Presentation 2:
Long Document Summarization

CS4624 Multimedia/Hypertext/Information Access

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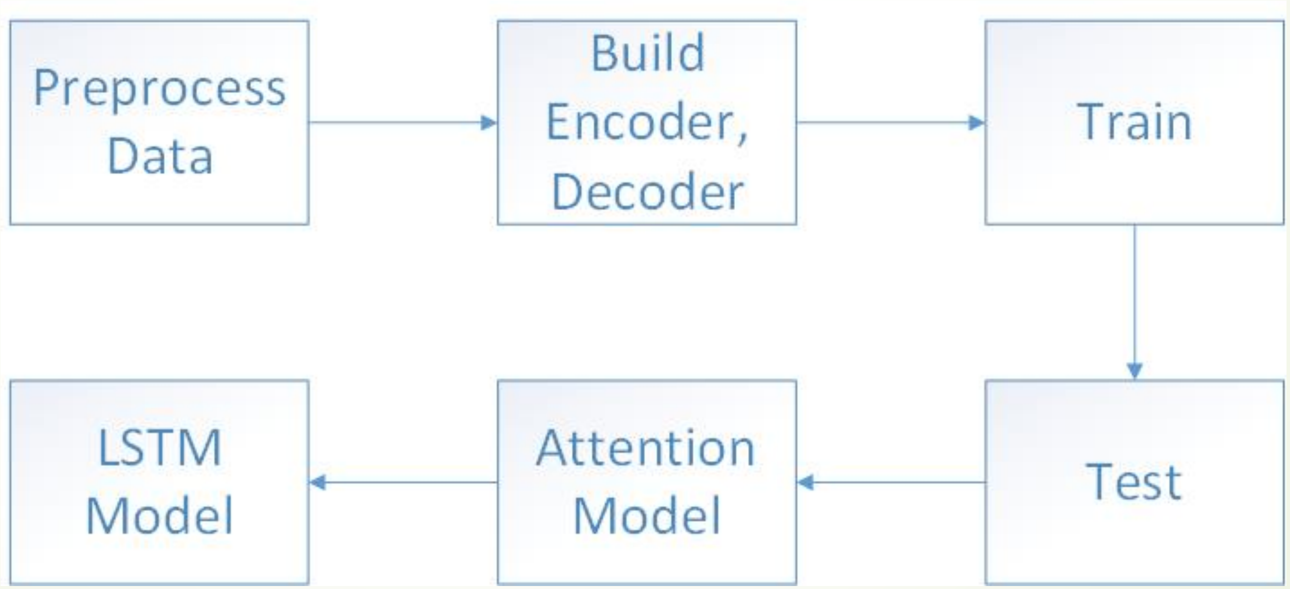
Outline

- Project Design
- Current Status
  - Data Preprocess
  - Encoder/Decoder
  - Training
  - Testing
- Future Plan
- Acknowledgements and References

Project Design

- **Purpose**: Generate abstract from long document by deep learning.



