Backpropagation Report

CS_30

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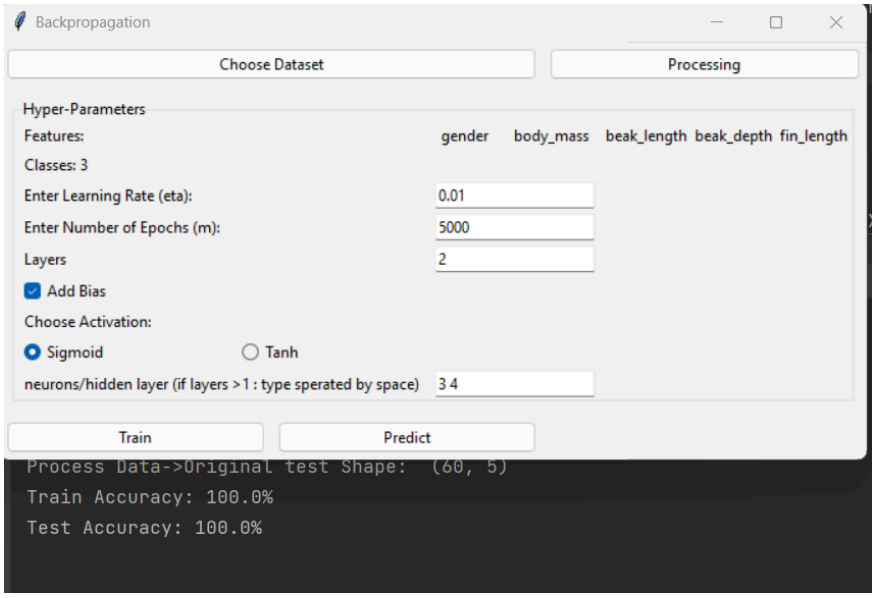
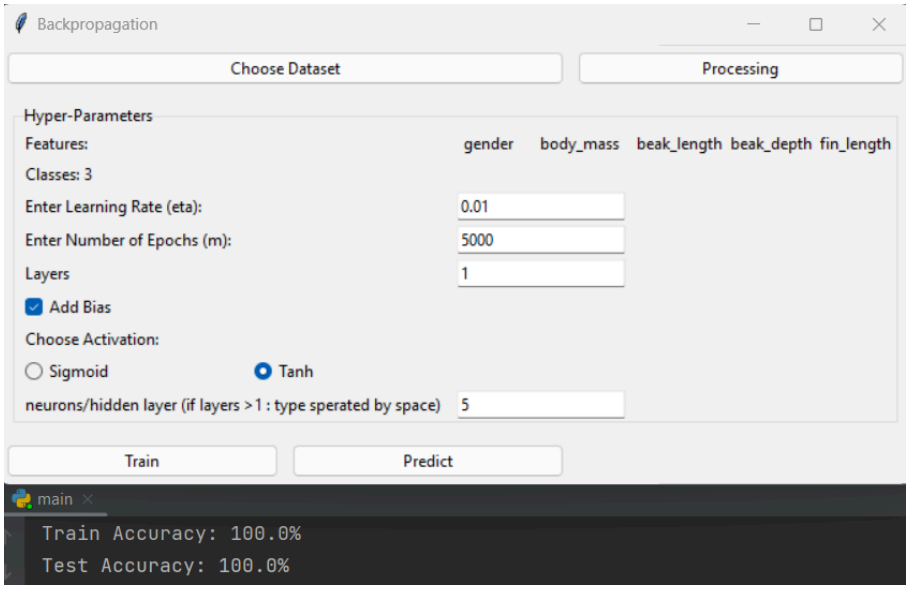
Results

Activation Function	Train Accuracy	Test Accuracy	LR	Epochs	#Layers	#HiddenNodes
Sigmoid	100%	100%	0.01	5000	2	3, 4
Tanh	100%	100%	0.01	5000	1	5





Conclusion

Weight initialization is very important for training deep neural networks. In this study, we found that using “0.6 * np.random.randn(self.hidden_size[0], self.input_size)” instead of 0.01 for initializing weights improved the model’s performance. Smaller weights can cause gradients to become too small during backpropagation, making it hard for the model to learn.

Using larger initial weights helps keep the gradients from shrinking, making training faster and improving accuracy. This shows that choosing the right weight initialization can make training more stable and effective.