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LSTMs and Named Entity Recognition

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Practice Quiz

Assignment: Named Entity Recognition (NER)

Week 2 > RNNs and Vanishing Gradients

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RNNs and Vanishing Gradients

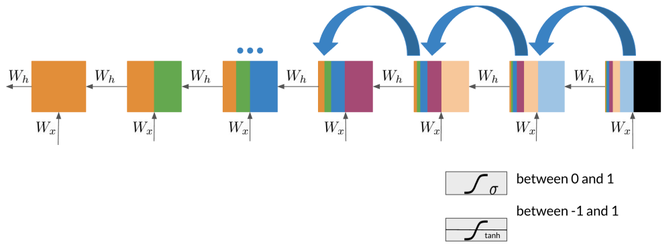
Advantages of RNNs

RNNs allow us to capture dependencies within a short range and they take up less RAM than other n-gram models.

Disadvantages of RNNs

RNNs struggle with longer term dependencies and are very prone to vanishing or exploding gradients.

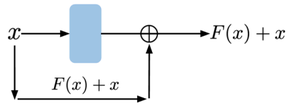
Note that as you are back-propagating through time, you end up getting the following:



Note that the *sigmoid* and *tanh* functions are bounded by 0 and 1 and -1 and 1 respectively. This eventually leads us to a problem. If you have many numbers that are less than |1|, then as you go through many layers, and you take the product of those numbers, you eventually end up getting a gradient that is very close to 0. This introduces the problem of vanishing gradients.

Solutions to Vanishing Gradient Problems

- Identity RNN with ReLU activation $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ -1 ⟶ 0
- Gradient clipping 32 ⟶ 25
- Skip connections



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