Preprocess Data

Build Encoder, Decoder

Train

Test

Attention Model

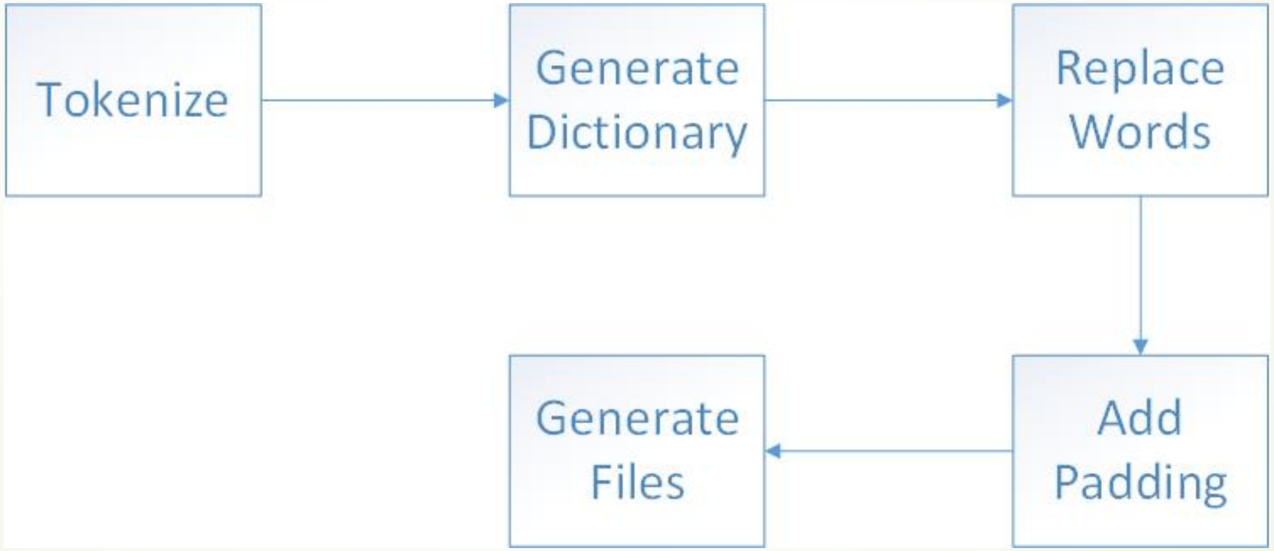
LSTM Model

Current Status

- Data Preprocess
- Encoder/Decoder
- Training
- Testing

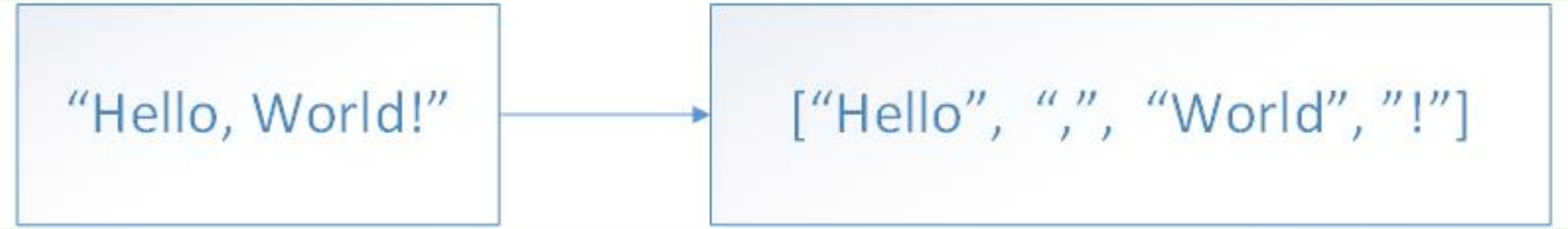
Data Preprocess

- 300,000 articles from CNN/Dailymail



Data Preprocess: Tokenize

- Tokenize words, symbols and numbers



“Hello, World!”

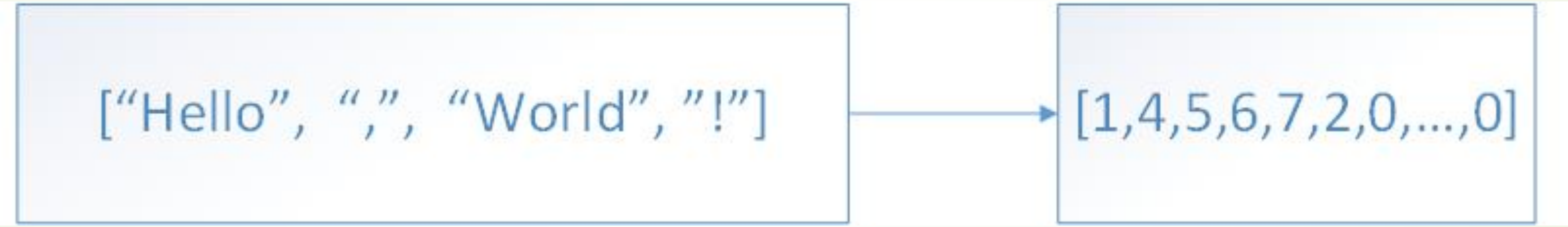
[“Hello”, “,”, “World”, ”!”]

