**Understanding Neural Networks through TensorFlow Playground**

Introduction

Mainly this assignment felt like an introduction to soft creating models. Neural networks are computer models inspired by the human brain, designed to recognize patterns and relationships in data. This report summarizes a series of experiments that I conducted using tensor flow to learn more about the complexity on models.

Task 1 - Activation Functions

The first task involved testing different activation functions to observe their influence on the learning process.

Activation functions in neural networks determine whether a neuron should be activated or not to allowing the Neural Network to model non-linear relationships in the data.

After playing with layers, it doesnt look like any addtional layers have an effect on the models training and tests losses. but it blurs out the colors which in turn evens out the weight value nearer one.

Task 2 - Hidden Layer Neurons

Next, the effect of the number of neurons and hidden layers on learning was explored. From my observations, the neurons values average out when you have multiple neurons but most of the generated neurons have random-ish values between the x and y. I figured that neurons process and transmit information, while hidden layers help the network learn complex patterns by transforming inputs through multiple layers of abstraction.

Task 3 - Learning Rate

Learning rate experiments highlighted the importance of tuning this parameter for efficient training. The learning rate is a hyperparameter that controls how much the model’s weights are updated during training. A low learning rate like 0.01, resulted in a slow model. But on the other hand too high of a learning rate, like 10, sped up learning but caused unstable fluctuations. This experiment showed how a learning rate affects a model.

Task 4 - Data Noise

The impact of data noise on generalization was another key aspect of the experiments. The more noise added the more random variations and its harder to see a real pattern. This highlighted the need for filtering noise.

Task 5 - Dataset Exploration

The final task was just me trying the different 3 data sets. Simple datasets were easy to learn or navigate. Understanding the dataset’s complexity proved crucial in selecting the appropriate network architecture because without the foundation there is nothing you can really do to edit or create models. Practicing different datasets is always good practice.

Conclusion

This hands on exploration with TensorFlow Playground highlighted the basic structure or nature of model design. That to me is the most important thing I got out of this. At first trying to figure out what each parameter was doing was hard it looked like it had little effects. This soft approach, combined with a deep understanding of each parameter’s role, is key to mastering neural networks and applying them successfully in practice. Overall I enjoyed this experience.