## Thomas Jones – CS 5567-0002 – Project 2

Collab link: <https://colab.research.google.com/drive/1SPB-VQoMvXrzVq93_2OjnW5pIgKFe4ZR?usp=sharing>

Video link:

#### Dataset Comparison

Consider the following two images:

A black and white image of a number

Description automatically generatedA close-up of a radiograph

Description automatically generated

The MNIST data is shape variant but generally invariant in terms of intensity while the fashion MNIST data has both shape and intensity variation.

#### Top Performing Model Shape

|  |  |  |  |
| --- | --- | --- | --- |
| Layer | Activation Map Dimensions | Number of Weights | Number of Biases |
| Input | 28x28x1 | -- | -- |
| Conv2D(relu) | 25x25x64 (4x4 kernel) | 1024 | 64 |
| MaxPool2D | 12x12x64 | -- | -- |
| Convo2D(relu) | 10x10x64 (3x3 kernel) | 36,864 | 64 |
| MaxPool2D | 5x5x64 | -- | -- |
| Dropout(0.4) | 5x5x64 | -- | -- |
| Flatten | 1600 | -- | -- |
| Dense(relu) | 256 | 409,600 | 256 |
| Dense (softmax) | 10 | 2560 | 10 |

#### Results Comparison

As seen from the heatmaps on page 4, the default learning rate for the Adam optimizer provided a reasonable performance. It was also found that limiting the epoch count to 7 instead of the proposed 25-50 also provided acceptable results as performance plateaued. ***For both datasets, the target accuracy was achieved with the provided topology*, *32/16, Adam optimizer with a learning rate of 0.002***.

Further topology exploration found the best for both was **64/32** with an accuracy of **96%** for MNIST and **87%** for Fashion\_MNIST. Both using the same Adam optimizer as above . When the epoch count was increased to 25 epochs an **88%** test accuracy was achieved with a topology of **64/32/16** for Fashion\_MNIST.

The lost/accuracy graphs for each are shown below.

A graph with blue lines

Description automatically generatedA graph with blue lines

Description automatically generated

*MNIST*

*A graph with blue lines

Description automatically generatedA graph with a line

Description automatically generated*

*Fashion MNIST*

Adding further neurons or even additional layers did not drastically improve the performance of the network above the target values. It was not until feature extraction was performed via the CNN that performance exceeded 90%.

The best performing CNN model achieved a **92%** test accuracy. It is worth noting that that of the experiments, 6 models broke the 92% barrier. There is a wide variety in the topologies of these models, the most common factor being the optimization algorithm. This was seen in the dense experiments as well.

The worst CNNs achieved a 10% accuracy, no better than guessing, and essentially failed to learn anything.

#### Model Overall Discussion

Larger models made little difference and generally performed worse than simpler models for this case, hence, in no way were they worth the additional training time. The biggest difference seen in performance was the selection of optimization algorithm with Adam generally performing the best and SGD performing the worst across the tested hyperparameters. Understanding why this is the case would require a deeper dive than is provided by the scope of this work.

The CNN implementation is worth the additional training time compared to the FC network as the performance gains are offset by the incremental increase in performance. Given that for a model to be useful it must provide real-world value that additional accuracy reduces the functional cost, in terms of missed classifications, of the model. There will be certain industry use cases where the cost considerations of implementing the model outweigh the cost of misclassifications, for example, an app on a phone where memory constraints limit model size. Dataset complexity, as measured by seperability of the features, will make the model requirements more complex as well.

The biggest key finding was that the optimizer, for this exercise, had the biggest impact in model performance.

A diagram of a graph

Description automatically generated with medium confidence

*Box plot of experiment scores vs optimizer*

## Methodology & Detailed Results

The ultimate purpose of this project was to compare the performance of fully connected vs CNN based topologies. An experimental framework was selected where;

1. Baseline models were constructed where the maximum epoch count and learning rates were explored for both datasets. The reduced test accuracy of the fashion dataset shows the challenge of the additional complexity. See page 2 for heatmaps.
2. Based on the initial model results a target learning rate and epoch count were selected. This selection helped to limit the search space.
3. Using Keras, a convolutional model was constructed. Initially, a small search space was selected using the Keras-Tuner hyperparameter library. This library reduced the code complexity found when iterating over, capturing, and reporting on results. The first execution used a GridSearch to walk through a limited search space.
4. The hyper-parameter search space was then expanded and a BayesianOptimization tuner used.

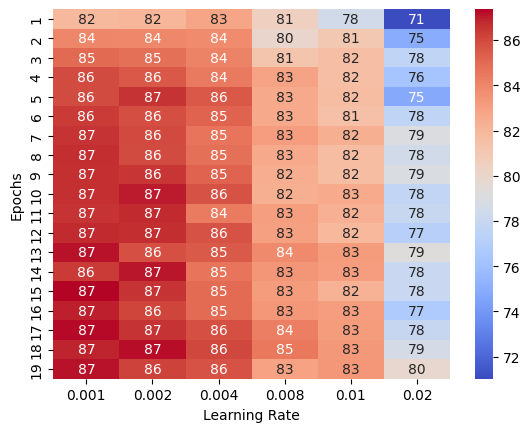
#### Learning Rate vs Epoch count analysis

Heatmaps of achieved accuracy as a function of Epochs and Learning Rate. Two hidden layers were used of 32 and 16 neurons respectively. The Adam optimizer with various learning rates were iterated over to increasing number of epochs. This gives us a view of how many epochs and what learning rate to select for further tests of the topologies.

