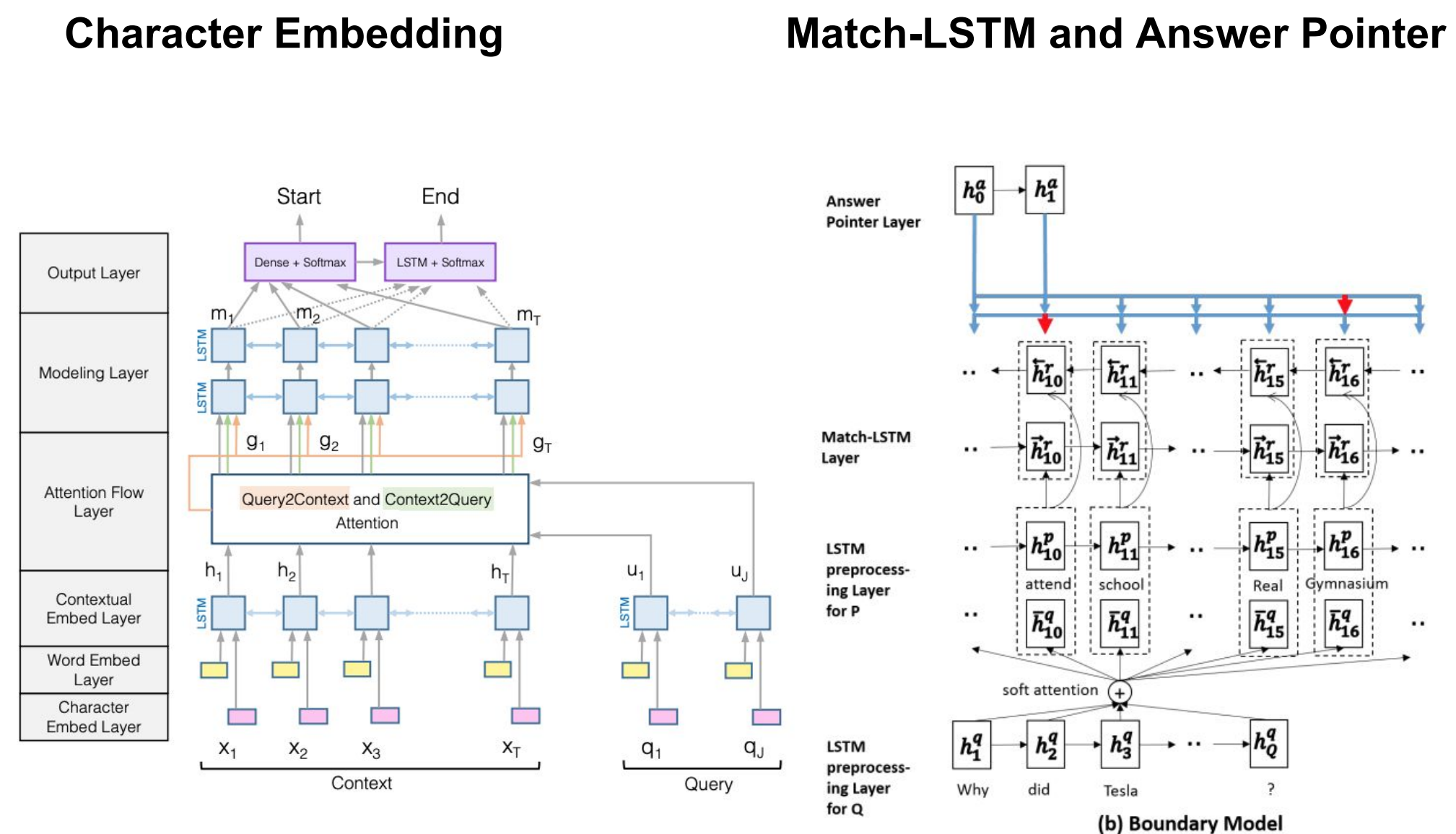
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Problem

Can we teach a machine to answer questions given a passage?
We set out to develop a model using deep learning to answer questions using the SQuAD 2.0 dataset.

Dataset

Example from Stanford Question Answering Dataset:

- **Question**: Which NFL team won Super Bowl 50?
- **Passage**: Super Bowl 50 was an American football game to determine the champion of the National Football League (NFL) for the 2015 season. The American Football Conference (AFC) champion Denver Broncos defeated the National Football Conference (NFC) champion Carolina Panthers 24–10 to earn their third Super Bowl title.
- **Answer**: Denver Broncos

Approach

Character Embedding

Match-LSTM and Answer Pointer

Results

Character Embedding

Orange: Baseline
Green: Baseline with Character Embeddings

Orange: Baseline
Blue: Baseline with dropout = 0.1
Red: Baseline with dropout = 0.3

