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Lecture Notes (Optional)

Language Model Evaluation

Splitting the Data

We will now discuss the train/val/test splits and perplexity.

Train/Val/Test splits

Smaller Corpora:

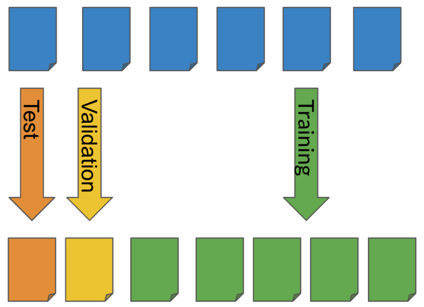
- 80% train
- 10% val
- 10% test

Larger Corpora:

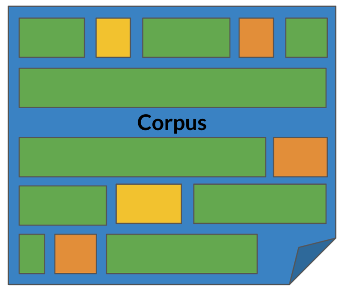
- 98% train
- 1% val
- 1% test

There are two main methods for splitting the data:

- Continuous text



- Random short sequences



Perplexity

Perplexity is used to tell us whether a set of sentences look like they were written by humans rather than by a simple program choosing words at random. A text that is written by humans is more likely to have lower perplexity, where a text generated by random word choice would have a higher perplexity.

Concretely, here are the formulas to calculate perplexity.

$$PP(W) = P(s1, s2, \ldots, sm)^{-\frac{1}{m}}$$

$$PP(W) = \sqrt[m]{\prod_{i=1}^{m} \prod_{j=1}^{|si|} \frac{1}{P(wj^{(i)} \mid wj-1^{(i)})}}$$

$wj^{(i)} \rightarrow$ j corresponds to the jth word in the ith sentence. If you were to concatenate all the sentences then wi is the ith word in the test set. To compute the log perplexity, you go from

$$PP(W) = \sqrt[m]{\prod_{i=1}^{m} \frac{1}{P(wi \mid wi-1)}}$$

To

$$\log PP(W) = -\frac{1}{m} \sum_{i=1}^{m} \log 2\,(P(wi \mid wi-1))$$