A screenshot of a graph

Description automatically generated

*MNIST Accuracy vs Learning Rate vs Epochs*



*Fashion\_MNIST Accuracy vs Learning Rate vs Epochs*

#### Accuracy for MNIST across hyper-parameters (7 epochs)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accuracy | Topology | Activations | Optimizer | LR | Mmt | WD |
| 96.2 | [784, 64, 32, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 95.7 | [784, 32, 16, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 95.7 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 95.54 | [784, 32, 16, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 95.42 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 95.22 | [784, 64, 32, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 95.06 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 94.82 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0.001 |
| 94.78 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 94.7 | [784, 28, 28, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 94.68 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 94.67 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 94.45 | [784, 28, 28, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 94.45 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 94.25 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0.001 |
| 93.59 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 93.11 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 92.82 | [784, 64, 32, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 92.67 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 92.62 | [784, 32, 16, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 92.54 | [784, 64, 32, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 92.39 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 92.38 | [784, 28, 28, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 92.31 | [784, 64, 32, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 92.3 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 92.29 | [784, 32, 16, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 92.23 | [784, 28, 28, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 92.21 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 92.17 | [784, 28, 28, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 92.15 | [784, 64, 32, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 92.05 | [784, 28, 28, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 91.92 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0.001 |
| 91.85 | [784, 32, 16, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 91.85 | [784, 32, 16, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 91.85 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 91.73 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 91.66 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0 |
| 91.18 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0 |
| 91.14 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 89.74 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0.001 |
| 87.46 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 87.1 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 86.4 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 84.18 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 84.08 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 79.35 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 78.43 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 65.26 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 60.36 | [784, 64, 32, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 54.57 | [784, 28, 28, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 53.33 | [784, 64, 32, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 53.1 | [784, 32, 16, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 49.78 | [784, 64, 32, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 49.37 | [784, 28, 28, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 48.77 | [784, 32, 16, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 40.76 | [784, 32, 16, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 39.93 | [784, 64, 32, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 39.47 | [784, 28, 28, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 36.08 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 31.89 | [784, 28, 28, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 31.58 | [784, 32, 16, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 25.84 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 24.27 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 23.81 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 19.82 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 18.52 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 12.81 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 11.7 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 11.37 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0 |
| 11.35 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 11.35 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 11.35 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 11.35 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 11.35 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 11.35 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0 |
| 11.35 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 11.35 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 11.35 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 11.35 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 9.58 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |

#### Accuracy across Fashion\_MNIST across hyper-parameters (7 epochs)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accuracy | Topology | Activations (Hidden) | Optimizer | LR | Mmnt | WD |
| 87.07 | [784, 64, 32, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0 |
| 86.84 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0 |
| 86.73 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.5 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 86.49 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.28 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0 |
| 86.23 | [784, 32, 16, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0 |
| 86.19 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.17 | [784, 64, 32, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 85.87 | [784, 28, 28, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0 |
| 85.79 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 85.74 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 85.71 | [784, 64, 32, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 85.65 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.6 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 85.54 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.41 | [784, 32, 16, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 85.22 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 85.22 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0.001 |
| 85.2 | [784, 28, 28, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 85.2 | [784, 28, 28, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 85.19 | [784, 32, 16, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.11 | [784, 32, 16, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 85.04 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 84.98 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0.001 |
| 84.95 | [784, 64, 32, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 84.95 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 84.86 | [784, 28, 28, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 84.76 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 84.19 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 84 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 84 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 83.02 | [784, 64, 32, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 82.99 | [784, 64, 32, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 82.91 | [784, 64, 32, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 82.86 | [784, 28, 28, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 82.85 | [784, 32, 16, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 82.8 | [784, 32, 16, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 82.77 | [784, 28, 28, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 82.72 | [784, 32, 16, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 82.72 | [784, 28, 28, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 82.33 | [784, 32, 16, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 82.27 | [784, 64, 32, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 82.18 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 82.01 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 81.66 | [784, 28, 28, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 81.35 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0 |
| 81.32 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 81.24 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 81.24 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 81.14 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0 |
| 80.02 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 79.73 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 78.41 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 76.58 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0.001 |
| 75.35 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 74.09 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0.001 |
| 73.93 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 73.4 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 72.12 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 71.57 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 71.21 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 66.92 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 66.45 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 60.62 | [784, 64, 32, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 52.58 | [784, 64, 32, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 52.51 | [784, 64, 32, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 52.38 | [784, 32, 16, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 51.62 | [784, 28, 28, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 51.53 | [784, 32, 16, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 51.23 | [784, 32, 16, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 50.73 | [784, 28, 28, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 48.96 | [784, 28, 28, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 45.31 | [784, 64, 32, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 41.48 | [784, 28, 28, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 40.34 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 39.68 | [784, 32, 16, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 33.34 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 31.34 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 30.98 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 30.18 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 30.03 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 27.57 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0 |
| 27.5 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 26.98 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 26.96 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 26.78 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 23.48 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 21.16 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 19.61 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 17.62 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 15.66 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 10.36 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 10 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 10 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0 |
| 10 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |

#### Accuracy across Fashion\_MNIST across hyper-parameters (25 epochs)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accuracy | Topology | Activations (Hidden) | Optimizer | LR | Mmnt | WD |
| 88.05 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 87.99 | [784, 64, 32, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0 |
| 87.73 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0 |
| 87.5 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 87.17 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0 |
| 87.13 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.99 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 86.94 | [784, 64, 32, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.76 | [784, 28, 28, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 86.76 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0 |
| 86.68 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 86.64 | [784, 32, 16, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0 |
| 86.64 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0 |
| 86.64 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 86.54 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.52 | [784, 28, 28, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.4 | [784, 28, 28, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0 |
| 86.39 | [784, 32, 16, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 86.36 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 86.29 | [784, 64, 32, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 86.28 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0.001 |
| 86.27 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 86.25 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 86.24 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0.001 |
| 86.22 | [784, 64, 32, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 86.18 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | adam | 0.002 | 0 | 0.001 |
| 86.16 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 86.05 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0 |
| 85.95 | [784, 64, 32, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 85.91 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 85.88 | [784, 32, 16, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 85.87 | [784, 28, 28, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0 |
| 85.76 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0 |
| 85.73 | [784, 28, 28, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 85.7 | [784, 32, 16, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 85.67 | [784, 32, 16, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 85.66 | [784, 28, 28, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 85.59 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.57 | [784, 64, 32, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.53 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.52 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.42 | [784, 32, 16, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.37 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.34 | [784, 28, 28, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 85.34 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 85.3 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 85.23 | [784, 32, 16, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 85.21 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 85.2 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 85.13 | [784, 32, 16, 10] | [sigmoid, relu] | adam | 0.002 | 0 | 0.001 |
| 85.12 | [784, 64, 32, 10] | [sigmoid, relu] | asgd | 0.02 | 0 | 0.001 |
| 84.98 | [784, 64, 32, 10] | [sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 84.92 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 84.84 | [784, 28, 28, 10] | [sigmoid, tanh] | adam | 0.002 | 0 | 0.001 |
| 84.73 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 84.48 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 84.18 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 84.11 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0 |
| 83.9 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | adam | 0.002 | 0 | 0.001 |
| 83.64 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0 |
| 82.2 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | asgd | 0.02 | 0 | 0.001 |
| 81.19 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 80.7 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | asgd | 0.02 | 0 | 0.001 |
| 74.39 | [784, 64, 32, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 73.94 | [784, 32, 16, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 73.73 | [784, 64, 32, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 73.14 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | asgd | 0.02 | 0 | 0.001 |
| 73.06 | [784, 32, 16, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 72.92 | [784, 64, 32, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 72.61 | [784, 64, 32, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 71.83 | [784, 28, 28, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 71.82 | [784, 28, 28, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 71.79 | [784, 28, 28, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 71.31 | [784, 28, 28, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 70.67 | [784, 32, 16, 10] | [sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 69.71 | [784, 32, 16, 10] | [sigmoid, relu] | sgd | 0.001 | 0.1 | 0 |
| 66.64 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 64.48 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 62.82 | [784, 28, 28, 28, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 61.12 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 57.66 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 55.12 | [784, 64, 32, 16, 10] | [relu, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 54.65 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0 |
| 52.17 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 43.98 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 41.89 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0.001 |
| 38.66 | [784, 64, 32, 16, 8, 10] | [relu, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 35.59 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 32.12 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 30.15 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 29.03 | [784, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 28.88 | [784, 28, 28, 28, 28, 10] | [relu, sigmoid, tanh, relu] | sgd | 0.001 | 0.1 | 0 |
| 27.58 | [784, 64, 32, 16, 10] | [sigmoid, sigmoid, tanh] | sgd | 0.001 | 0.1 | 0 |
| 26.06 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0 |
| 25.43 | [784, 28, 28, 28, 28, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |
| 22.06 | [784, 64, 32, 16, 8, 10] | [sigmoid, sigmoid, tanh, tanh] | sgd | 0.001 | 0.1 | 0.001 |

