Problem Set 09

Data Mining & Machine Learning

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Approach Description

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2. Overall Model

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3. Experiments & Model Tuning

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Without special specification, the model used in experiments is specified here:

- Experiment Model Description Here:
- Embedding Layer (drop out 0.25)
- SimpleRNN layer
- Dense Layer(256 nodes, drop out 0.25, activation: relu)
- Output Dense Layer (32 batches, 10 epochs, early stop)
- Total number of top words: 5000
- Max length of each review: 3000

3.1. Choosing Max Length (number of words) for each review

- Experiment Model Description Here:
- Embedding Layer (drop out 0.25)
- SimpleRNN layer
- Dense Layer(256 nodes, drop out 0.25, activation: relu)
- Output Dense Layer (32 batches, 10 epochs, early stop)
- Total number of top words: 5000

We can see the pattern in this experiment: <u>With the max length of each review increases, the classification also increases</u>. Because we want the highest classification rate and using max length of 250 will also finish in acceptable time span, I choose 250 as the max length of each review.

Max Length	50	100	150	200	250
Classification rate	0.8104	0.8337	0.8375	0.8363	**0.8485**

3.2. Choosing Total number of top words

- Experiment Model Description Here:
- Embedding Layer (drop out 0.25)
- SimpleRNN layer
- Dense Layer(256 nodes, drop out 0.25, activation: relu)
- Output Dense Layer (32 batches, 10 epochs, early stop)
- Max length of each review: 250

The result shows when the total number of top words increases from 500 to 8000, the classification start to increase first, then it get to a steady rate around 0.835 - 0.845. Because of this pattern, I choose 5000 as the total number of words in the final model because it both has **high classification rate** in considerable **fast** in computing process.

Total Number	500	1000	2500	3000	4000	5000	6000	7000	8000
Classification rate	0.7901	0.8052	0.8384	0.8403	0.8371	**0.8436**	0.8192	0.8428	0.8389

3.3. Choosing types of RNN model

- Experiment Model Description Here:
- Embedding Layer (drop out 0.25)
- Dense Layer(256 nodes, drop out 0.25, activation: relu)
- Output Dense Layer (32 batches, 10 epochs, early stop)
- Max length of each review: 250
- Total number of top words: 5000

According to the result, the type of LSTM RNN model has the highest classification rate.

TYPE	Simple RNN(16)	LSTM(32)	GRU(32)
Classification rate	0.8446	**0.8538**	0.8461

3.4 Choosing Number of Nodes in RNN layer

Number of Nodes	4	8	16	32	64	128
Classification rate				0.8538		