Deep Learning
Assignment -2
Named Entity Recognition

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(20CS30046)

Contents:

ENGLISH COARSE:
Model hyperparameters:

```
SEQ_LEN = 30
(Maximum allowable length of the list of words from the sentence)
```

- EMBEDDING_DIM = 100
- HIDDEN_DIM   = 100
- NUM_EPOCHS   = 10
- BATCH_SIZE   = 32

Performance:
Model for English Language (coarse grain):

- test_loss | 0.4126929044723511
- precision   recall   f1-score   support
-
-                          <PAD>   1.00   1.00   1.00   3727316
- B-AerospaceManufacturer   0.29   0.25   0.27   1015
- B-AnatomicalStructure   0.31   0.19   0.24   5838
- B-ArtWork   0.18   0.07   0.10   1270
- B-Artist   0.51   0.55   0.53   57034
- B-Athlete   0.46   0.43   0.44   27624
- B-CarManufacturer   0.32   0.20   0.24   2984
- B-Cleric   0.30   0.19   0.23   4732
- B-Clothing   0.20   0.05   0.08   2243
- B-Disease   0.40   0.18   0.25   5622
- B-Drink   0.27   0.15   0.19   2246
- B-Facility   0.33   0.32   0.32   16181
- B-Food   0.14   0.03   0.05   5317
- B-HumanSettlement   0.61   0.54   0.57   41099
- B-MedicalProcedure   0.14   0.07   0.09   3850
- B-Medication/Vaccine   0.16   0.09   0.12   5421
- B-MusicalGRP   0.31   0.16   0.21   12969
- B-MusicalWork   0.38   0.35   0.36   15303
- B-ORG   0.35   0.34   0.35   22414
- B-OtherLOC   0.40   0.22   0.29   4635
- B-OtherPER   0.23   0.31   0.26   22027
- B-OtherPROD   0.26   0.10   0.15   11833
- B-Politician   0.24   0.15   0.18   15990
- ...
-                      accuracy   0.92   7499400
-                     macro avg   0.37   0.26   0.30   7499400
-                  weighted avg   0.91   0.92   0.91   7499400

ENGLISH FINE:
Model hyperparameters:
```
SEQ_LEN = 30
(Maximum allowable length of the list of words from the sentence)
```

- EMBEDDING_DIM = 100
- HIDDEN_DIM   = 100
- NUM_EPOCHS   = 10
- BATCH_SIZE   = 32

Performance:
Model for English Language (fine grain):

- test_loss | 0.3169195353984833
- precision   recall f1-score   support
-
	precision	recall	f1-score	support
<PAD>	1.00	1.00	1.00	2499089
B-CreativeWorks	0.46	0.35	0.40	62057
B-Group	0.48	0.38	0.42	59928
B-Location	0.59	0.56	0.58	67749
B-Medical	0.31	0.26	0.28	22439
B-Person	0.72	0.73	0.72	137485
B-Product	0.23	0.18	0.20	27451
I-CreativeWorks	0.60	0.47	0.53	107119
I-Group	0.58	0.49	0.53	73919
I-Location	0.67	0.65	0.66	62771
I-Medical	0.37	0.30	0.33	10580
I-Person	0.74	0.74	0.74	153359
I-Product	0.23	0.16	0.19	17415
O	0.93	0.96	0.94	2948139
accuracy			0.92	6249500
macro avg	0.57	0.52	0.54	6249500
weighted avg	0.92	0.92	0.92	6249500

HINDI COARSE:
Model hyperparameters:

```
SEQ_LEN = 30

(Maximum allowable length of the list of words from the sentence)
```

- EMBEDDING_DIM = 100
- HIDDEN_DIM   = 100
- NUM_EPOCHS   = 10
- BATCH_SIZE   = 32

Performance:
Model for Hindi Language (coarse grain):

- test_loss | 0.27055782079696655
- precision   recall f1-score   support
-
-

	precision	recall	f1-score	support
<PAD>	1.00	1.00	1.00	258203
B-AerospaceManufacturer	0.31	0.05	0.08	85
B-AnatomicalStructure	0.64	0.55	0.59	489
B-ArtWork	0.20	0.00	0.01	426
B-Artist	0.39	0.35	0.37	1852
B-Athlete	0.51	0.55	0.53	1171
B-CarManufacturer	0.72	0.77	0.74	146
B-Cleric	0.49	0.69	0.57	188
B-Clothing	0.52	0.78	0.62	77
B-Disease	0.67	0.56	0.61	633
B-Drink	0.51	0.79	0.62	135
B-Facility	0.45	0.39	0.42	859
B-Food	0.55	0.46	0.50	428
B-HumanSettlement	0.71	0.62	0.67	5825
B-MedicalProcedure	0.61	0.51	0.56	334
B-Medication/Vaccine	0.53	0.54	0.53	377
B-MusicalGRP	0.48	0.66	0.56	173
B-MusicalWork	0.36	0.66	0.46	44
B-ORG	0.70	0.63	0.66	1847
B-OtherLOC	0.64	0.57	0.60	231
B-OtherPER	0.30	0.30	0.30	741
B-OtherPROD	0.45	0.34	0.39	778
B-Politician	0.47	0.39	0.43	1155
...				
accuracy			0.95	551970
macro avg	0.60	0.53	0.54	551970
weighted avg	0.95	0.95	0.95	551970