#### CNN Experiment Results

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| score | Inp Drop | IDR | FC | KS 1 | Act | 1DR | DR | CNN2 | FC 2 | Act | 2DR | DR | DNS 1 | Act | DNS2? | DNS2 | Act | Opt | LR | Mnmt | Btch | Ep |
| 0.923600018 | FALSE |  | 64 | 4 | relu | FALSE |  | TRUE | 64 | relu | TRUE | 0.4 | 256 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 160 | 30 |
| 0.921000004 | FALSE |  | 32 | 5 | relu | TRUE | 0.2 | FALSE |  |  |  |  | 256 | sigmoid | FALSE |  |  | adam | 0.002 | 0.5 | 160 | 30 |
| 0.92019999 | FALSE |  | 48 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 224 | sigmoid | TRUE | 96 | relu | adam | 0.001 | 0.1 | 128 | 20 |
| 0.920099974 | FALSE |  | 64 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 256 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 224 | 10 |
| 0.920000017 | FALSE |  | 32 | 3 | relu | FALSE |  | TRUE | 112 | relu | TRUE | 0.3 | 96 | relu | TRUE | 96 | sigmoid | adam | 0.002 | 0.1 | 96 | 30 |
| 0.920000017 | FALSE |  | 32 | 3 | relu | FALSE |  | TRUE | 64 | relu | TRUE | 0.4 | 160 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 224 | 20 |
| 0.919200003 | FALSE |  | 48 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 192 | sigmoid | TRUE | 32 | sigmoid | adam | 0.001 | 0.1 | 32 | 20 |
| 0.918799996 | FALSE |  | 32 | 4 | relu | TRUE | 0.5 | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 256 | 20 |
| 0.918799996 | FALSE |  | 64 | 4 | relu | TRUE | 0.3 | FALSE |  |  |  |  | 96 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 20 |
| 0.91869998 | FALSE |  | 64 | 4 | relu | TRUE | 0.5 | FALSE |  |  |  |  | 128 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 224 | 20 |
| 0.918500006 | FALSE |  | 64 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 160 | sigmoid | TRUE | 32 | sigmoid | adam | 0.001 | 0.1 | 64 | 10 |
| 0.917299986 | FALSE |  | 64 | 4 | relu | FALSE |  | TRUE | 112 | relu | FALSE | 0.5 | 64 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 256 | 20 |
| 0.917100012 | FALSE |  | 64 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 256 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 64 | 30 |
| 0.916700006 | FALSE |  | 48 | 3 | relu | FALSE |  | TRUE | 128 | relu | FALSE | 0.2 | 128 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 224 | 20 |
| 0.916199982 | FALSE |  | 48 | 3 | relu | FALSE |  | TRUE | 128 | relu | FALSE | 0.5 | 96 | relu | TRUE | 64 | sigmoid | adam | 0.001 | 0.1 | 32 | 20 |
| 0.915899992 | FALSE |  | 32 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 192 | sigmoid | TRUE | 32 | relu | adam | 0.001 | 0.5 | 256 | 20 |
| 0.915300012 | FALSE |  | 64 | 5 | relu | FALSE |  | TRUE | 96 | relu | TRUE | 0.5 | 64 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 32 | 10 |
| 0.915000021 | FALSE |  | 32 | 5 | relu | TRUE | 0.2 | FALSE |  |  |  |  | 192 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 224 | 10 |
| 0.914699972 | FALSE |  | 64 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 96 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 10 |
| 0.913699985 | FALSE |  | 64 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 96 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 224 | 10 |
| 0.913500011 | FALSE |  | 64 | 4 | relu | TRUE | 0.5 | FALSE |  |  |  |  | 96 | sigmoid | FALSE |  |  | adam | 0.002 | 0.5 | 224 | 10 |
| 0.912299991 | TRUE | 0.1 | 32 | 5 | relu | TRUE | 0.1 | TRUE | 128 | relu | TRUE | 0.1 | 192 | sigmoid | TRUE | 64 | sigmoid | adam | 0.002 | 0.1 | 160 | 30 |
| 0.912299991 | TRUE | 0.1 | 48 | 3 | relu | FALSE |  | TRUE | 112 | relu | FALSE | 0.4 | 224 | relu | TRUE | 128 | relu | adam | 0.001 | 0.5 | 96 | 30 |
| 0.912 | FALSE |  | 48 | 5 | relu | FALSE |  | TRUE | 96 | relu | FALSE | 0.5 | 160 | relu | TRUE | 96 | sigmoid | adam | 0.002 | 0.5 | 128 | 10 |
| 0.91170001 | FALSE |  | 32 | 5 | relu | TRUE | 0.2 | TRUE | 80 | sigmoid | FALSE | 0.4 | 128 | relu | TRUE | 64 | relu | adam | 0.001 | 0.1 | 96 | 30 |
| 0.910099983 | FALSE |  | 64 | 4 | relu | FALSE |  | TRUE | 80 | relu | TRUE | 0.3 | 32 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 32 | 10 |
| 0.909600019 | FALSE |  | 64 | 4 | relu | FALSE |  | TRUE | 64 | relu | FALSE | 0.5 | 64 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 224 | 10 |
| 0.908399999 | FALSE |  | 48 | 3 | sigmoid | FALSE |  | TRUE | 64 | sigmoid | TRUE | 0.4 | 160 | sigmoid | TRUE | 128 | relu | adam | 0.002 | 0.5 | 64 | 30 |
| 0.905499995 | FALSE |  | 32 | 4 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.5 | 96 | sigmoid | TRUE | 64 | relu | adam | 0.002 | 0.5 | 128 | 30 |
| 0.903999984 | TRUE | 0.1 | 64 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 224 | relu | TRUE | 96 | relu | adam | 0.002 | 0.5 | 160 | 10 |
| 0.902999997 | TRUE | 0.2 | 48 | 5 | relu | FALSE |  | FALSE |  |  |  |  | 32 | relu | TRUE | 128 | relu | adam | 0.002 | 0.1 | 224 | 30 |
| 0.90170002 | FALSE |  | 64 | 4 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | FALSE | 0.1 | 128 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 96 | 30 |
