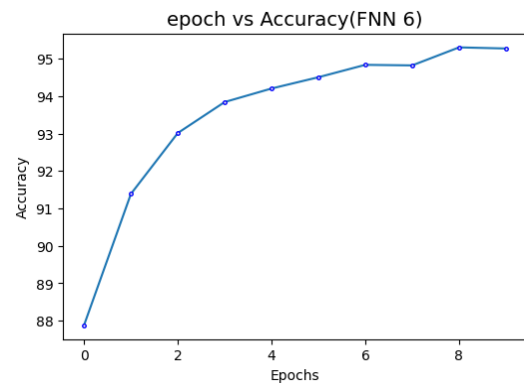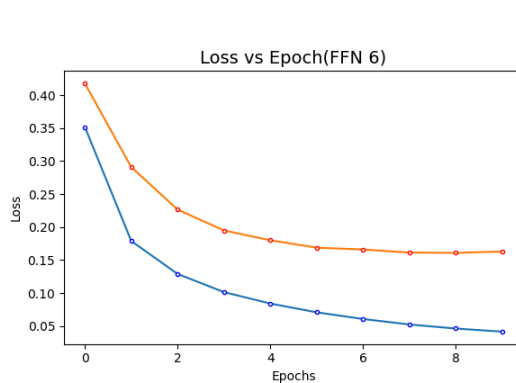# iNLP Assignment 2 Report

Submitted by: Shukan Patel
25/02/2024

1. FNN Configurations
CONF 1

embedding_dim = 25
hidden_dim = 25
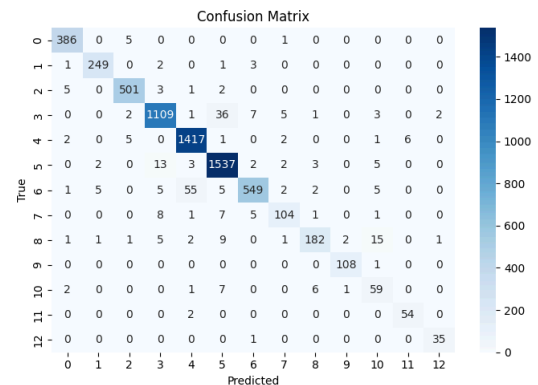learning_rate = 0.01
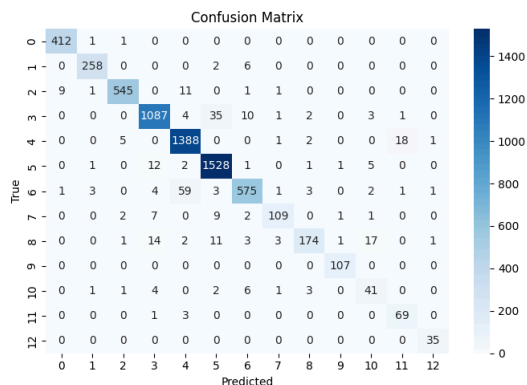

Loss vs Epoch(FFN 6)

epoch vs Accuracy(FNN 6)

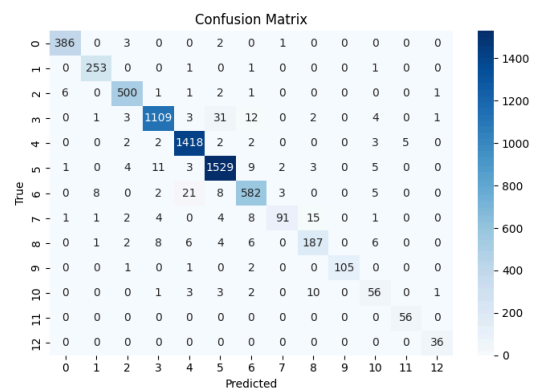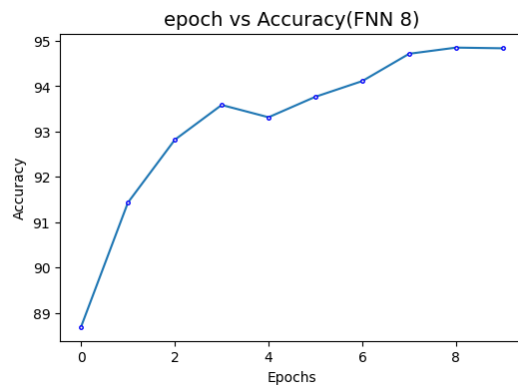| Dev :	Test:
Accuracy: 0.9527250828063836	Accuracy: 0.9527250828063836
Recall (micro): 0.9527250828063836	Recall (micro): 0.9527250828063836
F1 Score (micro): 0.9527250828063836	F1 Score (micro): 0.9527250828063836
F1 Score (macro): 0.915114904106855	F1 Score (macro): 0.9151149041068556

