

01. What happens when the number of hidden nodes increase?

As the number of hidden nodes increases, the accuracy of the neural network initially improves.

After a certain point, adding more hidden nodes does not significantly increase the accuracy and may even cause a slight decrease in performance due to overfitting.

02. Can you explain the pattern of the accuracy when the hidden nodes increase?

With very few hidden nodes, the model is too simple to capture the complexity of the data, leading to low accuracy (underfitting).

As the number of hidden nodes increases, the model becomes better at capturing the patterns in the data, leading to higher accuracy.

When it reach a certain number of hidden nodes, the model's performance slightly decreases because the model becomes too complex and starts to overfit the training data, capturing noise instead of useful patterns.

Low Hidden Units (1-2 hidden units):

Accuracy for 1 hidden units: 67.5 %

Accuracy for 2 hidden units: 67.25 %

Explanation: With only 1 or 2 hidden units, the model has very limited capacity to capture the complexity of the data. This results in underfitting, where the model cannot adequately learn the patterns in the data, leading to low accuracy. Increasing Hidden Units (3-5 hidden units):

Accuracy for 3 hidden units: 90.75 %

Accuracy for 4 hidden units: 90.5 %

Accuracy for 5 hidden units: 91.25 %

Explanation: As the number of hidden units increases from 3 to 5, the accuracy significantly improves. This suggests that the model now has enough capacity to capture the underlying patterns in the data, reducing underfitting and better generalizing to the

input data. The slight fluctuations in accuracy are normal and can be attributed to variations in the training process. Further Increasing Hidden Units (20-50 hidden units):

Accuracy for 20 hidden units: 90.5 %

Accuracy for 50 hidden units: 90.75 %

Explanation: With 20 and 50 hidden units, the accuracy does not significantly improve compared to having 3-5 hidden units. In fact, there might be a slight decrease in some cases. This indicates that beyond a certain point, adding more hidden units does not necessarily lead to better performance. The model might start to overfit the training data, capturing noise rather than useful patterns, or the increased complexity does not provide additional benefits for the given dataset.