| 0.900900006 | TRUE | 0.2 | 32 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 128 | relu | TRUE | 32 | sigmoid | adam | 0.002 | 0.5 | 192 | 30 |
| 0.900699973 | FALSE |  | 32 | 5 | sigmoid | TRUE | 0.1 | FALSE |  |  |  |  | 64 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 30 |
| 0.899500012 | TRUE | 0.1 | 64 | 4 | relu | FALSE |  | TRUE | 128 | relu | TRUE | 0.5 | 128 | sigmoid | TRUE | 128 | sigmoid | adam | 0.002 | 0.5 | 32 | 30 |
| 0.898400009 | TRUE | 0.2 | 64 | 3 | relu | TRUE | 0.2 | FALSE |  |  |  |  | 256 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 256 | 20 |
| 0.898299992 | FALSE |  | 48 | 4 | sigmoid | FALSE |  | TRUE | 128 | relu | FALSE | 0.3 | 128 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 30 |
| 0.898100019 | TRUE | 0.1 | 64 | 5 | relu | TRUE | 0.1 | FALSE |  |  |  |  | 160 | sigmoid | TRUE | 128 | relu | adam | 0.001 | 0.5 | 256 | 10 |
| 0.897400022 | FALSE |  | 64 | 5 | relu | FALSE |  | TRUE | 80 | sigmoid | TRUE | 0.1 | 128 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 192 | 10 |
| 0.896899998 | FALSE |  | 48 | 3 | sigmoid | FALSE |  | TRUE | 128 | sigmoid | FALSE | 0.3 | 256 | sigmoid | FALSE |  |  | adam | 0.002 | 0.5 | 192 | 20 |
| 0.896300018 | FALSE |  | 64 | 4 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.2 | 128 | sigmoid | TRUE | 96 | relu | adam | 0.001 | 0.5 | 128 | 20 |
| 0.895699978 | FALSE |  | 32 | 5 | relu | TRUE | 0.5 | TRUE | 112 | relu | TRUE | 0.3 | 64 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 256 | 10 |
| 0.895500004 | FALSE |  | 64 | 5 | relu | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.3 | 192 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 128 | 10 |
| 0.893999994 | TRUE | 0.2 | 64 | 4 | relu | TRUE | 0.4 | FALSE |  |  |  |  | 192 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 160 | 20 |
| 0.893599987 | FALSE |  | 64 | 5 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.1 | 192 | sigmoid | TRUE | 32 | sigmoid | adam | 0.001 | 0.5 | 32 | 10 |
| 0.890799999 | TRUE | 0.1 | 32 | 3 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.3 | 96 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 64 | 30 |
| 0.890299976 | TRUE | 0.3 | 32 | 4 | relu | FALSE |  | TRUE | 64 | relu | FALSE | 0.1 | 160 | relu | TRUE | 64 | sigmoid | adam | 0.001 | 0.1 | 32 | 30 |
| 0.886799991 | TRUE | 0.2 | 64 | 5 | relu | FALSE |  | FALSE |  |  |  |  | 192 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 160 | 10 |
| 0.886399984 | TRUE | 0.4 | 32 | 4 | relu | FALSE |  | TRUE | 112 | relu | TRUE | 0.1 | 128 | relu | TRUE | 128 | sigmoid | adam | 0.001 | 0.1 | 160 | 30 |
| 0.885900021 | TRUE | 0.1 | 64 | 3 | relu | TRUE | 0.2 | TRUE | 80 | relu | TRUE | 0.5 | 160 | sigmoid | TRUE | 64 | sigmoid | adam | 0.001 | 0.5 | 160 | 10 |
| 0.883599997 | TRUE | 0.3 | 32 | 5 | relu | TRUE | 0.1 | TRUE | 64 | relu | FALSE | 0.1 | 192 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 96 | 20 |
| 0.88319999 | TRUE | 0.1 | 64 | 5 | sigmoid | TRUE | 0.1 | TRUE | 96 | sigmoid | FALSE | 0.5 | 96 | sigmoid | TRUE | 64 | relu | adam | 0.002 | 0.1 | 256 | 20 |
| 0.880400002 | TRUE | 0.4 | 48 | 4 | relu | FALSE |  | TRUE | 80 | sigmoid | FALSE | 0.1 | 160 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 192 | 20 |
| 0.879899979 | TRUE | 0.2 | 48 | 3 | sigmoid | FALSE |  | TRUE | 112 | relu | FALSE | 0.3 | 192 | relu | TRUE | 96 | sigmoid | adam | 0.001 | 0.1 | 256 | 30 |
| 0.879400015 | TRUE | 0.2 | 32 | 5 | relu | TRUE | 0.2 | TRUE | 112 | relu | TRUE | 0.3 | 32 | sigmoid | TRUE | 96 | relu | adam | 0.002 | 0.5 | 256 | 10 |
| 0.876900017 | TRUE | 0.2 | 32 | 3 | relu | TRUE | 0.2 | TRUE | 80 | relu | TRUE | 0.2 | 32 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 10 |
| 0.876299977 | FALSE |  | 64 | 3 | sigmoid | FALSE |  | TRUE | 128 | relu | FALSE | 0.2 | 96 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 128 | 20 |
| 0.875199974 | FALSE |  | 64 | 5 | sigmoid | TRUE | 0.2 | TRUE | 80 | relu | FALSE | 0.5 | 96 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 192 | 30 |
| 0.872600019 | FALSE |  | 32 | 4 | sigmoid | TRUE | 0.3 | TRUE | 96 | sigmoid | TRUE | 0.1 | 128 | sigmoid | TRUE | 64 | sigmoid | adam | 0.001 | 0.1 | 192 | 20 |
| 0.872500002 | FALSE |  | 32 | 3 | sigmoid | FALSE |  | TRUE | 64 | relu | FALSE | 0.5 | 256 | relu | TRUE | 32 | relu | adam | 0.001 | 0.5 | 64 | 10 |
| 0.871200025 | TRUE | 0.3 | 48 | 3 | relu | TRUE | 0.1 | TRUE | 64 | sigmoid | TRUE | 0.4 | 64 | relu | TRUE | 64 | relu | adam | 0.002 | 0.1 | 224 | 20 |
| 0.870199978 | TRUE | 0.3 | 32 | 4 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 192 | relu | TRUE | 128 | relu | adam | 0.002 | 0.5 | 32 | 20 |
| 0.870100021 | TRUE | 0.3 | 32 | 3 | relu | FALSE |  | TRUE | 64 | relu | TRUE | 0.4 | 160 | sigmoid | TRUE | 96 | relu | adam | 0.002 | 0.5 | 128 | 10 |
| 0.868900001 | FALSE |  | 48 | 3 | sigmoid | TRUE | 0.2 | FALSE |  |  |  |  | 96 | relu | TRUE | 64 | sigmoid | adam | 0.001 | 0.5 | 64 | 10 |
| 0.868300021 | TRUE | 0.3 | 32 | 4 | sigmoid | FALSE |  | TRUE | 96 | sigmoid | TRUE | 0.5 | 256 | sigmoid | TRUE | 64 | sigmoid | adam | 0.002 | 0.1 | 128 | 20 |
