

Report for Deep Learning (CS541) Homework6:

Report By:

Swapneel Dhananjay Wagholikar (WPI ID: 257598983)

Anuj Pradeep Pai Raikar (WPI ID: 181758784)

The assignment is completed in PyTorch. In the given starter code, pytorch was translating from French to English. We have paired up the dataset by changing the English and French indexes so that the code started translating from English to French. Then, as per the instructions, we have partitioned the data into 80% training and 20% testing.

Version 1: Supervised Training

Network is trained for 75k epochs.

```
hidden_size = 128
encoder_v1 = EncoderRNN(input_lang.n_words, hidden_size, glove_emb = False).to(device)
attn_decoder_v1 = AttnDecoderRNN(hidden_size, output_lang.n_words, dropout_p=0.1).to(device) #output_lang.n_words, dropout_p=0.1

%matplotlib inline
%matplotlib notebook

trainIters(encoder_v1, attn_decoder_v1, 75000, print_every=5000, autoencoder = False)
```

Results:-

We received loss as 1.4577 after training for 75k iterations. Please check the screenshot below for the observed result:

```
1m 13s (- 17m 9s) (5000 6%) 3.5316
2m 21s (- 15m 17s) (10000 13%) 2.9623
3m 29s (- 13m 59s) (15000 20%) 2.7310
4m 37s (- 12m 42s) (20000 26%) 2.4967
5m 46s (- 11m 32s) (25000 33%) 2.3236
6m 53s (- 10m 20s) (30000 40%) 2.1741
8m 2s (- 9m 11s) (35000 46%) 2.0618
9m 11s (- 8m 2s) (40000 53%) 1.9746
10m 18s (- 6m 52s) (45000 60%) 1.8358
11m 27s (- 5m 43s) (50000 66%) 1.7529
12m 35s (- 4m 34s) (55000 73%) 1.7321
13m 44s (- 3m 26s) (60000 80%) 1.6100
14m 53s (- 2m 17s) (65000 86%) 1.5530
16m 0s (- 1m 8s) (70000 93%) 1.5030
17m 8s (- 0m 0s) (75000 100%) 1.4577
```

Evaluations Snap:

```
> i m going to swim every day .  
= je vais nager chaque jour .  
< je vais nager . <EOS>  
  
> i m not really that old .  
= je ne suis pas vraiment aussi vieux .  
< je ne suis pas vraiment vieux . . <EOS>  
  
> i m thrilled .  
= je suis ravie .  
< je suis en . <EOS>  
  
> you re so picky .  
= tu es tellement difficile !  
< vous etes tellement idiot ! <EOS>  
  
> she is always finding fault with other people .  
= elle trouve toujours a redire aux autres .  
< elle est toujours a des des . . <EOS>  
  
> they are making a salad .  
= ils font une salade .  
< ce sont un que . . <EOS>  
  
> you are so stupid .  
= tu es tellement idiote !  
< vous etes tellement idiot ! <EOS>  
  
> you re sneaky .  
= tu es sournoise .  
< vous etes depourvues . <EOS>  
  
> i m pretty happy .  
= je suis assez heureux .  
< je suis assez contente . <EOS>
```

Version 2: Pretraining as autoencoder

Now, again the network is trained for 75k epoch using encoder.

Please find the required screenshot below:

```
[26] hidden_size = 128
      encoder_v2 = EncoderRNN(input_lang.n_words, hidden_size, glove_emb = False).to(device)
      attn_decoder_v2 = AttnDecoderRNN(hidden_size, output_lang.n_words, dropout_p=0.1).to(device) #output_lang.n_words, dropout_p=0.1
      %matplotlib inline
      %matplotlib notebook
      trainIters(encoder_v2, attn_decoder_v2, 75000, print_every=5000, autoencoder = True)
```

Results:-

In this version of the training, the loss is reduced than the previous one and we received it as 0.2313 after training for 75k epochs. Please check the screenshot below for the observed result:

```
1m 11s (- 16m 46s) (5000 6%) 2.6178
2m 19s (- 15m 9s) (10000 13%) 1.8351
3m 28s (- 13m 53s) (15000 20%) 1.4025
4m 36s (- 12m 39s) (20000 26%) 1.1601
5m 44s (- 11m 29s) (25000 33%) 0.9695
6m 53s (- 10m 20s) (30000 40%) 0.8007
8m 1s (- 9m 9s) (35000 46%) 0.6533
9m 9s (- 8m 0s) (40000 53%) 0.5559
10m 17s (- 6m 51s) (45000 60%) 0.4819
11m 26s (- 5m 43s) (50000 66%) 0.4181
12m 33s (- 4m 34s) (55000 73%) 0.4483
13m 42s (- 3m 25s) (60000 80%) 0.3672
14m 49s (- 2m 16s) (65000 86%) 0.3133
15m 58s (- 1m 8s) (70000 93%) 0.2560
17m 6s (- 0m 0s) (75000 100%) 0.2313
```