Data Preprocess: Generate Dictionary

- Generate a dictionary includes all words and symbols
- For example:
  - “Hello” → 4
  - “,” → 5
- Also include:
  - “<Padding>” → 0
  - “<Start of Sentence>” → 1
  - “<End of Sentence>” → 2
  - ”<Unknown Word>” → 3

Data Preprocess:
Replace Words and Add Padding

- Replace words by ID
- Add <SOS>, <EOS>, and <Padding>

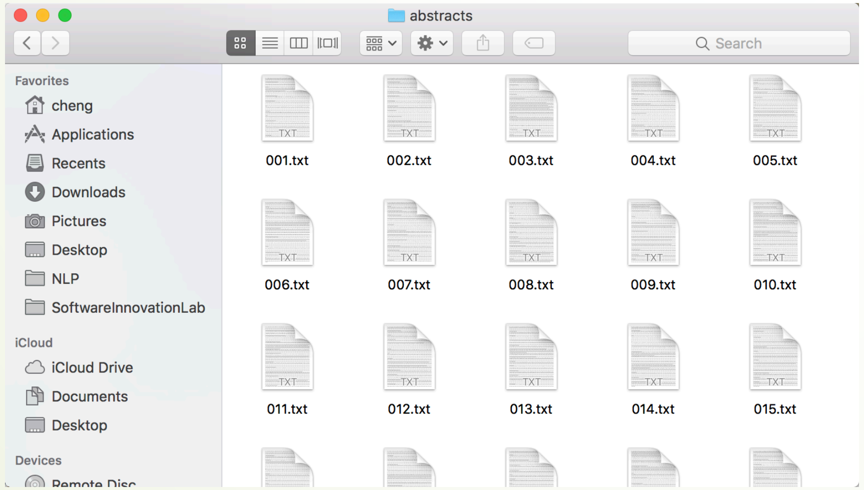


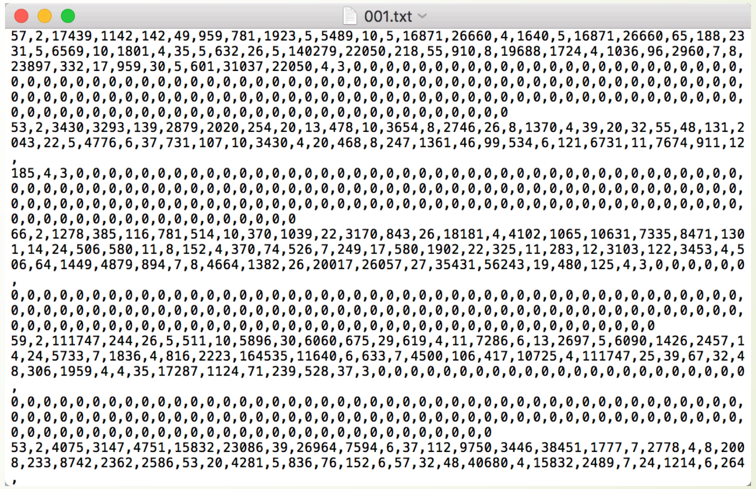
[“Hello”, “,”, “World”, ”!”]

[1,4,5,6,7,2,0,…,0]

Data Preprocess: Generate Files

- Each file contains 1024 articles or abstracts
- 183 files in training set
- 61 files in testing and validation sets.





