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Assignment 4 Writeup

Results

After running the Viterbi algorithm on all sentences in the development set, my code reported that the model correctly tagged approximately 2% of sentences. While this may seem like abysmal performance, that number is artificially low. In calculating accuracy, I simply checked if the correct and predicted tag sequences were identical. If they were not, that would mean the HMM did not correctly tag that sentence. However, this marks as incorrect sentences where my model was *almost* correct.

Consider the sentence: "But with the convening of the new Congress , he was the public man again , presiding over the Senate until John Kennedy's Inauguration ." Its correct tag sequence is

'cc', 'in', 'at', 'nn', 'in', 'at', 'jj', 'np', ',', 'pps', 'bedz', 'at', 'jj', 'nn', 'rb', ',', 'vbg', 'in', 'at', 'nn-tl', 'in', 'np', 'np\$', 'nn-tl', '.,

whereas my model assigns it

'cc', 'in-hl', 'at', 'nn', 'in', 'nn', 'jj', 'np', ',', 'pps', 'bedz', 'nn', 'jj', 'vb', 'rb', 'pps', 'vbg', 'in', 'nn', 'nn-tl', 'cs', 'np', 'np\$', 'nn-tl',.

As you can see, these sequences are much more than 2% similar; out of the 24 tags, my model correctly finds 17 of them. This pattern recurs frequently throughout the data. Therefore, I think a more useful metric is to see, given a sentence, what percent of words in that sentence the model correctly tagged.

Effort

I began this assignment last Thursday, 3/15, when I spent roughly 8 hours learning about HMMs and trying to understand the Viterbi algorithm. On Friday I spent another 2 on the same task. Then again on Monday I passed 6 hours towards that end. Finally, on Tuesday, with a thorough intuition behind HMMs and the Viterbi algorithm in hand, I began to implement them. Between Tuesday and Wednesday, I spent 12 hours coding the assignment and writing this document. In sum, this assignment took me 28 hours to complete. The most challenging parts were acquiring the understanding beforehand and getting the emission and transition matrices correct.