Confusion Matrix

Confusion Matrix

iNLP Assignment 2 Report

CONF 2 (Higher embedding size)

embedding_dim = 100
hidden_dim = 25
learning_rate = 0.01

Loss vs Epoch(FNN 7)

epoch vs Accuracy(FNN 7)

Dev :
Accuracy: 0.9588979223125564
Recall (micro): 0.9588979223125564
F1 Score (micro): 0.9588979223125564
F1 Score (macro): 0.9315474532645684

Test:
Accuracy: 0.955775075987842
Recall (micro): 0.955775075987842
F1 Score (micro): 0.955775075987842
F1 Score (macro): 0.9333712148598946

Confusion Matrix

Confusion Matrix

iNLP Assignment 2 Report

CONF 3 (Two hidden layers)

embedding_dim = 25
hidden_dim1 = 25
hidden_dim2 = 100
learning_rate = 0.01

Loss vs Epoch(FNN 8)

epoch vs Accuracy(FNN 8)

Dev :
Accuracy: 0.9563384522734116
Recall (micro): 0.9563384522734116
F1 Score (micro): 0.9563384522734116
F1 Score (macro): 0.9209797680652171

Test:
Accuracy: 0.9586626139817629
Recall (micro): 0.9586626139817629
F1 Score (micro): 0.9586626139817629
F1 Score (macro): 0.9268787156695731

Confusion Matrix

Confusion Matrix

CONF 4 (Used tanh activation)

embedding_dim = 25
hidden_dim = 25
learning_rate = 0.1

Loss vs Epoch(FNN 8)

epoch vs Accuracy(FNN 8)
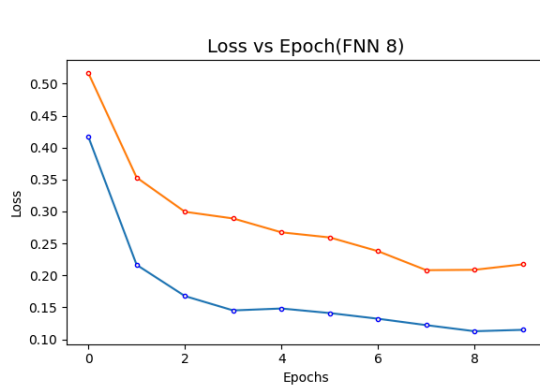
Dev :	Test:
Accuracy: 0.9483589280337248	Accuracy: 0.9501519756838905
Recall (micro): 0.9483589280337248	Recall (micro): 0.9501519756838905
F1 Score (micro): 0.9483589280337248	F1 Score (micro): 0.9501519756838905
F1 Score (macro): 0.8933870614243996	F1 Score (macro): 0.8984601365732543

Confusion Matrix

Confusion Matrix
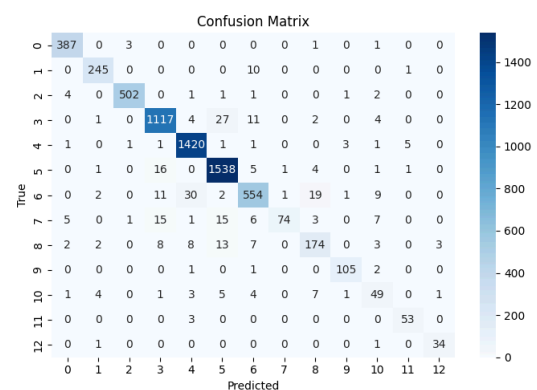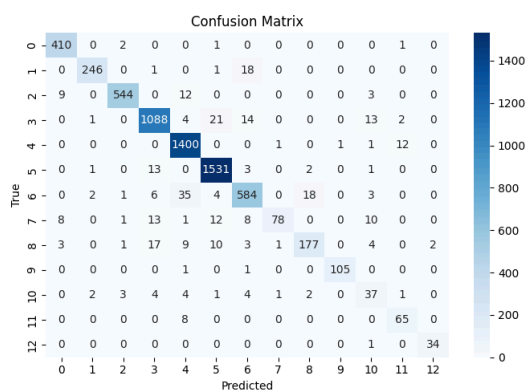
iNLP Assignment 2 Report