HINDI FINE:
Model hyperparameters:
SEQ_LEN = 30

(Maximum allowable length of the list of words from the sentence)

- EMBEDDING_DIM = 100
- HIDDEN_DIM   = 100
- NUM_EPOCHS   = 10
- BATCH_SIZE   = 32

Performance:
Model for Hindi Language (fine grain):

- test_loss | 0.23821161687374115

	precision	recall	f1-score	support
<PAD>	1.00	1.00	1.00	172076
B-CreativeWorks	0.62	0.49	0.54	2795
B-Group	0.74	0.73	0.73	3888
B-Location	0.74	0.61	0.67	7148
B-Medical	0.60	0.62	0.61	1957
B-Person	0.72	0.60	0.65	5714
B-Product	0.48	0.51	0.49	1590
I-CreativeWorks	0.70	0.47	0.57	3894
I-Group	0.84	0.77	0.81	5553
I-Location	0.74	0.64	0.69	3246
I-Medical	0.67	0.56	0.61	790
I-Person	0.76	0.59	0.67	6500
I-Product	0.52	0.47	0.50	741
O	0.96	0.98	0.97	244083
accuracy			0.95	459975
macro avg	0.72	0.65	0.68	459975
weighted avg	0.95	0.95	0.95	459975

BENGALI COARSE:
Model hyperparameters:
```
SEQ_LEN = 30
(Maximum allowable length of the list of words from the sentence)
```

- EMBEDDING_DIM = 100
- HIDDEN_DIM   = 100
- NUM_EPOCHS   = 10
- BATCH_SIZE   = 32

Performance:
Model for Bengali Language (coarse grain):

- test_loss | 0.2614765763282776
- precision   recall f1-score   support
-
-

	precision	recall	f1-score	support
<PAD>	1.00	1.00	1.00	339381
B-AerospaceManufacturer	0.20	0.04	0.07	97
B-AnatomicalStructure	0.62	0.51	0.56	532
B-ArtWork	0.22	0.01	0.02	455
B-Artist	0.42	0.37	0.39	2744
B-Athlete	0.35	0.30	0.32	1087
B-CarManufacturer	0.56	0.88	0.69	84
B-Cleric	0.60	0.52	0.56	240
B-Clothing	0.12	0.71	0.20	17
B-Disease	0.58	0.61	0.60	554
B-Drink	0.60	0.75	0.67	120
B-Facility	0.49	0.40	0.44	894
B-Food	0.32	0.34	0.33	453
B-HumanSettlement	0.74	0.63	0.68	6011
B-MedicalProcedure	0.60	0.59	0.59	266
B-Medication/Vaccine	0.44	0.52	0.48	462
B-MusicalGRP	0.52	0.55	0.54	300
B-MusicalWork	0.38	0.35	0.36	226
B-ORG	0.75	0.63	0.68	1988
B-OtherLOC	0.56	0.67	0.61	172
B-OtherPER	0.25	0.33	0.29	1117
B-OtherPROD	0.33	0.30	0.32	704
B-Politician	0.38	0.28	0.32	1294
...				
accuracy			0.95	595770
macro avg	0.55	0.53	0.53	595770
weighted avg	0.95	0.95	0.95	595770

BENGALI FINE:
Model hyperparameters:
```
SEQ_LEN = 30
(Maximum allowable length of the list of words from the sentence)
```

- `EMBEDDING_DIM = 100`
- `HIDDEN_DIM   = 100`
- `NUM_EPOCHS   = 10`
- `BATCH_SIZE   = 32`

Performance:
Model for Bengali Language (fine grain):

- test_loss | 0.23504815995693207

	precision	recall	f1-score	support
<PAD>	1.00	1.00	1.00	240692
B-CreativeWorks	0.57	0.47	0.51	3639
B-Group	0.69	0.70	0.70	3651
B-Location	0.75	0.61	0.67	7375
B-Medical	0.54	0.63	0.58	1916
B-Person	0.70	0.61	0.65	6934
B-Product	0.45	0.46	0.46	1491
I-CreativeWorks	0.70	0.52	0.60	4695
I-Group	0.80	0.79	0.80	4970
I-Location	0.78	0.68	0.73	3302
I-Medical	0.57	0.60	0.58	669
I-Person	0.75	0.64	0.69	7694
I-Product	0.48	0.48	0.48	761
O	0.95	0.97	0.96	208686
accuracy			0.95	496475
macro avg	0.70	0.66	0.67	496475
weighted avg	0.95	0.95	0.95	496475

Links for model files:

https://drive.google.com/drive/folders/1FtGo8nvPDswijWOsJLq4VyHoA53xsOZj?usp=sharing