Orange: Baseline
Blue: Baseline with GRU instead of LSTM

Match-LSTM and Answer Pointer

Red: Baseline
Blue: Match-LSTM with Answer Pointer

Red: Baseline
Blue: Match-LSTM with Answer Pointer
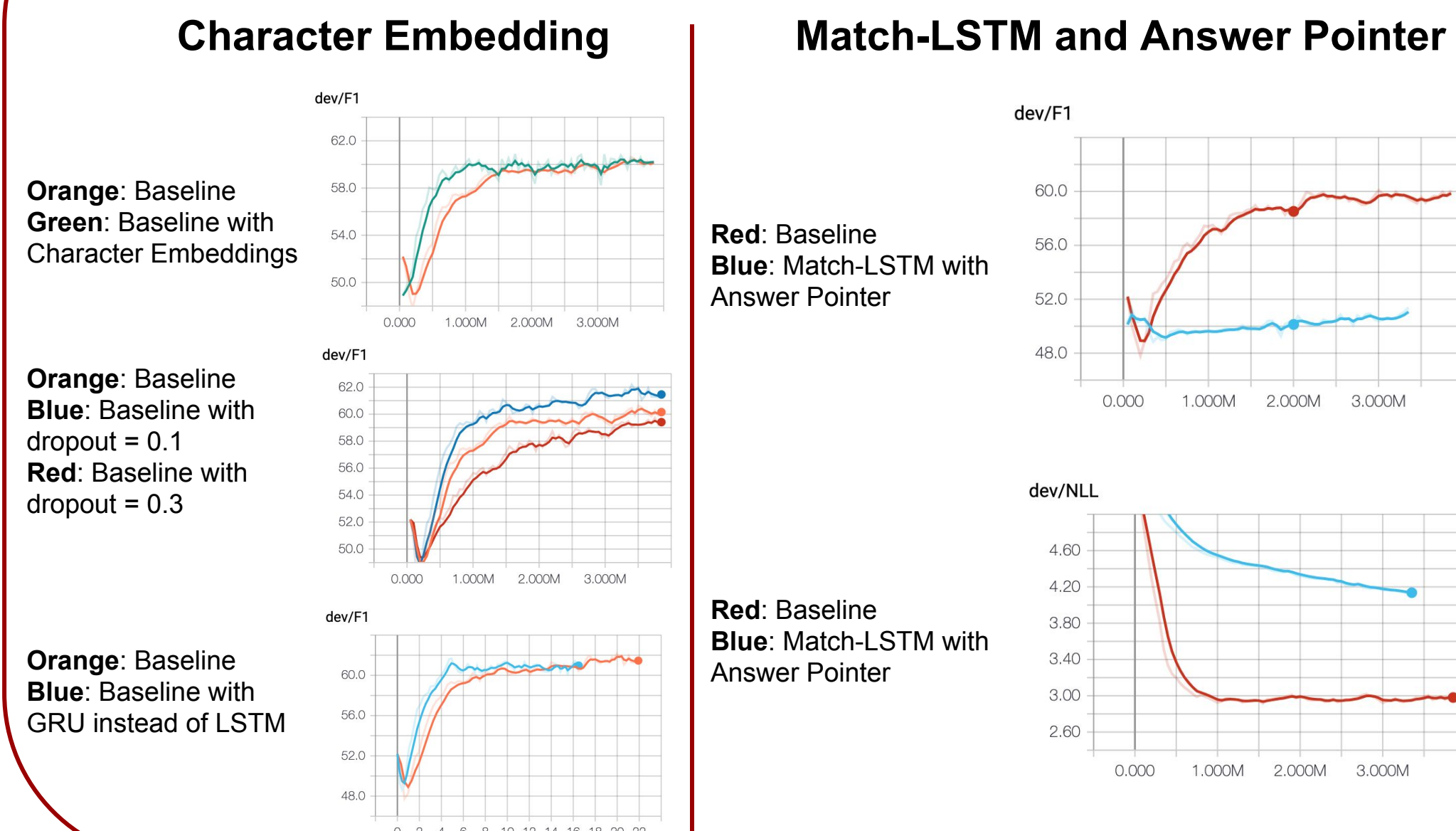

Conclusion

- Improved baseline model performance and training efficiency with added character embeddings, changing LSTMs to GRUs, and hyperparameter tuning
- Implemented new Match-LSTM architecture, but computational and time limitations hindered ability to test, tune, and fix the model
- Further work to be done in improving Match-LSTM efficiency and performance
  - Relying less heavily on LSTMs for faster training given resources available

References

Pranav Rajpurkar, Jian Zhang, Konstantin Lopyrev, and Percy Liang. Squad: 100, 000+ questions for machine comprehension of text. *CoRR,* abs/1606.05250, 2016.

Min Joon Seo, Aniruddha Kembhavi, Ali Farhadi, and Hannaneh Hajishirzi. Bidirectional attention flow for machine comprehension. *CoRR*, abs/1611.01603, 2016.

Shuohang Wang and Jing Jiang. Machine comprehension using match-lstm and answer pointer. *CoRR*, abs/1608.07905, 2016.