WINDOW 0

embedding_dim = 25
hidden_dim = 25
learning_rate = 0.01

Loss vs Epoch(FNN 8)

epoch vs Accuracy(FNN 8)
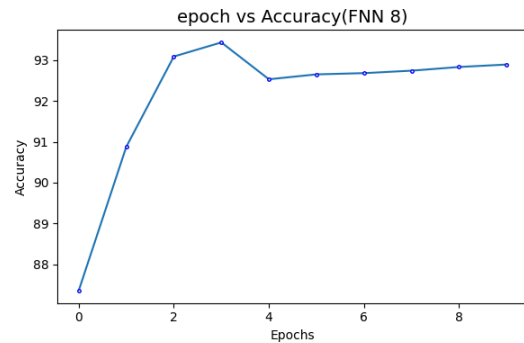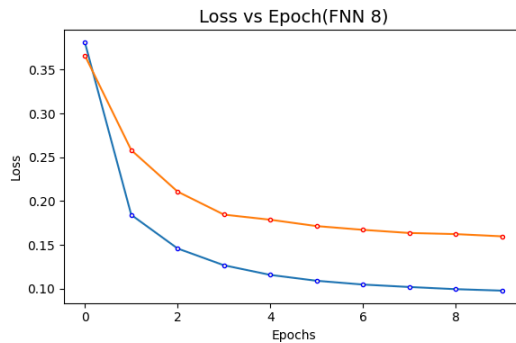
Dev :
Accuracy: 0.9289370671484493
Recall (micro): 0.9289370671484493
F1 Score (micro): 0.9289370671484493
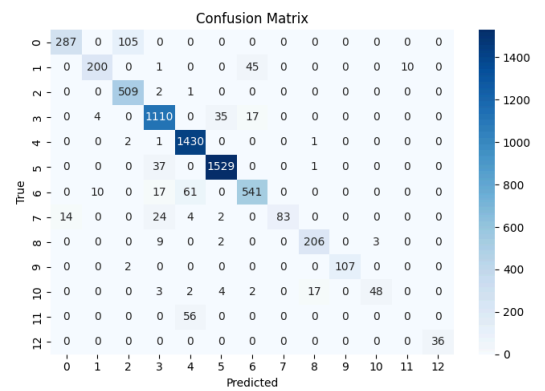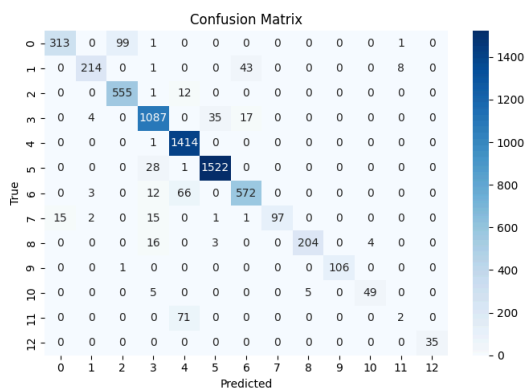F1 Score (macro): 0.853021034576875