Evaluations Snap:

✓ [27]
 > you re too tense .
 = tu es trop tendu .
 < faire guerie connue ruses ans <EOS>

> i m at the prison .
 = je suis a la prison .
 < j ai cache frousse cycle ans <EOS>

> he is not what he used to be .
 = il n est plus comme il l etait .
 < en content grassouillet paume en ponctuelle flics sincerement ans <EOS>

> he s handsome and charming .
 = il est beau et a du charme .
 < en forme malade ouvert heroine ans <EOS>

> they re traitors .
 = ce sont des traitres .
 < huit guerie estomac ans <EOS>

> he s lived here his entire life .
 = il a vecu ici toute sa vie .
 < en forme paresseuse perplexes manieres sceptique paresseuse ans <EOS>

> you are a good person .
 = tu es un mec bien .
 < faire avons moi paresseux detenu ans <EOS>

> you are early .
 = tu viens tot .
 < faire avons laide ans <EOS>

> he s so young .
 = il est tellement jeune .
 < en forme allons humain ans <EOS>

Version 3: using pretrained embeddings for English in the Encoder

In version3, we have used pretrained embeddings.

```
[28] hidden_size = 100
      encoder_v3 = EncoderRNN(input_lang.n_words, hidden_size, glove_emb = True).to(device)
      attn_decoder_v3 = AttnDecoderRNN(hidden_size, output_lang.n_words, dropout_p=0.1).to(device) #output_lang.n_words, dropout_p=0.1
      %matplotlib inline
      %matplotlib notebook
      trainIters(encoder_v3, attn_decoder_v3, 75000, print_every=5000, autoencoder = False)
```

Results:-

In this version of the training, we received it as 2.0689 after training for 75k epochs. Please check the screenshot below for the observed:

1m 9s	(- 16m 12s)	(5000 6%)	3.7034
2m 15s	(- 14m 43s)	(10000 13%)	3.2209
3m 21s	(- 13m 25s)	(15000 20%)	3.0170
4m 26s	(- 12m 14s)	(20000 26%)	2.8893
5m 33s	(- 11m 6s)	(25000 33%)	2.7920
6m 38s	(- 9m 57s)	(30000 40%)	2.6788
7m 44s	(- 8m 51s)	(35000 46%)	2.5784
8m 50s	(- 7m 44s)	(40000 53%)	2.5081
9m 56s	(- 6m 37s)	(45000 60%)	2.4328
11m 3s	(- 5m 31s)	(50000 66%)	2.4000
12m 8s	(- 4m 24s)	(55000 73%)	2.2821
13m 14s	(- 3m 18s)	(60000 80%)	2.2218
14m 20s	(- 2m 12s)	(65000 86%)	2.1666
15m 27s	(- 1m 6s)	(70000 93%)	2.0979
16m 33s	(- 0m 0s)	(75000 100%)	2.0689

Evaluations Snap:

[29] > they re terrified of you .
= vous les terrifiez .
< ils sont en . <EOS>

> he is close to the president .
= il est proche du president .
< il est a la de . <EOS>

> he is planning to launch his business .
= il projette de lancer son entreprise .
< il est habitue a il . . <EOS>

> i m still not buying it .
= je ne le gobe toujours pas .
< je ne suis pas sur . <EOS>

> he s the only one who survived .
= il est le seul a avoir survecu .
< c est le qui a la . . <EOS>

> i m economically independent of my parents .
= je suis financierelement independant de mes parents .
< je suis en de de mon <EOS>

> he is a clever boy .
= c est un garcon intelligent .
< c est un peu . <EOS>

> he is included among my friends .
= il compte parmi mes amis .
< il est sur sur de . . <EOS>

> he is seeking a new position .
= il cherche actuellement un nouveau poste .
< il est un un garcon . <EOS>