| 0.86680001 | FALSE |  | 48 | 4 | sigmoid | TRUE | 0.4 | TRUE | 80 | sigmoid | TRUE | 0.2 | 96 | sigmoid | TRUE | 96 | sigmoid | adam | 0.002 | 0.1 | 160 | 10 |
| 0.866599977 | TRUE | 0.4 | 48 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 20 |
| 0.865999997 | TRUE | 0.3 | 32 | 4 | sigmoid | TRUE | 0.1 | TRUE | 96 | sigmoid | FALSE | 0.5 | 96 | relu | TRUE | 32 | relu | adam | 0.002 | 0.1 | 64 | 20 |
| 0.864499986 | TRUE | 0.1 | 64 | 4 | sigmoid | TRUE | 0.5 | FALSE |  |  |  |  | 160 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 64 | 20 |
| 0.864000022 | TRUE | 0.2 | 32 | 3 | sigmoid | FALSE |  | TRUE | 128 | relu | FALSE | 0.3 | 128 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 256 | 20 |
| 0.862999976 | TRUE | 0.3 | 48 | 4 | sigmoid | FALSE |  | TRUE | 128 | relu | FALSE | 0.2 | 160 | sigmoid | FALSE |  |  | adam | 0.002 | 0.5 | 256 | 20 |
| 0.862800002 | FALSE |  | 48 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 256 | relu | TRUE | 128 | relu | adam | 0.001 | 0.5 | 128 | 10 |
| 0.861299992 | FALSE |  | 48 | 3 | sigmoid | TRUE | 0.5 | TRUE | 80 | sigmoid | FALSE | 0.5 | 96 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 64 | 10 |
| 0.860899985 | TRUE | 0.4 | 32 | 5 | relu | TRUE | 0.1 | TRUE | 96 | sigmoid | FALSE | 0.4 | 224 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 64 | 20 |
| 0.859000027 | TRUE | 0.3 | 32 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 192 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 128 | 20 |
| 0.858799994 | FALSE |  | 32 | 5 | relu | TRUE | 0.5 | FALSE |  |  |  |  | 128 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 64 | 30 |
| 0.857900023 | TRUE | 0.4 | 32 | 4 | relu | TRUE | 0.5 | TRUE | 112 | sigmoid | TRUE | 0.4 | 224 | sigmoid | TRUE | 32 | sigmoid | adam | 0.001 | 0.5 | 224 | 20 |
| 0.857200027 | TRUE | 0.1 | 48 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 128 | sigmoid | TRUE | 96 | relu | sgd | 0.002 | 0.5 | 32 | 20 |
| 0.856899977 | TRUE | 0.4 | 64 | 4 | relu | TRUE | 0.1 | TRUE | 80 | relu | TRUE | 0.2 | 256 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 10 |
| 0.856400013 | TRUE | 0.4 | 48 | 4 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.4 | 256 | sigmoid | TRUE | 64 | relu | adam | 0.002 | 0.5 | 256 | 20 |
| 0.856000006 | TRUE | 0.1 | 48 | 3 | sigmoid | FALSE |  | TRUE | 96 | relu | FALSE | 0.2 | 224 | relu | TRUE | 96 | relu | adam | 0.001 | 0.5 | 160 | 10 |
| 0.855300009 | TRUE | 0.4 | 64 | 5 | relu | TRUE | 0.1 | TRUE | 128 | sigmoid | FALSE | 0.1 | 64 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 32 | 20 |
| 0.854900002 | TRUE | 0.4 | 48 | 3 | sigmoid | TRUE | 0.2 | FALSE |  |  |  |  | 128 | relu | TRUE | 96 | relu | adam | 0.001 | 0.1 | 128 | 30 |
| 0.854600012 | TRUE | 0.4 | 32 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 128 | relu | TRUE | 128 | relu | adam | 0.001 | 0.5 | 96 | 30 |
| 0.854600012 | FALSE |  | 48 | 4 | sigmoid | TRUE | 0.3 | TRUE | 80 | sigmoid | FALSE | 0.3 | 64 | relu | TRUE | 96 | relu | adam | 0.002 | 0.5 | 224 | 10 |
| 0.854099989 | TRUE | 0.4 | 48 | 4 | relu | TRUE | 0.2 | FALSE |  |  |  |  | 96 | sigmoid | TRUE | 96 | sigmoid | adam | 0.001 | 0.1 | 160 | 30 |
| 0.853900015 | TRUE | 0.3 | 32 | 4 | sigmoid | FALSE |  | TRUE | 96 | relu | TRUE | 0.3 | 192 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 32 | 20 |
| 0.852800012 | TRUE | 0.4 | 32 | 4 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.4 | 32 | sigmoid | FALSE |  |  | adam | 0.002 | 0.5 | 160 | 20 |
| 0.849099994 | TRUE | 0.1 | 32 | 4 | relu | TRUE | 0.4 | FALSE |  |  |  |  | 192 | relu | TRUE | 32 | relu | sgd | 0.002 | 0.5 | 32 | 10 |
| 0.84829998 | TRUE | 0.2 | 32 | 5 | relu | FALSE |  | FALSE |  |  |  |  | 224 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 160 | 30 |
| 0.848200023 | TRUE | 0.5 | 32 | 5 | relu | TRUE | 0.1 | TRUE | 96 | relu | TRUE | 0.4 | 224 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 224 | 20 |
| 0.847599983 | TRUE | 0.4 | 32 | 3 | relu | TRUE | 0.1 | FALSE |  |  |  |  | 224 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 32 | 30 |
| 0.846899986 | FALSE |  | 32 | 3 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.4 | 224 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 256 | 10 |
| 0.845600009 | TRUE | 0.4 | 32 | 4 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 64 | relu | TRUE | 128 | sigmoid | adam | 0.001 | 0.1 | 192 | 20 |
| 0.843900025 | TRUE | 0.4 | 64 | 4 | relu | FALSE |  | TRUE | 64 | relu | FALSE | 0.4 | 96 | sigmoid | TRUE | 64 | relu | sgd | 0.002 | 0.5 | 32 | 30 |
| 0.83950001 | FALSE |  | 32 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 256 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 64 | 30 |
| 0.838999987 | TRUE | 0.5 | 48 | 5 | relu | TRUE | 0.3 | FALSE |  |  |  |  | 128 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 192 | 10 |
| 0.838199973 | FALSE |  | 64 | 3 | sigmoid | TRUE | 0.1 | TRUE | 80 | relu | FALSE | 0.5 | 192 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 224 | 10 |
| 0.834599972 | FALSE |  | 64 | 3 | sigmoid | TRUE | 0.4 | TRUE | 112 | relu | TRUE | 0.3 | 256 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 32 | 30 |