Test:
Accuracy: 0.9249240121580548
Recall (micro): 0.9249240121580548
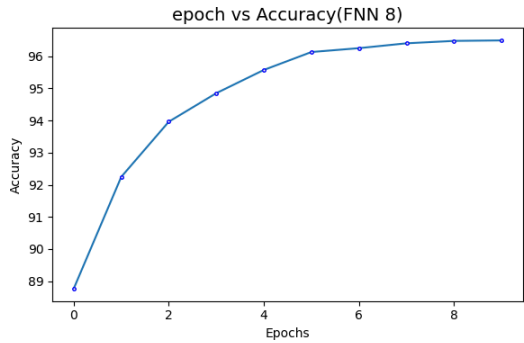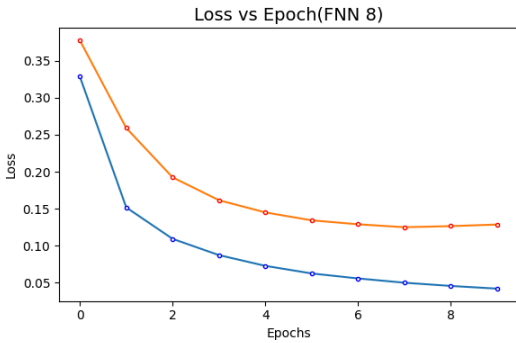F1 Score (micro): 0.9249240121580548
F1 Score (macro): 0.8298528106098898

Confusion Matrix

Confusion Matrix

iNLP Assignment 2 Report

WINDOW 1

embedding_dim = 25
hidden_dim = 25
learning_rate = 0.01

Loss vs Epoch(FNN 8)

epoch vs Accuracy(FNN 8)

Dev :	Test:
AccuAccuracy: 0.9649202047576031	Accuracy: 0.9648936170212766
Recall (micro): 0.9649202047576031	Recall (micro): 0.9648936170212766
F1 Score (micro): 0.9649202047576031	F1 Score (micro): 0.9648936170212766
F1 Score (macro): 0.9498869264899954	F1 Score (macro): 0.9457098779188464

Confusion Matrix

Confusion Matrix

iNLP Assignment 2 Report

WINDOW 2

embedding_dim = 25
hidden_dim = 25
learning_rate = 0.01

Loss vs Epoch(FNN 8)

epoch vs Accuracy(FNN 8)

Dev :
Accuracy: 0.9566395663956639
Recall (micro): 0.9566395663956639
F1 Score (micro): 0.9566395663956639
F1 Score (macro): 0.9297079787951064

Test:
Accuracy: 0.9582066869300911
Recall (micro): 0.9582066869300911
F1 Score (micro): 0.9582066869300911
F1 Score (macro): 0.9308397229096852

Confusion Matrix

Confusion Matrix

iNLP Assignment 2 Report

WINDOW 3

embedding_dim = 25
hidden_dim = 25
learning_rate = 0.01

epoch vs Accuracy(FNN 8)

Loss vs Epoch(FNN 8)
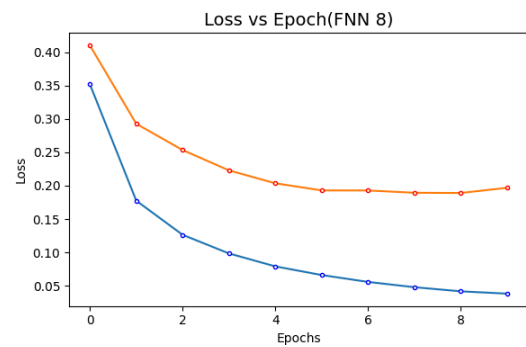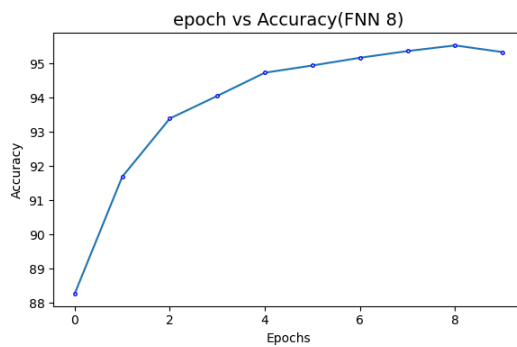
Dev :
Accuracy: 0.9533273110508883
Recall (micro): 0.9533273110508883
F1 Score (micro): 0.9533273110508883
F1 Score (macro): 0.9171764498115329

