Deep Learning Lab 3

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Introduction:

In this lab we are applying three different deep learning models that are Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), and LSTM Neural Networks on the same dataset to be able to compare the resultant outcomes as we running similar training sessions.

Objective:

To apply a test classification deep learning model using a standard dataset, and study any possible differences.

Approaches/Methods:

The theoretical approach is by running a specific number of training epochs using each of CNN, RNN, and LSTM deep learning models. The models are doing the same thing which is text classification.
The programmatical approach is by let the python program load the data set from the example dataset file (mk.txt) folder. Then we set the training/splitting percentages of the datasets used. Next, we create an initial numerical representation for the vocabularies used. Next, we apply the CNN, RNN, SLTM filters that are been randomized initially. Finally, we test the learned data to compare the accuracy.

Workflow:

1- Loading the unified data sets from the text file (mk.txt).
2- Parse and read the dataset.
3- Include the data as sessions in loop to start run it.
4- These sessions will maintain training the data and optimizing it.
5- Provide the reached accuracy.
6- Changing the hyperparameters to find out their impact on the work flow and the results.

Datasets:

The dataset used is a story that is talking about a political events so the accumulated dictionary of the vocabularies will be within a specific scope.

Parameters:

1- Learning Rate
2- Training Epoch
3- Batch Size
4- Display Step

Evaluation & Discussion:

CNN: Accuracy: from (78%) to (99%) during the first 100 training sessions
CNN: Loss: from (83%) to (~0%) during the first 100 training sessions

RNN: Accuracy: from (1%) to (%5) during the first 100 training sessions
RNN: Loss: from (54%) to (11%) during the first 100 training sessions

LSTM: Accuracy: from (1%) to (15%) during the first 100 training sessions
LSTM: Loss: from (17%) to (4%) during the first 100 training sessions

Conclusion

Based on the results above, using SLTM is improving the model performance in this application during the first 100 iterations. However, the CNN is giving the best results in this application during the same number of iteration.

References

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