| 0.833899975 | TRUE | 0.3 | 32 | 4 | relu | FALSE |  | TRUE | 96 | relu | TRUE | 0.4 | 160 | relu | FALSE |  |  | sgd | 0.001 | 0.5 | 32 | 20 |
| 0.832300007 | TRUE | 0.5 | 64 | 5 | relu | TRUE | 0.5 | FALSE |  |  |  |  | 32 | sigmoid | TRUE | 96 | sigmoid | adam | 0.001 | 0.1 | 32 | 10 |
| 0.831900001 | TRUE | 0.3 | 48 | 3 | relu | TRUE | 0.5 | FALSE |  |  |  |  | 256 | sigmoid | TRUE | 96 | relu | sgd | 0.002 | 0.1 | 32 | 30 |
| 0.83069998 | TRUE | 0.5 | 32 | 3 | relu | TRUE | 0.1 | TRUE | 96 | relu | FALSE | 0.2 | 64 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 32 | 20 |
| 0.830500007 | FALSE |  | 32 | 3 | sigmoid | TRUE | 0.2 | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 32 | 30 |
| 0.827600002 | FALSE |  | 48 | 3 | sigmoid | TRUE | 0.3 | TRUE | 64 | relu | TRUE | 0.4 | 128 | relu | TRUE | 64 | relu | adam | 0.001 | 0.5 | 64 | 10 |
| 0.826499999 | FALSE |  | 32 | 5 | relu | FALSE |  | FALSE |  |  |  |  | 256 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 128 | 10 |
| 0.826200008 | TRUE | 0.5 | 32 | 5 | relu | FALSE |  | FALSE |  |  |  |  | 64 | sigmoid | TRUE | 96 | sigmoid | adam | 0.001 | 0.5 | 128 | 30 |
| 0.825900018 | TRUE | 0.5 | 48 | 3 | relu | TRUE | 0.2 | FALSE |  |  |  |  | 256 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 96 | 10 |
| 0.825600028 | TRUE | 0.5 | 32 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 224 | 30 |
| 0.823000014 | TRUE | 0.3 | 64 | 3 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.5 | 96 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 256 | 10 |
| 0.822300017 | FALSE |  | 32 | 3 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 224 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 128 | 10 |
| 0.8204 | TRUE | 0.4 | 48 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 128 | sigmoid | TRUE | 32 | relu | sgd | 0.002 | 0.5 | 64 | 20 |
| 0.819299996 | TRUE | 0.5 | 48 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 224 | relu | TRUE | 128 | relu | adam | 0.002 | 0.1 | 160 | 10 |
| 0.815299988 | TRUE | 0.4 | 64 | 3 | relu | TRUE | 0.1 | FALSE |  |  |  |  | 128 | relu | FALSE |  |  | sgd | 0.001 | 0.5 | 128 | 20 |
| 0.814899981 | TRUE | 0.2 | 32 | 4 | relu | TRUE | 0.1 | FALSE |  |  |  |  | 128 | relu | TRUE | 96 | sigmoid | sgd | 0.001 | 0.1 | 32 | 30 |
| 0.812600017 | TRUE | 0.5 | 48 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 128 | sigmoid | FALSE |  |  | adam | 0.001 | 0.1 | 192 | 20 |
| 0.810899973 | FALSE |  | 32 | 4 | relu | TRUE | 0.4 | TRUE | 112 | relu | FALSE | 0.5 | 224 | relu | TRUE | 96 | relu | sgd | 0.002 | 0.1 | 64 | 20 |
| 0.809000015 | FALSE |  | 32 | 3 | relu | TRUE | 0.4 | TRUE | 64 | relu | TRUE | 0.5 | 192 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 128 | 30 |
| 0.807299972 | TRUE | 0.2 | 64 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 64 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 96 | 20 |
| 0.805199981 | TRUE | 0.5 | 32 | 4 | relu | TRUE | 0.1 | FALSE |  |  |  |  | 160 | relu | TRUE | 64 | sigmoid | sgd | 0.002 | 0.5 | 32 | 10 |
| 0.800700009 | TRUE | 0.3 | 48 | 4 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 224 | sigmoid | TRUE | 128 | sigmoid | adam | 0.001 | 0.5 | 256 | 10 |
| 0.796700001 | TRUE | 0.3 | 32 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 64 | relu | TRUE | 128 | relu | sgd | 0.001 | 0.1 | 32 | 30 |
| 0.789699972 | FALSE |  | 32 | 4 | sigmoid | TRUE | 0.4 | TRUE | 80 | relu | FALSE | 0.4 | 256 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 32 | 20 |
| 0.785000026 | TRUE | 0.1 | 64 | 4 | relu | TRUE | 0.3 | TRUE | 64 | relu | FALSE | 0.2 | 224 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.5 | 96 | 30 |
| 0.784099996 | TRUE | 0.3 | 32 | 4 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 96 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 192 | 20 |
| 0.780099988 | FALSE |  | 64 | 3 | relu | FALSE |  | TRUE | 64 | relu | FALSE | 0.3 | 128 | relu | FALSE |  |  | sgd | 0.001 | 0.5 | 192 | 20 |
| 0.7755 | TRUE | 0.2 | 64 | 5 | relu | TRUE | 0.2 | FALSE |  |  |  |  | 192 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 224 | 10 |
| 0.773800015 | TRUE | 0.2 | 64 | 5 | relu | TRUE | 0.5 | FALSE |  |  |  |  | 192 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 192 | 20 |
| 0.773000002 | TRUE | 0.2 | 32 | 4 | relu | TRUE | 0.3 | TRUE | 96 | relu | TRUE | 0.1 | 128 | relu | TRUE | 96 | relu | sgd | 0.002 | 0.5 | 64 | 10 |
| 0.769500017 | TRUE | 0.5 | 48 | 4 | relu | FALSE |  | TRUE | 80 | relu | FALSE | 0.1 | 160 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 64 | 30 |
| 0.768700004 | TRUE | 0.1 | 64 | 5 | sigmoid | FALSE |  | TRUE | 96 | relu | FALSE | 0.4 | 256 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 96 | 10 |
| 0.764100015 | FALSE |  | 48 | 5 | relu | TRUE | 0.2 | TRUE | 128 | sigmoid | FALSE | 0.5 | 256 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 32 | 30 |
| 0.763000011 | TRUE | 0.1 | 48 | 5 | relu | TRUE | 0.2 | FALSE |  |  |  |  | 32 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 224 | 20 |
