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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

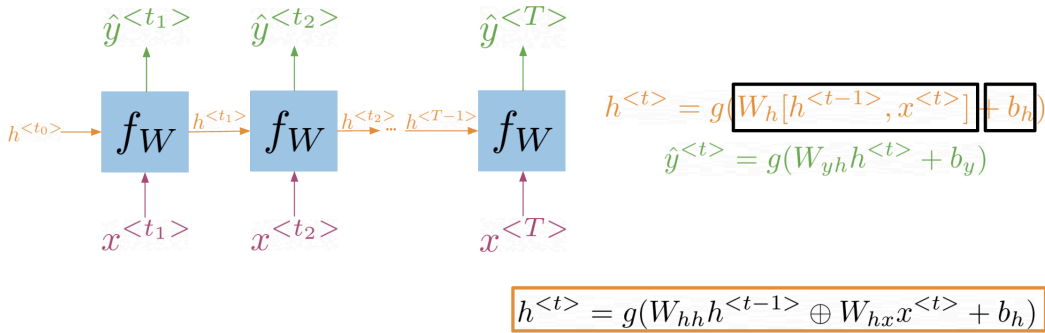
Lecture Notes (Optional)

Practice Quiz

Week 1 > Math in Simple RNNs

Math in Simple RNNs

It is best to explain the math behind a simple RNN with a diagram:



Note that:

$$h^{<t>} = g(Wh[h^{<t-1>}, x^{<t>}] + bh)$$

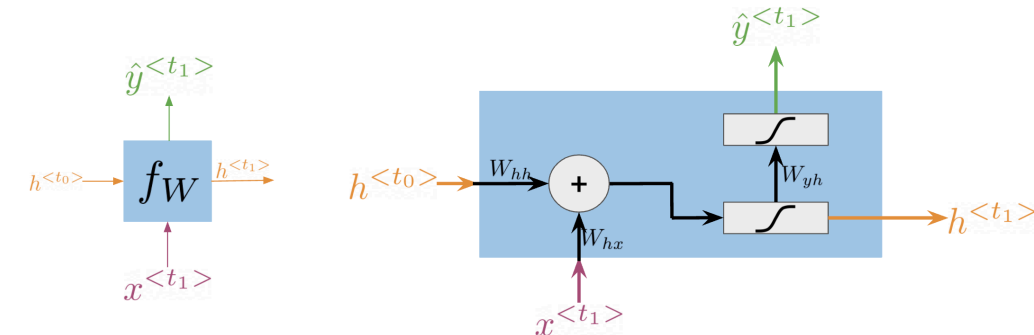
Is the same as multiplying  $Whh$  by  $h$  and  $Whx$  by  $x$ . In other words, you can concatenate it as follows:

$$h^{<t>} = g(W_hh^{<t-1>} \oplus W_hx^{<t>} + b_h)$$

For the prediction at each time step, you can use the following:

$$\hat{y}^{<t>} = g(W_yh^{<t>} + b_y)$$

Note that you end up training  $Whh, Whx, W_yh, b_h, b_y$ . Here is a visualization of the model.



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