

Introduction to Neural Networks and TensorFlow

Practice Assignment: Classification Using Deep Neural Networks

N-grams vs. Sequence Models

Video: Lesson Introduction 49 sec

Video: Traditional Language models 3 min

Reading: Traditional Language models 5 min

Video: Recurrent Neural Networks 4 min

Reading: Recurrent Neural Networks 4 min

Video: Applications of RNNs 3 min

Reading: Application of RNNs 3 min

Video: Math in Simple RNNs 3 min

Reading: Math in Simple RNNs 6 min

Lab: Hidden State Activation 20 min

Video: Cost Function for RNNs 2 min

Reading: Cost Function for RNNs 5 min

Video: Implementation Note 1 min

Reading: Implementation Note 3 min

Video: Gated Recurrent Units 4 min

Reading: Gated Recurrent Units 7 min

Lab: Vanilla RNNs, GRUs and the scan function 20 min

Video: Deep and Bi-directional RNNs 4 min

Reading: Deep and Bi-directional RNNs 10 min

Reading: Calculating Perplexity 10 min

Lab: Calculating Perplexity 20 min

Video: Week Conclusion 57 sec

Lecture Notes (Optional)

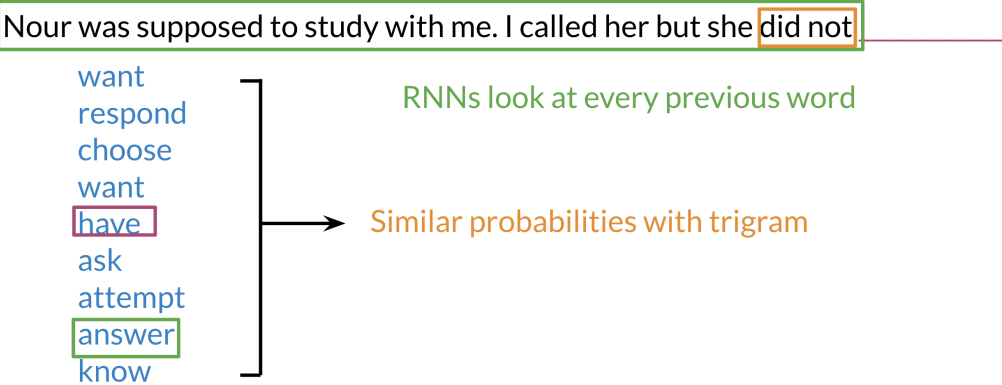
Practice Quiz

Assignment: Deep N-grams

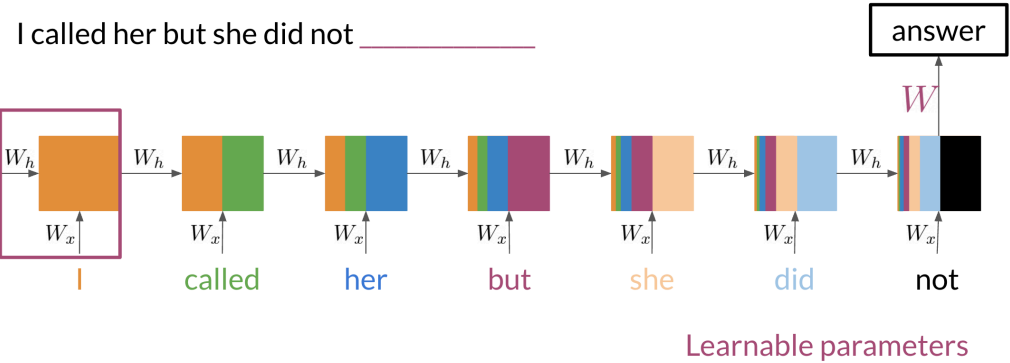
Week 1 Recurrent Neural Networks

Recurrent Neural Networks

Previously, we tried using traditional language models, but it turns out they took a lot of space and RAM. For example, in the sentence below:



An N-gram (*trigram*) would only look at "did not" and would try to complete the sentence from there. As a result, the model will not be able to see the beginning of the sentence "I called her but she". Probably the most likely word is *have* after "did not". RNNs help us solve this problem by being able to track dependencies that are much further apart from each other. As the RNN makes its way through a text corpus, it picks up some information as follows:



Note that as you feed in more information into the model, the previous word's retention gets weaker, but it is still there. Look at the orange rectangle above and see how it becomes smaller as you make your way through the text. This shows that your model is capable of capturing dependencies and remembers a previous word although it is at the beginning of a sentence or paragraph. Another advantage of RNNs is that a lot of the computation shares parameters.

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