NLU - Recurrent Neural Networks Coursework

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1. Question 2. (a)

Perform parameter tuning using a subset of the training and development sets. Use a fixed vocabulary of size 2000, and vary the number of hidden units (at least: 25, 50), the look-back in backpropagation (at least: 0, 2, 5), and learning rate (at least: 0.5, 0.1, 0.05). The mode train-lm in rnn.py allows for more parameters, which you are free to explore. You should tune your model to maximize generalization performance (minimize cross-entropy loss) on the dev set. For these experiments, use the first 1000 sentences of both the training and development sets and train for 10 epochs.6 Report your findings. [10 marks]

2. Question 3. (b)

Train your new model, explaining the parameters you used and how you chose them, and include the results in your report. [5 marks] Training model for 20 epochs training set: 25000 sentences (batch size 100) Optimizing loss on 1000 sentences Vocab size: 2000 Hidden units: 75 Steps for back propagation: 2 Initial learning rate set to 1.5, annealing set to 5 calculating initial mean loss on dev set: 10.866100445506362 calculating initial acc on dev set: 0.0 epoch 1, learning rate 1.5000 epoch done in 77.17 seconds new loss: 0.8383244503140014 new acc: 0.717 epoch 2, learning rate 1.2500 epoch done in 75.84 seconds new loss: 0.49486246419812296 new acc: 0.749 epoch 3, learning rate 1.0714 epoch done in 74.65 seconds new loss: 0.40378818544569023 new acc: 0.791 epoch 4, learning rate 0.9375 epoch done in 79.65 seconds new loss: 0.3366944654257544 new acc: 0.822 epoch 5, learning rate 0.8333 epoch done in 79.93 seconds new loss: 0.3371483253707253 new acc: 0.827 epoch 6, learning rate 0.7500 epoch done in 86.57 seconds new loss: 0.27794822954041887 new acc: 0.851 epoch 7, learning rate 0.6818 epoch done in 78.72 seconds new loss: 0.3678019026282291 new acc: 0.8 epoch 8, learning rate 0.6250 epoch done in 75.93 seconds new loss: 0.2398670978508597 new acc: 0.875

3. Question 4. (a)

Implement method compare num pred and evaluate your prediction accuracy: ¿ python rnn.py predict-lm rnn.py data dir rnn dir Include your result in your final report. [4 marks]

4. Question 4. (b)

Knowledge: Comprehensive range of up-to-date material handled in a professional way. Understanding and handling of key concepts: Shows a command of the subject and current theory. Focus on the subject: Clear and analytical; fully explores the subject. Critical analysis and discussion: Shows evidence of serious thought in critically evaluating and integrating the evidenced and ideas. Deals confidently with the complexities and subtleties of the arguments. Shows elements of personal insight / creativity / originality. Literature synthesised, analysed and referenced: Comprehensive grasp of the up-to-date literature which is used in a professional way. Structure: Clear and coherent showing logical, ordered thought. Presentation: Clear and professional with few, relatively minor flaws. Accurate referencing; using the correct referencing system. Figures and tables well constructed and accurate. Good standard of spelling and grammar.

References