| 0.756500006 | TRUE | 0.3 | 32 | 5 | sigmoid | TRUE | 0.1 | FALSE |  |  |  |  | 64 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 192 | 20 |
| 0.755800009 | FALSE |  | 48 | 3 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 128 | relu | TRUE | 64 | sigmoid | sgd | 0.002 | 0.5 | 32 | 10 |
| 0.754299998 | FALSE |  | 32 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 64 | relu | TRUE | 32 | relu | sgd | 0.001 | 0.5 | 160 | 30 |
| 0.752799988 | FALSE |  | 64 | 5 | relu | FALSE |  | TRUE | 80 | relu | TRUE | 0.4 | 64 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 160 | 10 |
| 0.751999974 | TRUE | 0.2 | 64 | 4 | relu | TRUE | 0.3 | TRUE | 96 | relu | FALSE | 0.4 | 192 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.5 | 160 | 30 |
| 0.750699997 | FALSE |  | 32 | 4 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 224 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 96 | 10 |
| 0.75029999 | FALSE |  | 48 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 64 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 160 | 20 |
| 0.750199974 | FALSE |  | 48 | 5 | relu | TRUE | 0.5 | TRUE | 112 | relu | FALSE | 0.3 | 96 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 160 | 20 |
| 0.75 | TRUE | 0.2 | 64 | 4 | sigmoid | TRUE | 0.1 | FALSE |  |  |  |  | 224 | relu | TRUE | 128 | relu | sgd | 0.002 | 0.1 | 192 | 30 |
| 0.746599972 | FALSE |  | 64 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 256 | 30 |
| 0.745999992 | TRUE | 0.5 | 48 | 3 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 128 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 64 | 10 |
| 0.745400012 | TRUE | 0.4 | 64 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 96 | relu | TRUE | 128 | sigmoid | sgd | 0.001 | 0.1 | 32 | 30 |
| 0.74119997 | FALSE |  | 48 | 4 | sigmoid | TRUE | 0.4 | TRUE | 112 | relu | TRUE | 0.2 | 128 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 64 | 20 |
| 0.737600029 | TRUE | 0.2 | 32 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 128 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 96 | 10 |
| 0.736899972 | FALSE |  | 48 | 4 | relu | TRUE | 0.3 | TRUE | 96 | sigmoid | FALSE | 0.3 | 128 | relu | TRUE | 96 | relu | sgd | 0.002 | 0.5 | 224 | 30 |
| 0.734499991 | FALSE |  | 64 | 5 | relu | FALSE |  | FALSE |  |  |  |  | 96 | relu | TRUE | 96 | relu | sgd | 0.001 | 0.1 | 224 | 10 |
| 0.734200001 | TRUE | 0.3 | 48 | 3 | relu | FALSE |  | TRUE | 128 | relu | TRUE | 0.1 | 192 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.5 | 160 | 20 |
| 0.733399987 | TRUE | 0.5 | 32 | 3 | sigmoid | TRUE | 0.5 | FALSE |  |  |  |  | 256 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 192 | 20 |
| 0.732599974 | TRUE | 0.2 | 32 | 3 | relu | TRUE | 0.5 | TRUE | 80 | sigmoid | TRUE | 0.4 | 128 | relu | FALSE |  |  | sgd | 0.001 | 0.5 | 64 | 30 |
| 0.727299988 | TRUE | 0.4 | 32 | 4 | sigmoid | TRUE | 0.2 | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | sgd | 0.001 | 0.5 | 256 | 30 |
| 0.725799978 | TRUE | 0.5 | 32 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 128 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.1 | 160 | 20 |
| 0.723399997 | TRUE | 0.2 | 32 | 5 | relu | FALSE |  | TRUE | 112 | relu | TRUE | 0.5 | 96 | relu | FALSE |  |  | sgd | 0.001 | 0.5 | 160 | 10 |
| 0.7227 | TRUE | 0.2 | 32 | 3 | sigmoid | TRUE | 0.5 | FALSE |  |  |  |  | 128 | relu | TRUE | 64 | relu | sgd | 0.002 | 0.5 | 224 | 20 |
| 0.722500026 | TRUE | 0.5 | 32 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 224 | sigmoid | TRUE | 128 | relu | sgd | 0.001 | 0.5 | 32 | 10 |
| 0.722000003 | TRUE | 0.1 | 48 | 3 | sigmoid | FALSE |  | TRUE | 64 | relu | FALSE | 0.5 | 160 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 32 | 10 |
| 0.719600022 | FALSE |  | 48 | 4 | relu | FALSE |  | TRUE | 96 | sigmoid | TRUE | 0.2 | 192 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 64 | 30 |
| 0.717599988 | FALSE |  | 48 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 192 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 128 | 30 |
| 0.716499984 | TRUE | 0.5 | 32 | 3 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 160 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.5 | 64 | 10 |
| 0.716300011 | FALSE |  | 48 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 96 | sigmoid | TRUE | 128 | sigmoid | sgd | 0.002 | 0.1 | 32 | 30 |
| 0.714699984 | TRUE | 0.2 | 48 | 5 | sigmoid | TRUE | 0.2 | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | sgd | 0.002 | 0.5 | 224 | 10 |
| 0.706399977 | TRUE | 0.1 | 64 | 3 | sigmoid | TRUE | 0.3 | TRUE | 64 | relu | TRUE | 0.1 | 256 | relu | FALSE |  |  | sgd | 0.001 | 0.5 | 224 | 30 |
| 0.706399977 | TRUE | 0.1 | 64 | 4 | sigmoid | TRUE | 0.4 | TRUE | 80 | sigmoid | FALSE | 0.2 | 96 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 32 | 10 |
| 0.706200004 | FALSE |  | 32 | 3 | relu | FALSE |  | TRUE | 64 | relu | TRUE | 0.1 | 224 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 96 | 10 |
| 0.698899984 | FALSE |  | 32 | 5 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | FALSE | 0.1 | 160 | relu | TRUE | 64 | relu | sgd | 0.002 | 0.5 | 64 | 10 |
