

“Deep Learning Homework 2”

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Part 1: Model Information:

```
S2VT(  
  (drop): Dropout(p=0.5, inplace=False)  
  (linear1): Linear(in_features=4096, out_features=500, bias=True)  
  (linear2): Linear(in_features=500, out_features=4096, bias=True)  
  (lstm1): LSTM(500, 500, batch_first=True, dropout=0.5)  
  (lstm2): LSTM(1000, 500, batch_first=True, dropout=0.5)  
  (embedding): Embedding(4096, 500)  
)
```

Part 2: Creating Data:

Part 2.1: Train samples:

```
['<BOS> A wombat is walking about. <EOS>',  
'<BOS> A giant hamster is walking across the ground. <EOS>',  
'<BOS> A marsupial strolls in a cage. <EOS>',  
'<BOS> A wombat is walking around. <EOS>',  
'<BOS> A wombat is walking on a muddy surface towards a patch of dried grass. <EOS>',  
'<BOS> A wombat is walking on the ground. <EOS>',  
'<BOS> A wombat is walking toward grass. <EOS>',  
'<BOS> A wombat is walking towards the camera. <EOS>',  
'<BOS> A wombat is walking. <EOS>',  
'<BOS> A wombat is walking. <EOS>',  
'<BOS> A wombat is walking. <EOS>',  
'<BOS> A wombat is walking. <EOS>',  
'<BOS> An animal crawls in the dirt. <EOS>',  
'<BOS> An animal walks over a dirt patch. <EOS>',  
'<BOS> The animal is walking. <EOS>',  
'<BOS> The woodchuck walked across the yard. <EOS>',  
'<BOS> The woodchuck walked in the yard. <EOS>']
```

Part 2.2: Test Samples:

```
['<BOS> A man using a microwave <EOS>',  
'<BOS> A man heated a cup of coffee in the microwave. <EOS>',  
'<BOS> A man is operating a microwave oven. <EOS>',  
'<BOS> A man is operating a microwave. <EOS>',  
'<BOS> A man is pressing microwave buttons. <EOS>',  
'<BOS> A man is pushing buttons on a microwave oven. <EOS>',  
'<BOS> A man is putting a cup into the microwave oven. <EOS>',  
'<BOS> A man microwaves a teacup. <EOS>',  
'<BOS> A man puts a cup in the microwave. <EOS>',  
'<BOS> A man sets the timing/temperature knobs on the menu of the microwave oven in the kitchen and is waiting. <EOS>',  
'<BOS> A man turns on the microwave. <EOS>',  
'<BOS> A man uses a microwave. <EOS>',  
'<BOS> The man is using the microwave. <EOS>',  
'<BOS> A man is using a microwave. <EOS>']
```

Part 3: Information of some of Vocabularies with their Values

Vocabulary		Value
0	said	1
1	yelled	1
2	son.	1
3	Tomatoes	1
4	aloud	2
5	text.	1
6	aloud.	1
7	loud.	1
8	rooster	5
9	cock	2
10	sucking	9
11	mother's	2
12	glove.	1
13	mom's	1
14	brows.	1
15	darkens	1
16	colour	1
17	brow	1
18	eyelash	1

Part 4: Training phase information:

	Parameter	Value
1.	Epoch	30
2.	Iteration	2000
3.	Batch Size	10
4.	Learning Rate	0.0001

	Dataset	Size
1.	Train Set	1450
2.	Test Set	100

Part 5: Samples of Training Steps:

The picture below shows each epochs with their loss.

```
Epoch: 1 iteration: 0 , loss: 0.397649, time: 220.022035
Epoch: 1 save succeeded!
Epoch: 2 iteration: 0 , loss: 0.317351, time: 218.492053
Epoch: 2 save succeeded!
Epoch: 3 iteration: 0 , loss: 0.218613, time: 218.971453
Epoch: 3 save succeeded!
Epoch: 4 iteration: 0 , loss: 0.321797, time: 220.536516
Epoch: 4 save succeeded!
Epoch: 5 iteration: 0 , loss: 0.278147, time: 223.844599
Epoch: 5 save succeeded!
Epoch: 6 iteration: 0 , loss: 0.258921, time: 223.207318
Epoch: 6 save succeeded!
Epoch: 7 iteration: 0 , loss: 0.272062, time: 223.158498
Epoch: 7 save succeeded!
Epoch: 8 iteration: 0 , loss: 0.181377, time: 219.533936
Epoch: 8 save succeeded!
Epoch: 9 iteration: 0 , loss: 0.216315, time: 221.886520
Epoch: 9 save succeeded!
Epoch: 10 iteration: 0 , loss: 0.092990, time: 196.137806
Epoch: 10 save succeeded!
Epoch: 11 iteration: 0 , loss: 0.131746, time: 185.059966
Epoch: 11 save succeeded!
Epoch: 12 iteration: 0 , loss: 0.155816, time: 184.108651
Epoch: 12 save succeeded!
Epoch: 13 iteration: 0 , loss: 0.118489, time: 192.188703
Epoch: 13 save succeeded!
Epoch: 14 iteration: 0 , loss: 0.172287, time: 198.132407
Epoch: 14 save succeeded!
Epoch: 15 iteration: 0 , loss: 0.227182, time: 198.836318
Epoch: 15 save succeeded!
Epoch: 16 iteration: 0 , loss: 0.154213, time: 201.275077
Epoch: 16 save succeeded!
Epoch: 17 iteration: 0 , loss: 0.213673, time: 200.490295
Epoch: 17 save succeeded!
Epoch: 18 iteration: 0 , loss: 0.270120, time: 201.087673
Epoch: 18 save succeeded!
Epoch: 19 iteration: 0 , loss: 0.188210, time: 201.348174
Epoch: 19 save succeeded!
Epoch: 20 iteration: 0 , loss: 0.184244, time: 204.813964
Epoch: 20 save succeeded!
Epoch: 21 iteration: 0 , loss: 0.164092, time: 202.539508
Epoch: 21 save succeeded!
Epoch: 22 iteration: 0 , loss: 0.142393, time: 204.869399
Epoch: 22 save succeeded!
Epoch: 23 iteration: 0 , loss: 0.120242, time: 207.468195
Epoch: 23 save succeeded!
Epoch: 24 iteration: 0 , loss: 0.195111, time: 205.552834
Epoch: 24 save succeeded!
Epoch: 25 iteration: 0 , loss: 0.152824, time: 206.389188
Epoch: 25 save succeeded!
Epoch: 26 iteration: 0 , loss: 0.172238, time: 208.423039
Epoch: 26 save succeeded!
Epoch: 27 iteration: 0 , loss: 0.082705, time: 208.625109
Epoch: 27 save succeeded!
Epoch: 28 iteration: 0 , loss: 0.088135, time: 209.872481
Epoch: 28 save succeeded!
Epoch: 29 iteration: 0 , loss: 0.163572, time: 210.794463
Epoch: 29 save succeeded!
```

Epoch 3: The model began to produce some valid sentences in the proper sequence.

```
Epoch: 3
.....
Output Caption:

A woman is slicing a potato.
A group of people are dancing.
A dog is walking on a dog.
A woman is riding a horse.
A dog is eating a dog.
A man is pouring a gun.
A panda is eating a dog.
A man is cutting a piece of a knife.
A man is putting a gun.
A woman is slicing a potato.
.....
GT Caption:

<BOS> The lady poured soy sauce and seasonings on the tomatoes.
<BOS> A wall of bouncing balls descend a street.
<BOS> A dog is waving its tail and barking.
<BOS> A girl is climbing a rock.
<BOS> Someone with gloved hands is listening to a baby panda through a stethoscope.
<BOS> A man is cutting a bottle with a sword.
<BOS> Two bears investigate a pile of dirt.
<BOS> A large green ball is rolling into a potato.
<BOS> The cartoon girl flipped a pancake in a frying pan.
<BOS> A woman is cutting mushrooms.
.....
```

Epoch 9: The outcome gets better.

```
Epoch: 9
.....
Output Caption:

A woman is riding a horse.
A man is doing push ups.
A woman is riding a horse.
Two women are playing video games.
A cat is jumping into a car.
A man is cleaning a cd.
A man is cutting a dead deer.
A baby is falling asleep on a couch
A man is cutting a piece of wood.
A man is riding a motorcycle.
.....
GT Caption:

<BOS> A woman is riding on a horse.
<BOS> The man did chin-up in the doorway.
<BOS> The rider trotted on the horse across the field.
<BOS> Two boys are playing video game.
<BOS> A cat jumps from a utility pole.
<BOS> A man is cleaning a DVD.
<BOS> The man pet the nose of the alligator.
<BOS> A boy is slipping while sitting on a couch.
<BOS> Using a knife, a man cuts through a row of bottles that are full of water.
<BOS> A man is performing stunts with his bike.
.....
```

Epoch 29: The training procedure is complete.

```
Epoch: 29
.....
Output Caption:

A boy is looking out a window.
A toy fish is moving in the water.
A man is staring at his hand.
Two girls are talking on the phone.
A baby is sneezing and other baby.
A man is playing the guitar.
A person is frying something.
A man is mixing ingredients in a bowl.
Two cats are fighting.
A panda is lying on logs.
.....
GT Caption:

<BOS> A small boy has placed his hands on the window pane and
<BOS> Bath toys are swimming.
<BOS> A bright triangle shape appears on the hand of a man.
<BOS> Two girls are talking in telephone.
<BOS> The babies are sitting down.
<BOS> A man is playing a guitar.
<BOS> The woman is frying vegetables.
<BOS> The man mixed the dough in a bowl.
<BOS> Two cats are playing while sitting on stools.
<BOS> A panda is lounging around.
.....
```

Part 6: Running bleu_eval.py

Score is about 0.617 is bigger than baseline 0.6

```
!python bleu_eval.py test_output.txt
```

```
Average bleu score is 0.6077167702578283
```

Part 7: Plotting Loss Function:

