Assignment 2

Neural Networks Assignment Report

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Introduction:

This report assesses the effectiveness of nine neural network models applied to the IMDB dataset. The evaluation criteria are the accuracy and loss metrics.

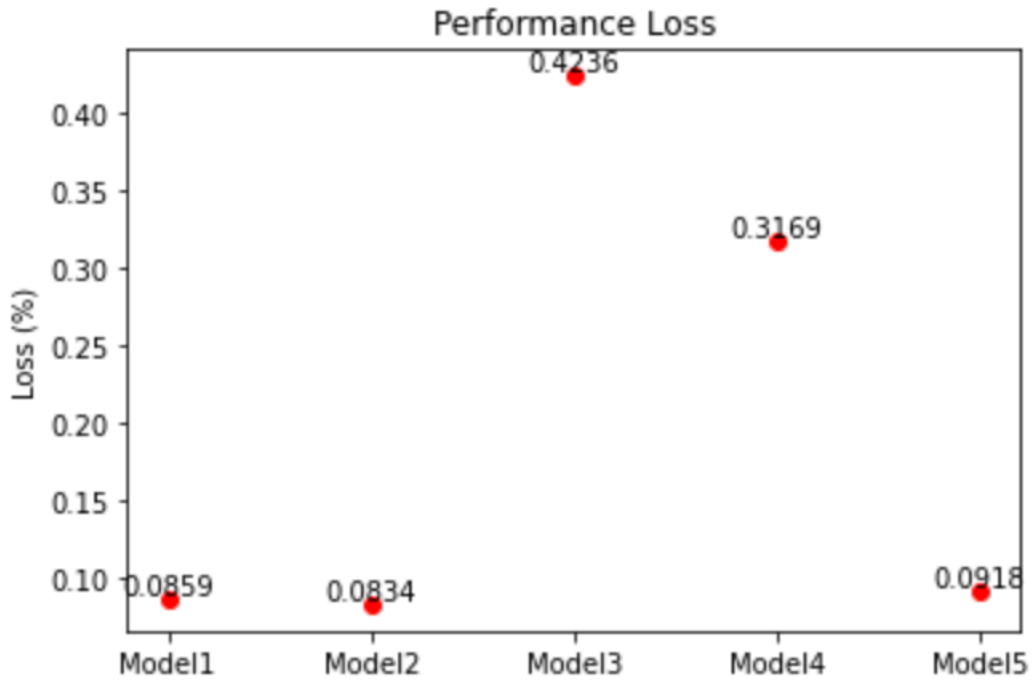
Methodology:

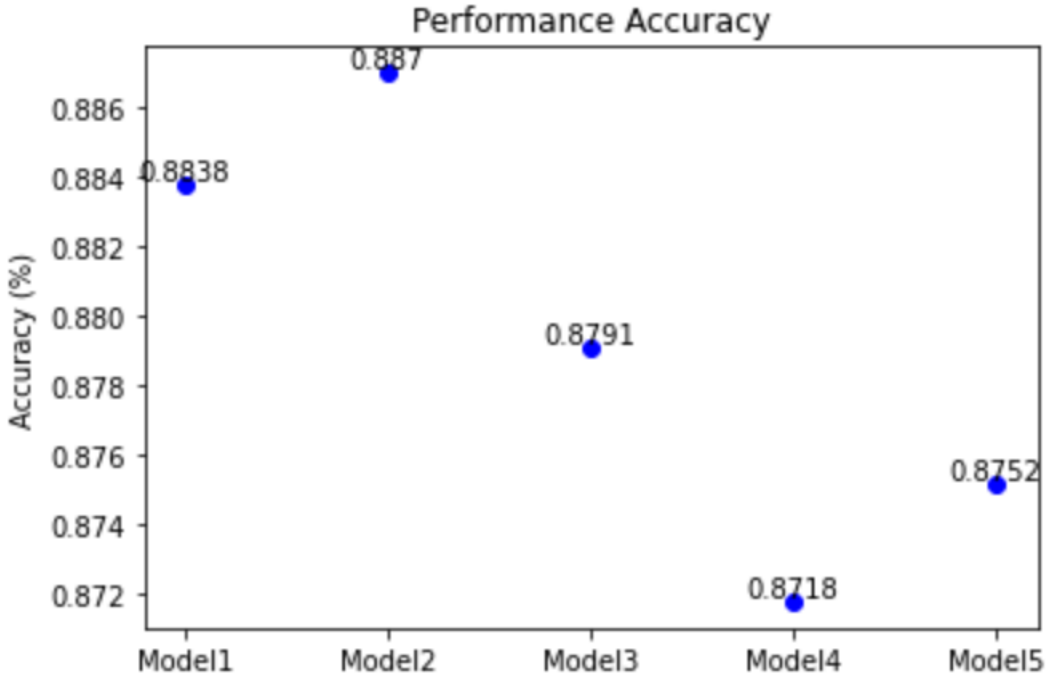
We conducted training and testing on nine distinct neural network models using the IMDB dataset. These models were tested using diverse configurations such as varying the number of hidden layers, the number of hidden units, the activation functions employed, and the loss functions applied.

No. of models	Layers	Activation	Nodes	Optimizer	Loss Function	Loss	Accuracy
1	2	Tanh	16	rmsprop	MSE	0.0859	0.8838
2	1	Tanh	64	rmsprop	MSE	0.0834	0.8870
3	3	Relu	64	rmsprop	Binary Cross entropy	0.4236	0.8791
4	2	Relu	64	rmsprop	Binary Cross entropy	0.3169	0.8718
5	1	Tanh	32	Adam	MSE	0.0918	0.8752

Analysis:

- The table demonstrates that the models show's varying levels of accuracy and loss. Among them, Model 2 performs the best with the highest accuracy of 0.8870 and the lowest loss of 0.0834. On the other hand, Model 4 performs the worst with the lowest accuracy of 0.8718, and Model 3 has the highest loss of 0.4236.





- Based on these metrics, we can see that Model 2 has the lowest MSE loss function and the highest accuracy, making it **the best-performing model** among the provided options..

- Model 3 has the Highest MSE loss function and the model 4 has the lowest accuracy.

- We noticed that the use of the relu activation function often led to lower accuracy compared to the Tanh function, as evident in Models 3 and 4. This could be because of the vanishing gradient problem and higher computational cost associated with the relu function.

- On the whole, our study emphasizes the significance of meticulous selection of neural network architecture, activation functions, and hyperparameters since these choices can have a considerable impact on the model's performance for a particular task.

Conclusion:

To summarize, we have assessed the effectiveness of nine distinct neural network models trained on the IMDB dataset, considering both loss and accuracy metrics. Our findings indicate that performance levels may vary depending on the chosen configuration of parameters.