Test:
Accuracy: 0.9580547112462006
Recall (micro): 0.9580547112462006
F1 Score (micro): 0.9580547112462006
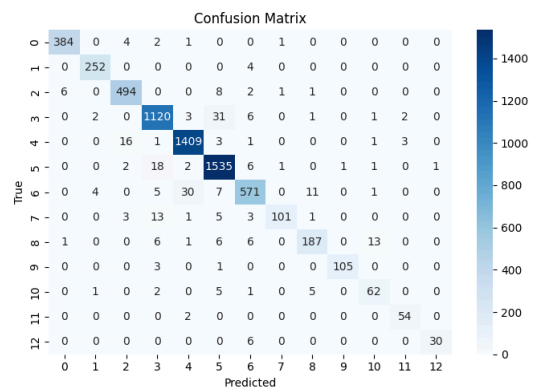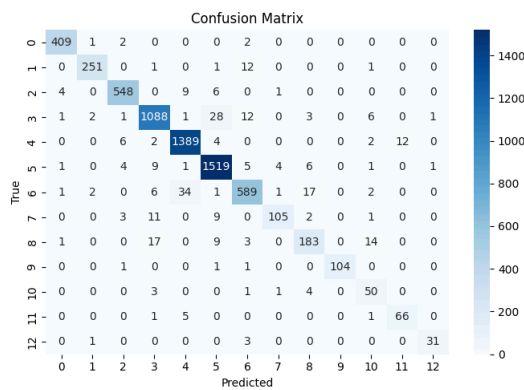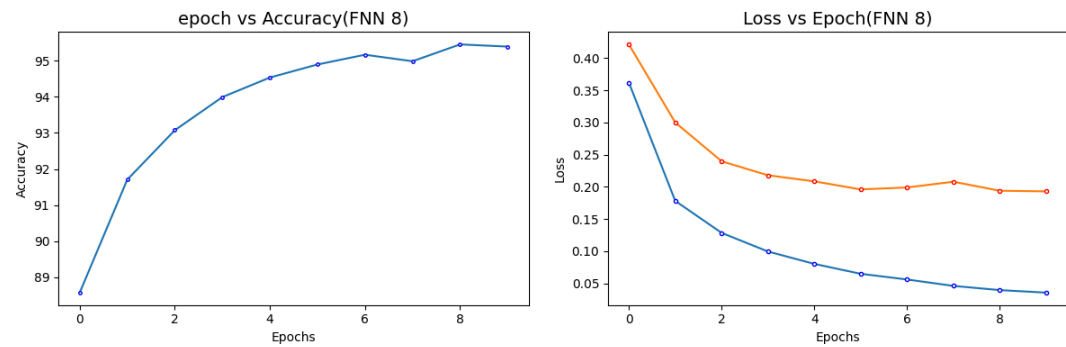F1 Score (macro): 0.9316682251599857

Confusion Matrix

Confusion Matrix

iNLP Assignment 2 Report

WINDOW 4

embedding_dim = 25
hidden_dim = 25
learning_rate = 0.01

epoch vs Accuracy(FNN 8)

Loss vs Epoch(FNN 8)

Dev :
Accuracy: 0.9539295392953929
Recall (micro): 0.9539295392953929
F1 Score (micro): 0.9539295392953929
F1 Score (macro): 0.912748095978223

Test:
Accuracy: 0.9566869300911854
Recall (micro): 0.9566869300911854
F1 Score (micro): 0.9566869300911854
F1 Score (macro): 0.9150190642611826

Confusion Matrix

Confusion Matrix
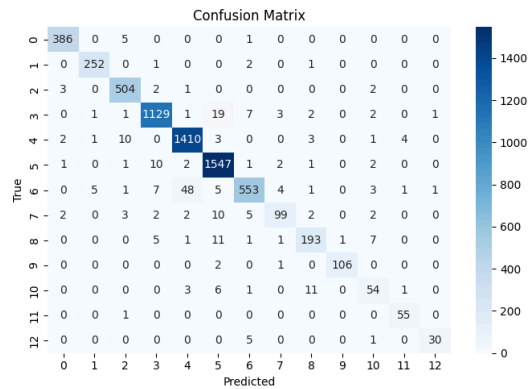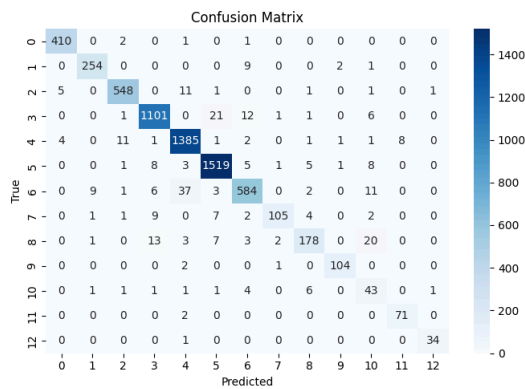
iNLP Assignment 2 Report

