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CS 3600

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Project 4

Q5:

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| --- | --- | --- |
| **Iteration** | **Pen Results Accuracy** | **Car Results Accuracy** |
| 1 | 0.906232133 | 0.97 |
| 2 | 0.889365352 | 0.98 |
| 3 | 0.905088622 | 0.975 |
| 4 | 0.902229846 | 0.975 |
| 5 | 0.906232133 | 0.975 |

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|  | **Pen Results Accuracy** | **Car Results Accuracy** |
| **AVERAGE** | 0.901829617 | 0.975 |
| **STDV** | 0.007157225 | 0.003535534 |
| **MAX** | 0.906232133 | 0.98 |

Q6:

|  |  |  |  |
| --- | --- | --- | --- |
| **Hidden Layers** | **Iteration** | **Pen Results Accuracy** | **Car Results Accuracy** |
| 0 | 1 | 0 | 0.66 |
| 0 | 2 | 0 | 0.66 |
| 0 | 3 | 0 | 0.66 |
| 0 | 4 | 0 | 0.66 |
| 0 | 5 | 0 | 0.66 |
| 5 | 1 | 0.849628359 | 0.98 |
| 5 | 2 | 0.847913093 | 0.96 |
| 5 | 3 | 0.810463122 | 0.975 |
| 5 | 4 | 0.830188679 | 0.965 |
| 5 | 5 | 0.846483705 | 0.97 |
| 10 | 1 | 0.880503145 | 0.965 |
| 10 | 2 | 0.882790166 | 0.975 |
| 10 | 3 | 0.878502001 | 0.97 |
| 10 | 4 | 0.929674099 | 0.965 |
| 10 | 5 | 0.883361921 | 0.97 |
| 15 | 1 | 0.905088622 | 0.975 |
| 15 | 2 | 0.905088622 | 0.97 |
| 15 | 3 | 0.899085192 | 0.975 |
| 15 | 4 | 0.901372213 | 0.96 |
| 15 | 5 | 0.90651801 | 0.96 |
| 20 | 1 | 0.905660377 | 0.965 |
| 20 | 2 | 0.889365352 | 0.95 |
| 20 | 3 | 0.900800457 | 0.975 |
| 20 | 4 | 0.905946255 | 0.965 |
| 20 | 5 | 0.889937107 | 0.99 |
| 25 | 1 | 0.906232133 | 0.96 |
| 25 | 2 | 0.897941681 | 0.955 |
| 25 | 3 | 0.905946255 | 0.965 |
| 25 | 4 | 0.901372213 | 0.965 |
| 25 | 5 | 0.907375643 | 0.97 |
| 30 | 1 | 0.907375643 | 0.965 |
| 30 | 2 | 0.904802744 | 0.965 |
| 30 | 3 | 0.909376787 | 0.96 |
| 30 | 4 | 0.901943968 | 0.945 |
| 30 | 5 | 0.908519154 | 0.97 |
| 35 | 1 | 0.905946255 | 0.965 |
| 35 | 2 | 0.904230989 | 0.955 |
| 35 | 3 | 0.901943968 | 0.95 |
| 35 | 4 | 0.902801601 | 0.96 |
| 35 | 5 | 0.884219554 | 0.965 |
| 40 | 1 | 0.904802744 | 0.95 |
| 40 | 2 | 0.889365352 | 0.97 |
| 40 | 3 | 0.903659234 | 0.965 |
| 40 | 4 | 0.905088622 | 0.965 |
| **Pen Results Accuracy** | | | |
| **Hidden Layers** | **AVERAGE** | **STDV** | **MAX** |
| 0 | 0 | 0 | 0 |
| 5 | 0.836935 | 0.0167 | 0.8496 |
| 10 | 0.890966 | 0.0217 | 0.9297 |
| 15 | 0.903431 | 0.0031 | 0.9065 |
| 20 | 0.898342 | 0.0082 | 0.9059 |
| 25 | 0.903774 | 0.004 | 0.9074 |
| 30 | 0.906404 | 0.003 | 0.9094 |
| 35 | 0.899828 | 0.0089 | 0.9059 |
| 40 | 0.900743 | 0.0066 | 0.9051 |

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| --- | --- | --- | --- |
| **Car Results Accuracy** | | | |
| **Hidden Layers** | **AVERAGE** | **STDV** | **MAX** |
| 0 | 0.66 | 0 | 0.66 |
| 5 | 0.97 | 0.0079 | 0.98 |
| 10 | 0.969 | 0.0042 | 0.975 |
| 15 | 0.968 | 0.0076 | 0.975 |
| 20 | 0.969 | 0.0147 | 0.99 |
| 25 | 0.963 | 0.0057 | 0.97 |
| 30 | 0.961 | 0.0096 | 0.97 |
| 35 | 0.959 | 0.0065 | 0.965 |
| 40 | 0.965 | 0.0094 | 0.975 |

Discussion:

From the graph above we can notice that for both data sets there is big positive correlation between number of hidden layers and accuracy of the model when we first start increasing the number of layers (starting from zero). But we can also notice that after a certain amount of hidden layers our accuracy hits a plateau (in this case at 5 hidden layers for Car data set and 10 for Pen data set). We could say that the above mentioned numbers of hidden layers are the most optimal for each model respectively.