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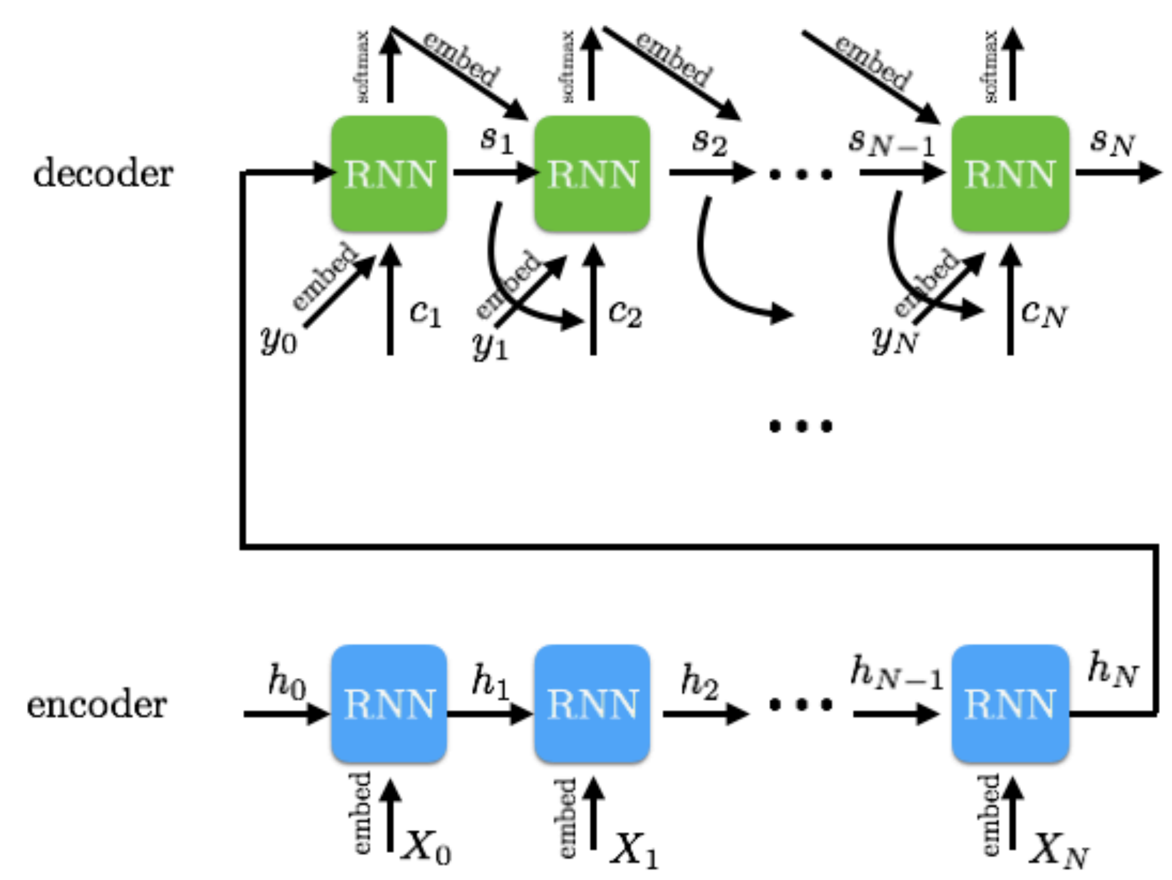
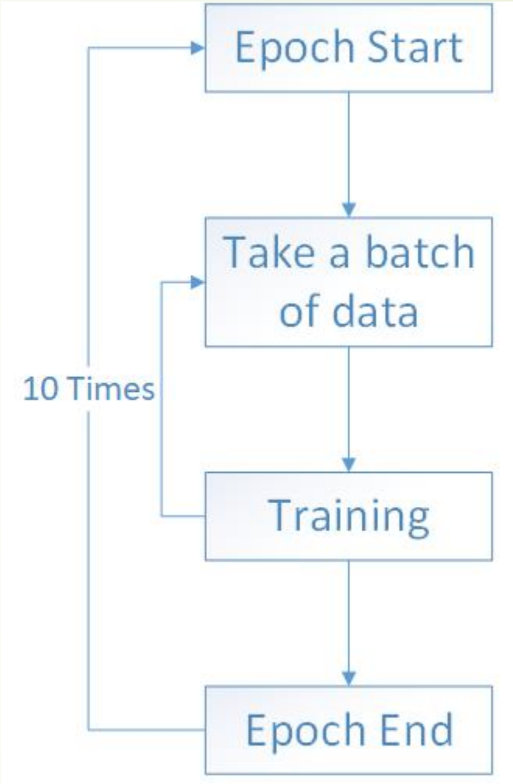
Encoder/Decoder



Training

- 10 epochs
- 4 documents each batch
- Trained 30 hours
- Loss decreases from 12.8 to 6.4