Analysis:

FNN window vs Accuracy Graph - Shukan
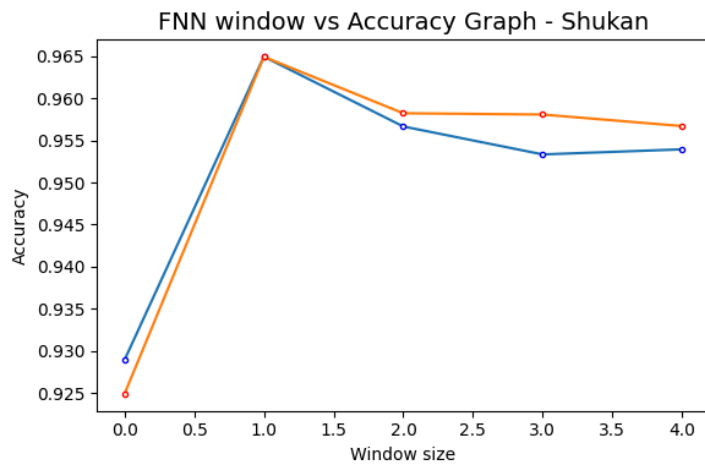
- For window size 1 It performs best.
- Large embedding size and very small embedding size also affects the performance
- Lower learning rate takes time to converge but decreases loss in a better way.

iNLP Assignment 2 Report

2. <u>RNN</u>

CONF Name	Dev Evaluation Matrices	Test Evaluation Matrices
vanilla_rnn_model_1.pth embedding_dim = 50 hidden_dim = 20 learning_rate = 0.1	Accuracy: 0.9504667268894911 Recall (micro): 0.9504667268894911 F1 Score (micro): 0.9504667268894911 F1 Score (macro): 0.9241342572856399	Accuracy: 0.9507598784194529 Recall (micro): 0.9507598784194529 F1 Score (micro): 0.9507598784194529 F1 Score (macro): 0.9293503940883175
vanilla_rnn_model_2.pth embedding_dim = 100 hidden_dim = 50 learning_rate = 0.07	Accuracy: 0.9188497440529961 Recall (micro): 0.9188497440529961 F1 Score (micro): 0.9188497440529961 F1 Score (macro): 0.8066397337735602	Accuracy: 0.9124620060790274 Recall (micro): 0.9124620060790274 F1 Score (micro): 0.9124620060790275 F1 Score (macro): 0.7851919476112363
vanilla_rnn_model_3.pth embedding_dim = 20 hidden_dim = 20 learning_rate = 0.01	Accuracy: 0.8367961457392352 Recall (micro): 0.8367961457392352 F1 Score (micro): 0.8367961457392352 F1 Score (macro): 0.6448543295068666	Accuracy: 0.8349544072948328 Recall (micro): 0.8349544072948328 F1 Score (micro): 0.834954407294833 F1 Score (macro): 0.6453843087199294
vanilla_rnn_model_4.pth embedding_dim = 50 hidden_dim = 20 learning_rate = 0.1	Accuracy: 0.9370671484492623 Recall (micro): 0.9370671484492623 F1 Score (micro): 0.9370671484492623 F1 Score (macro): 0.8585169592568442	Accuracy: 0.9337386018237082 Recall (micro): 0.9337386018237082 F1 Score (micro): 0.9337386018237082 F1 Score (macro): 0.8434242117847301
vanilla_rnn_model_5.pth embedding_dim = 50 hidden_dim = 50 learning_rate = 0.1	Accuracy: 0.9183980728696176 Recall (micro): 0.9183980728696176 F1 Score (micro): 0.9183980728696176 F1 Score (macro): 0.7981641235208994	Accuracy: 0.9159574468085107 Recall (micro): 0.9159574468085107 F1 Score (micro): 0.9159574468085107 F1 Score (macro): 0.7960137061973285

- For embedding size 50 the model works best, I tried with lower and higher values but it gives best for 50.
- I tried with greater than one batch size but performance was too poor.