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Assignment 3

The files requested (models and outputs) are in the requested folders under submission files. However due to the way my code was designed only 1 code file exists that runs all parts. In the readme.txt file there is an explanation of how to run each section of this code from that code file.

Part 1

- (a) Implemented
- (b) UNK substitution Implemented.
 - 1. After 20 epochs with UNK substitution my model achieves an 83.27% accuracy. (0.832723315857157)
 - 2. When using 2 copies of the training set one with UNK substitution and one without I get a slightly higher score of 83.67% Accuracy. (0.8366801859728954)
- (c) The highest development accuracy was at epoch 36 and it was 84.03% Accuracy. The accuracy on the test set was 83.10% (0.8310416460579682). The model achieved its best performance after 36 epochs.

Part 2

- (a) After adding right hand side context, I get 84.01% Accuracy.
- (b) Increasing the dimensions seemed to bring about better results, while increasing layers made results worse. Adam optimizer did better than SGD. The best performance achieved on the development set was 87.9% at epoch 6. I also achieved 87.53% on the test set (0.8752596696013454).

Hyperparameters I tested:

```
params = {  
    'EMBEDDING_DIM': [512, 128, 64, 32],  
    'HIDDEN_DIM': [512, 128, 64, 32],  
    'LAYERS': [1, 2, 4, 8, 16],  
    'optimize_fn': ['SGD', 'Adam']  
}
```

- (c) No, The development set stopped at epoch 12 with a 67.75% Accuracy while the test set achieved 66.16% Accuracy.

Part 3

- (a) Running the code with no modifications I get 88.89% Accuracy on the Irish test set. (0.888910871500643)
- (b) After adding the additional features, I get 91.45% Accuracy on the Irish test set. (0.9145316055000494)
- (c – bonus) I added prefix features taking the first, first two, and first three characters of a word. This gave me an accuracy of 92.57% (0.9257097635770106).

Part 4

Performance does not improve or degrade much on the Irish set. I was able to get 92.30% on the Irish test set (0.9230388762488871). On the welsh dev set I got (0.8933998376058462).

References:

To use my gpu I used some code I found online on the Pytorch forum.

<https://discuss.pytorch.org/t/questions-about-gpu-allocate-and-cache/66707>