Training

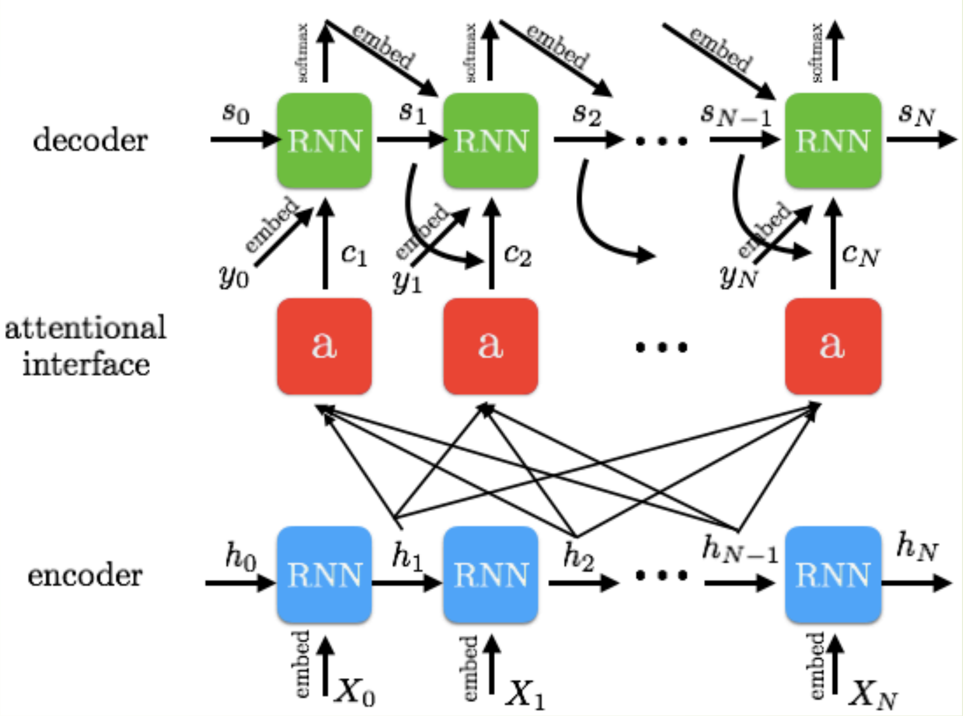
- Improve
  - Data parallel
  - 100 epochs
  - Flexible learning rate

Testing

- Input the article and get predicted abstract
- Evaluate by PyRouge

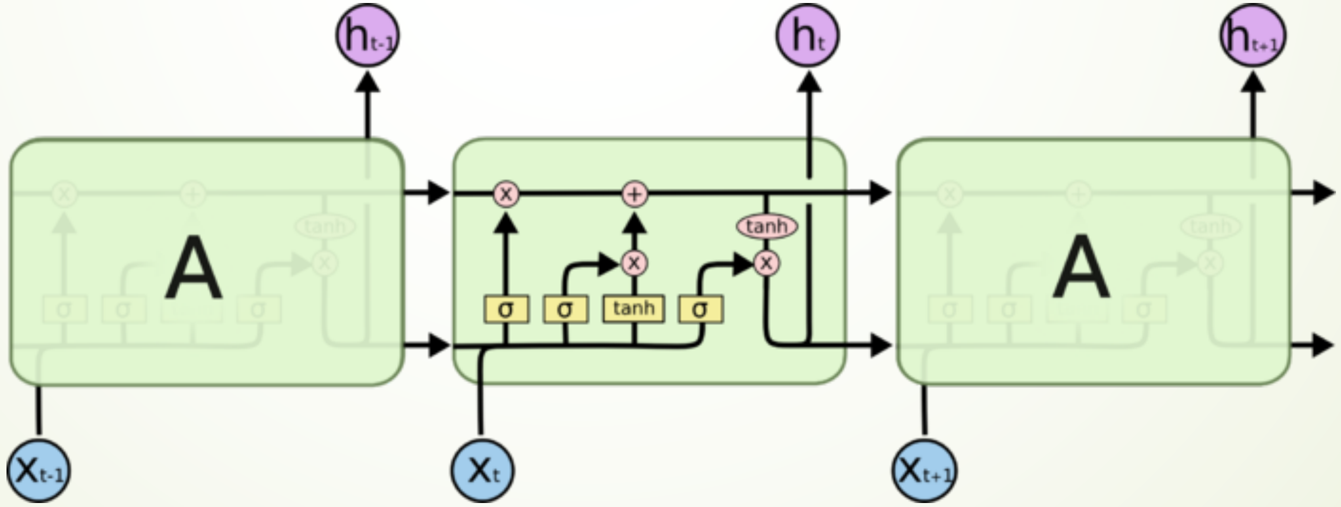
Attention Model

- Based on the attention of human
- Take part of hidden value from encoder



Long-Short Term Memory Model

- Based on human memory mechanism
- Encoder generate multiple hidden values
- Example: “The cloud is in the ___”



Acknowledgements

- Client: Yufeng Ma

References

- Encoder-decoder: https://theneuralperspective.com/2016/11/20/recurrent-neural-networks-rnn-part-3-encoder-decoder/
- Attention model: https://theneuralperspective.com/2016/11/20/recurrent-neural-network-rnn-part-4-attentional-interfaces/
- LSTM model: http://colah.github.io/posts/2015-08-Understanding-LSTMs/