End Semester Examination

Course Name: Foundations of Machine Learning **Code:** CS 564

Marks: 20 **Duration:** Nov 25, 10:00-Nov 26, 9:30

Make reasonable assumptions as and whenever necessary. Carefully read the instructions circulated in the group on Nov 24, 2021.

Q1. **15 points**

Please refer to the Assignment-4, Dated-Nov 17, 2021 on document classification. It talks about implementation of a Feed Forward Neural Network with a set of specifications.

For the same document classification problem, implement the following algorithms:

i. Vanilla RNN (Consider *two hidden layers*, and also use the other *specifications as mentioned in Assignment-4*)

ii. Re-implement the Feed Forward Neural Network (FFN) of Assignment-4 by initializing the weights to the (near) optimal weights of the FFN of Assignment-4 (*only tanh as the activation layer, and take the weights after the model converges*).

iii. You have three models now: FFN of Assignment-4 with tanh as the activation function, FFN of (ii) above and the Vanilla RNN of (i) above. Form an ensemble by combining the decisions of all these models by majority voting. Create another version of the ensemble model by weighted voting, where weights can be the accuracy value of these models on the validation data (i.e. 10% of the data).

Documents to submit:

i. Codes with appropriate documentation;

ii. Outputs of all the three models on the 20% test data;

iii. Output from the Ensemble model on the test data (20%);

iv. Overall Accuracy and Class-wise Accuracy of the three individual models as well as the ensemble model on the test data (20%);

v. Mention how many instances were misclassified by any of the three models, but correctly classified in the ensemble model; how many were wrongly classified by all three individual models, but were correctly classified by the ensemble;

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Best of Luck