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1. (1%) 請說明你實作的 RNN model，其模型架構、訓練過程和準確率為何？ (Collaborators:)

答：

模型架構：

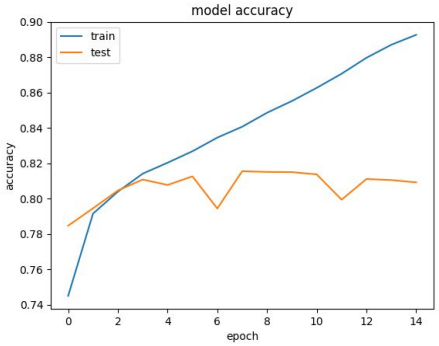
Layer (type)	Output Shape	Param #
bidirectional_1 (Bidirection	(None, 40, 512)	833536
bidirectional_2 (Bidirection	(None, 40, 512)	1574912
bidirectional_3 (Bidirection	(None, 40, 512)	1574912
bidirectional_4 (Bidirection	(None, 40, 512)	1574912
bidirectional_5 (Bidirection	(None, 512)	1574912
dense_1 (Dense)	(None, 1024)	525312
batch_normalization_1 (Batch	(None, 1024)	4096
dense_2 (Dense)	(None, 1024)	1049600
batch_normalization_2 (Batch	(None, 1024)	4096
dense_3 (Dense)	(None, 1024)	1049600
batch_normalization_3 (Batch	(None, 1024)	4096
dense_4 (Dense)	(None, 2)	2050

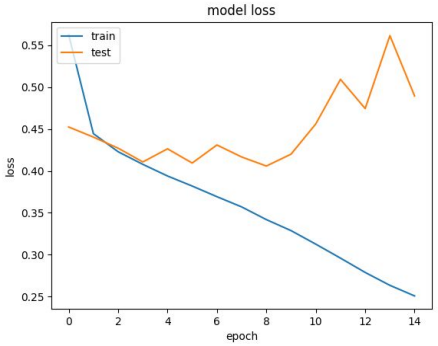
Total params: 9,772,034
Trainable params: 9,765,890
Non-trainable params: 6,144

訓練細節：

batch_size: 1024
epoch:40(with early stop)
cell: 5*LSTM with activative function tanh
4*Dense with activative function relu
val_ratio:0.05
max_length:40
loss_function:binary_crossentropy
drop_out_rate:0.3

訓練過程：





準確率：81.83%

2. (1%) 請說明你實作的 BOW model，其模型架構、訓練過程和準確率為何？ (Collaborators:)

答：

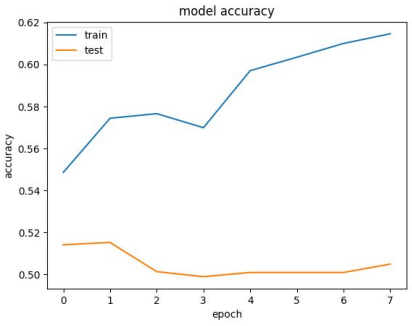
模型架構：

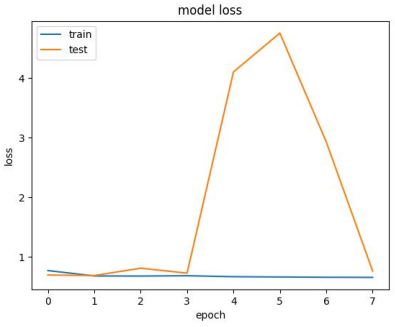
```
Layer (type)                 Output Shape              Param #
=================================================================
embedding_1 (Embedding)      (None, None, 200)         6000
_________________________________________________________________
bidirectional_1 (Bidirection (None, None, 512)         701952
_________________________________________________________________
bidirectional_2 (Bidirection (None, None, 512)         1181184
_________________________________________________________________
bidirectional_3 (Bidirection (None, None, 512)         1181184
_________________________________________________________________
bidirectional_4 (Bidirection (None, None, 512)         1181184
_________________________________________________________________
bidirectional_5 (Bidirection (None, 512)               1181184
_________________________________________________________________
dense_1 (Dense)              (None, 1024)              525312
_________________________________________________________________
batch_normalization_1 (Batch (None, 1024)              4096
_________________________________________________________________
dense_2 (Dense)              (None, 1024)              1049600
_________________________________________________________________
batch_normalization_2 (Batch (None, 1024)              4096
_________________________________________________________________
dense_3 (Dense)              (None, 1024)              1049600
_________________________________________________________________
batch_normalization_3 (Batch (None, 1024)              4096
_________________________________________________________________
dense_4 (Dense)              (None, 1024)              1049600
_________________________________________________________________
batch_normalization_4 (Batch (None, 1024)              4096
_________________________________________________________________
dense_5 (Dense)              (None, 2)                 2050
=================================================================
Total params: 9,125,234
Trainable params: 9,117,042
Non-trainable params: 8,192
_________________________________________________________________
Train on 190000 samples, validate on 10000 samples
```

訓練細節：

batch_size: 1024
epoch:40(with early stop)
cell: 5*LSTM with activative function tanh
4*Dense with activative function relu
val_ratio:0.05
max_length:30
embedding_output_dim:150
loss_function:binary_crossentropy
drop_out_rate:0.3

訓練過程：





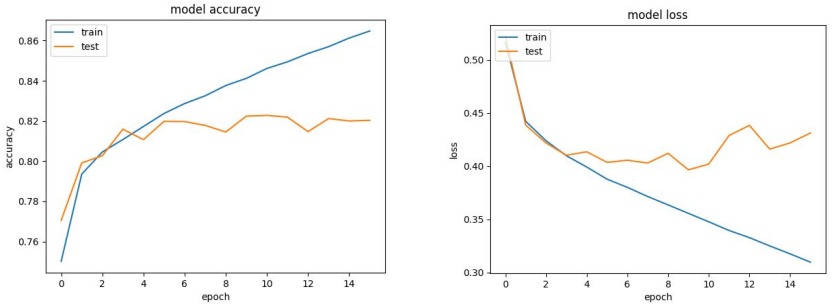
準確率：52.12%

我的BOW怎麼train都train不起來

3. (1%) 請比較bag of word與RNN兩種不同model對於"today is a good day, but it is hot"與"today is hot, but it is a good day"這兩句的情緒分數，並討論造成差異的原因。
(Collaborators:)
答：
RNN：
[[0.1955989 0.80440104]
[0.00954204 0.99045789]]
BOW：
[[0.75076592 0.24923402]
[0.75076592 0.24923402]]

    1. BOW的結果一定會是一樣，因為這兩句話的BOW encoding是一模一樣的。
    2. 因為我的bow train不起來，所以結果不太有參考價值。

4. (1%) 請比較"有無"包含標點符號兩種不同tokenize的方式，並討論兩者對準確率的影響。
(Collaborators:)
答：
有分標點符號：準確率：81.83%
沒分標點符號：
我採取跟RNN相同模型。
有分開標點符號的，跟沒分開標點符號的，準確率差不多，沒有差別。我猜測是因為人類的說話跟標點符號有些微相關，卻沒有太大關係，所以加上標點符號會沒差。
訓練準確率的圖：



準確率：
5. (1%) 請描述在你的semi-supervised方法是如何標記label，並比較有無semi-surpervised training對準確率的影響。
(Collaborators:)
答：
我使用助教的sample code threshold 放0.6，
準確率：81.95
在我的implement下，semi supervise 幾乎沒有什麼幫助。