Maximums highlighted in yellow.

Pen

| Hidden Nodes | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Avg. | Std. Dev. |
|---|---|---|---|---|---|---|---|
| Default | 76.5866% | 83.04745% | 88.33161% | 84.81989% | 77.415666% | 80.44025% | 3.16193% |
| 0 | 0.00000% | 0.00000% | 10.05946% | 0.00000% | 0.00000% | 2.88118% | 4.16237% |
| 5 | 58.00457% | 45.14008% | 64.86563% | 53.91652% | 57.00400% | 55.78616% | 6.41367% |
| 10 | 83.30474% | 78.73070% | 73.81360% | 71.12635% | 80.646083% | 77.52429% | 4.45684% |
| 15 | 86.96397% | 73.52773% | 81.13207% | 79.90280% | 79.24528% | 80.154373% | 4.29252% |
| 20 | 80.44596% | 77.24413% | 76.12921% | 81.24642% | 79.16580% | 78.81646% | 1.91275% |
| 25 | 77.93024% | 73.09891% | 79.44539% | 80.61749% | 81.96112% | 78.61063% | 3.05915% |
| 30 | 80.56032% | 71.32647% | 77.90165% | 82.64722% | 81.84676% | 78.85648% | 4.09456% |
| 35 | 86.36363% | 73.70502% | 78.53058% | 75.84333% | 76.55803% | 78.21612% | 4.34729% |
| 40 | 82.96169% | 79.61692% | 79.38822% | 80.87478% | 82.41852% | 81.052029% | 1.44036% |

Car

| Hidden Nodes | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Avg. | Std. Dev |
|---|---|---|---|---|---|---|---|
| Default | 73.49476% | 73.56020% | 72.90575% | 66.753926% | 68.9136 | 71.12565% | 2.78257% |
| 0 | 4.12303% | 4.12303% | 4.12303% | 4.12303% | 4.12303% | 4.12303% | 0.0000% |
| 5 | 23.82198% | 47.44764% | 59.88219% | 63.41623% | 61.51832% | 55.78616% | 6.41367% |
| 10 | 68.25916% | 65.90314% | 61.58376% | 68.25916% | 75.78534% | 67.95811% | 4.61089% |
| 15 | 73.88743% | 69.76439% | 64.72513% | 61.78010% | 74.80366% | 68.99214% | 5.07060% |
| 20 | 67.21204% | 67.86649% | 65.51047% | 68.32468% | 66.5575% | 67.09424% | 0.99200% |
| 25 | 70.94240% | 64.46335% | 67.60471% | 69.50261% | 69.50261% | 68.40314% | 2.23718% |
| 30 | 67.01570% | 68.45549% | 66.23036% | 72.05497% | 73.29842% | 69.41099% | 2.78817% |
| 35 | 67.34293% | 69.69895% | 65.57591% | 66.42670% | 66.88481% | 67.18586% | 1.38558% |
| 40 | 69.76439% | 70.09162% | 69.04450% | 73.69109% | 70.15706% | 70.54973% | 1.61954% |
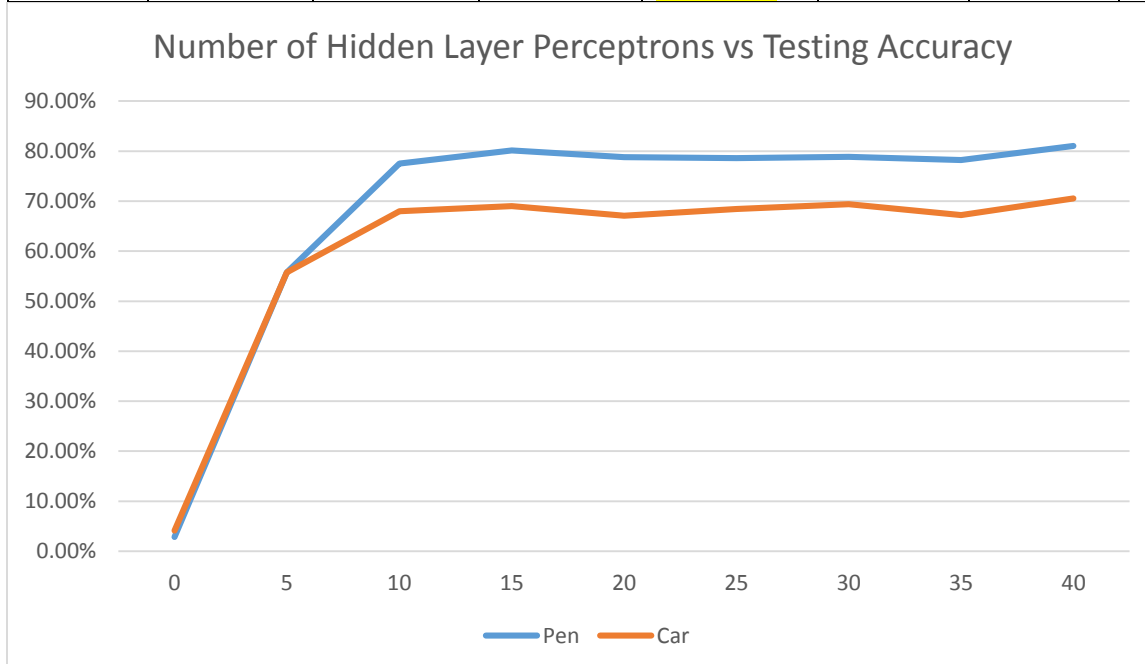
By increasing the number of hidden layer perceptrons, we are effectively increasing the expressiveness of the neural network. This can be seen as increasing the dimensions of the matrices the NN represents. In doing so, the hypothesis space of neural network grows larger, which allows it to better express the underlying function it is trying to learn. At the same time, increasing the hypothesis space exposes potentially more local minima that the NN can get stuck in, which reduces the number of iterations it needs to converge, but also increases the number of calculations needed per iteration. This could lead to overfitting if done in excess. Finally, size of dataset has a clear impact on how long each step takes, as it requires the entire dataset to be fed forward for each iteration of backpropogation. The car dataset has notably less accuracy than the pen dataset, which might be attributable to the smaller size of the car dataset. It may need more iterations than allowed for these tests to converge to a solution with a higher test accuracy due to insufficient data: a larger dataset may remedy this.