ELL881 – Assignment-2

Report By:

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Named Entity Recognition

In this assignment I have used LSTM for a Named Entity Recognition.

Data pre-processing:

Split the train data into train (83.34%) and validation set (16.66%).

Loading Glove Embeddings:

Used pre-trained word vectors from Glove. Glove provides word vectors in four different dimensions (50, 100, 200, 300). I tried experiment with all the embedding dimensions and tried to find the best embedding which serves our purpose. For words for which embeddings do not exist I have used random Embeddings.

LSTM Implementation:

For this task, I used a Bi-Directional LSTM. Here, we have Hidden Dimension as hyperparameter. I tried to experiment with different hidden dimension for different embedding dimensions and tried to find the best parameters.

Other than LSTM layer we have a fully connected layer which is used for output projection. At the output layer (having 22(tag set size) neurons), used SoftMax activation.

Used Negative Log Likelihood Loss function.

Trained the network using Adam Optimization based gradient descent with a learning rate of 0.01.
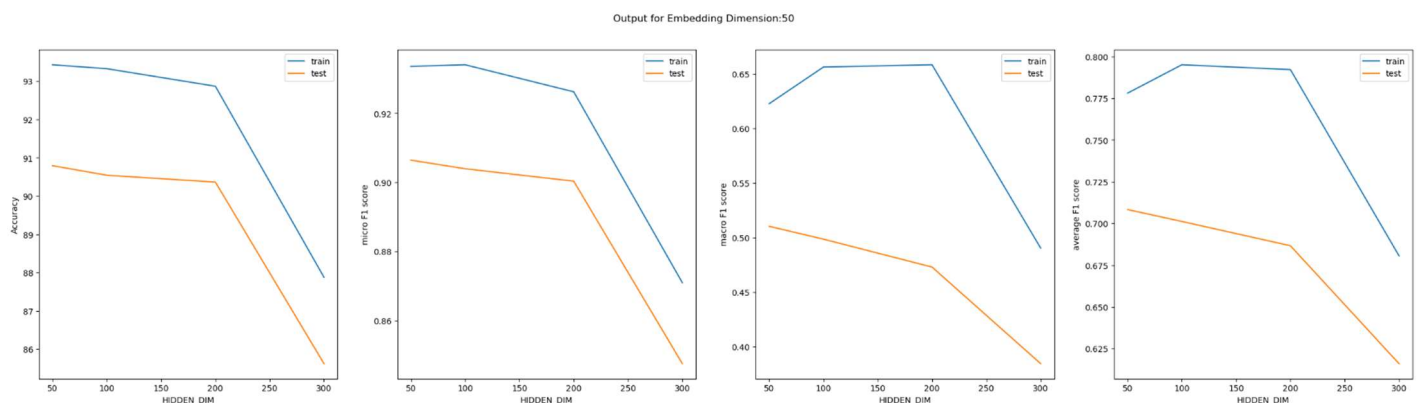
Evaluation:

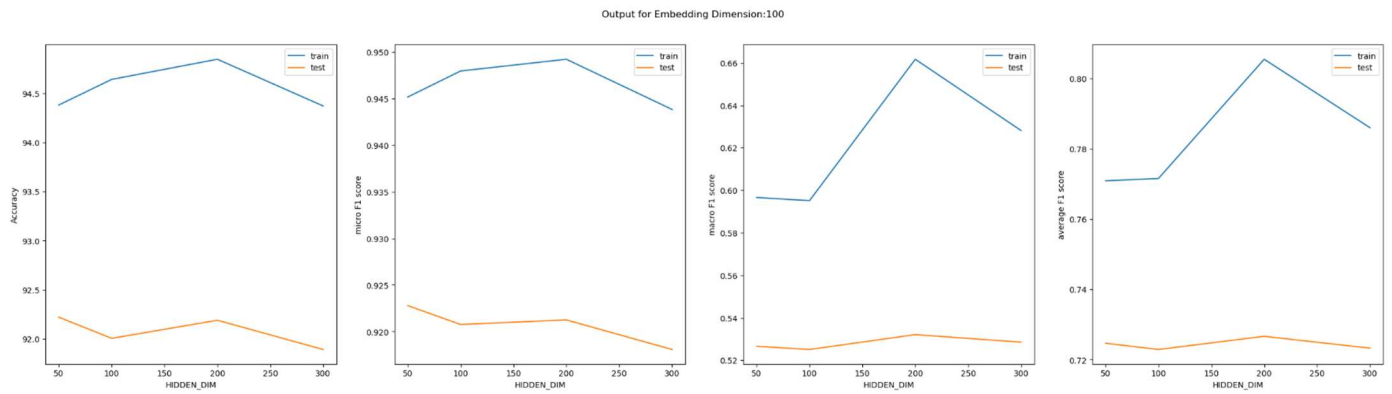Evaluated the model using four metrics.

1. Accuracy
2. Micro F1 score
3. Macro F1 score
4. Average F1 score

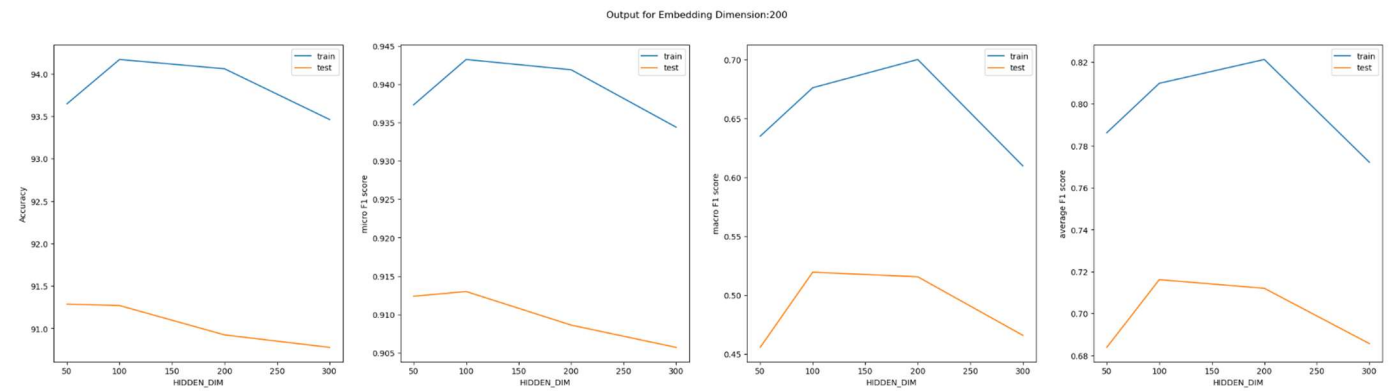**Experiment:** (Varied embedding and hidden dimension)
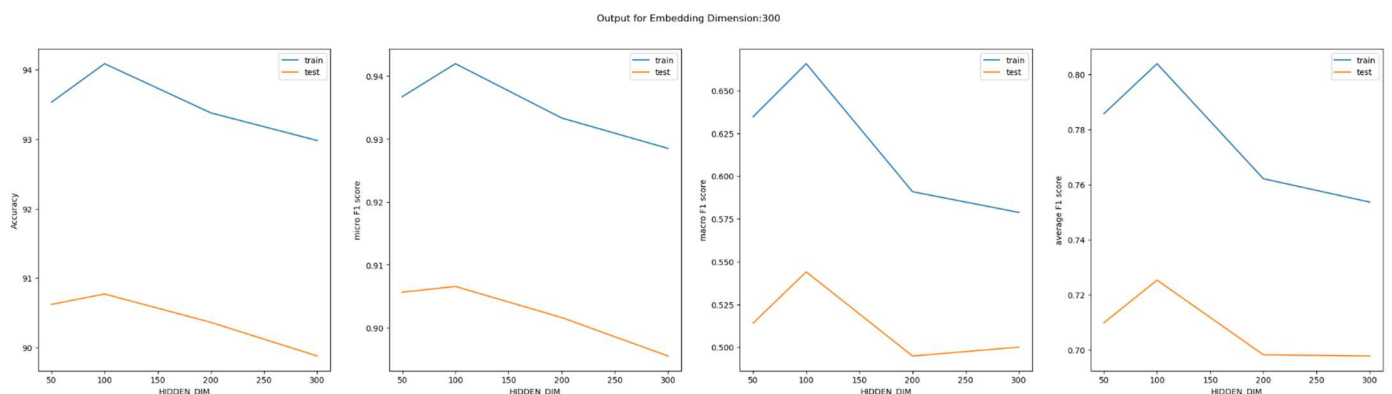
Results for Embedding Dimension=50:

Results for Embedding Dimension=100:

Output for Embedding Dimension:100

Results for Embedding Dimension=200:

Output for Embedding Dimension:200

Results for Embedding Dimension=300:

Output for Embedding Dimension:300

From the above plots, it can be observed that **Embedding DIM=100** and **Hidden DIM=200**, were giving good results for both train and validation data.

Final Scores

Scores on Training Data:
Micro F1 score: 0.9456064215094463
Macro F1 score: 0.6453163182907482
Average F1 score: 0.7954613699000972
Accuracy: 94.58131429057214

Scores on Test Data:
Micro F1 score: 0.9145083379857757
Macro F1 score: 0.5336768869162866
Average F1 score: 0.7240926124510312
Accuracy: 91.66051037423222

Scores on Validation Data:
Micro F1 score: 0.9199738476626349
Macro F1 score: 0.5269121369190366
Average F1 score: 0.7234429922908358
Accuracy: 92.09511932430134