| 0.696099997 | FALSE |  | 32 | 4 | relu | TRUE | 0.4 | TRUE | 80 | relu | TRUE | 0.2 | 96 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 128 | 20 |
| 0.695100009 | FALSE |  | 48 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | relu | TRUE | 96 | relu | sgd | 0.001 | 0.1 | 160 | 20 |
| 0.691999972 | FALSE |  | 32 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 64 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 224 | 10 |
| 0.685599983 | TRUE | 0.5 | 32 | 3 | sigmoid | TRUE | 0.3 | TRUE | 64 | relu | FALSE | 0.2 | 256 | relu | TRUE | 64 | sigmoid | sgd | 0.002 | 0.5 | 32 | 10 |
| 0.683099985 | TRUE | 0.2 | 32 | 5 | relu | FALSE |  | TRUE | 128 | relu | TRUE | 0.4 | 224 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 192 | 20 |
| 0.677600026 | FALSE |  | 64 | 3 | sigmoid | TRUE | 0.2 | TRUE | 112 | relu | FALSE | 0.4 | 160 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 160 | 20 |
| 0.666599989 | FALSE |  | 64 | 3 | relu | TRUE | 0.2 | TRUE | 128 | relu | FALSE | 0.1 | 192 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.1 | 256 | 30 |
| 0.663500011 | TRUE | 0.2 | 32 | 3 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 128 | sigmoid | TRUE | 96 | relu | sgd | 0.002 | 0.5 | 96 | 10 |
| 0.656199992 | FALSE |  | 64 | 5 | sigmoid | FALSE |  | TRUE | 96 | relu | FALSE | 0.5 | 96 | relu | TRUE | 64 | relu | sgd | 0.001 | 0.1 | 224 | 20 |
| 0.654600024 | FALSE |  | 32 | 3 | relu | FALSE |  | TRUE | 96 | sigmoid | FALSE | 0.1 | 96 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 256 | 30 |
| 0.651600003 | TRUE | 0.3 | 32 | 3 | relu | TRUE | 0.3 | FALSE |  |  |  |  | 32 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 192 | 10 |
| 0.649900019 | TRUE | 0.3 | 64 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 256 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 160 | 20 |
| 0.648800015 | TRUE | 0.3 | 48 | 5 | relu | TRUE | 0.1 | TRUE | 96 | relu | TRUE | 0.4 | 256 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.1 | 192 | 20 |
| 0.644400001 | TRUE | 0.2 | 48 | 5 | sigmoid | TRUE | 0.1 | TRUE | 112 | relu | TRUE | 0.5 | 64 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 128 | 30 |
| 0.642099977 | FALSE |  | 64 | 3 | sigmoid | TRUE | 0.5 | FALSE |  |  |  |  | 96 | sigmoid | TRUE | 96 | relu | sgd | 0.002 | 0.5 | 192 | 20 |
| 0.635800004 | FALSE |  | 64 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 256 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.1 | 224 | 30 |
| 0.627799988 | TRUE | 0.5 | 32 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 256 | sigmoid | TRUE | 32 | sigmoid | sgd | 0.001 | 0.1 | 32 | 30 |
| 0.621599972 | TRUE | 0.2 | 32 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | sigmoid | TRUE | 96 | relu | sgd | 0.002 | 0.1 | 128 | 20 |
| 0.61559999 | FALSE |  | 48 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 96 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 224 | 20 |
| 0.60650003 | TRUE | 0.4 | 48 | 4 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 96 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 160 | 20 |
| 0.601000011 | TRUE | 0.1 | 48 | 4 | sigmoid | TRUE | 0.5 | FALSE |  |  |  |  | 128 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 128 | 10 |
| 0.596499979 | FALSE |  | 32 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 96 | sigmoid | TRUE | 128 | relu | sgd | 0.001 | 0.1 | 160 | 10 |
| 0.581499994 | FALSE |  | 32 | 5 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 160 | relu | TRUE | 64 | sigmoid | sgd | 0.002 | 0.5 | 160 | 10 |
| 0.580600023 | TRUE | 0.3 | 48 | 4 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | FALSE | 0.5 | 256 | relu | FALSE |  |  | sgd | 0.002 | 0.1 | 160 | 20 |
| 0.549600005 | FALSE |  | 64 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 192 | relu | TRUE | 64 | relu | sgd | 0.001 | 0.1 | 256 | 10 |
| 0.544499993 | FALSE |  | 64 | 5 | relu | TRUE | 0.1 | FALSE |  |  |  |  | 128 | sigmoid | TRUE | 96 | sigmoid | sgd | 0.001 | 0.1 | 224 | 20 |
| 0.542299986 | TRUE | 0.1 | 32 | 3 | sigmoid | FALSE |  | TRUE | 96 | relu | FALSE | 0.2 | 224 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 192 | 20 |
| 0.541800022 | TRUE | 0.5 | 48 | 5 | sigmoid | TRUE | 0.5 | FALSE |  |  |  |  | 224 | relu | TRUE | 128 | relu | sgd | 0.001 | 0.1 | 128 | 10 |
| 0.541000009 | FALSE |  | 48 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | sigmoid | TRUE | 128 | relu | sgd | 0.001 | 0.1 | 160 | 20 |
| 0.535099983 | TRUE | 0.1 | 64 | 3 | relu | FALSE |  | FALSE |  |  |  |  | 32 | sigmoid | TRUE | 96 | relu | sgd | 0.001 | 0.5 | 160 | 10 |
| 0.52759999 | TRUE | 0.3 | 32 | 3 | relu | FALSE |  | TRUE | 128 | relu | FALSE | 0.5 | 256 | sigmoid | TRUE | 32 | sigmoid | sgd | 0.001 | 0.5 | 192 | 20 |
| 0.522300005 | TRUE | 0.4 | 48 | 5 | relu | FALSE |  | TRUE | 128 | relu | FALSE | 0.2 | 96 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.1 | 256 | 10 |
| 0.519400001 | FALSE |  | 48 | 4 | relu | TRUE | 0.5 | TRUE | 64 | sigmoid | TRUE | 0.5 | 256 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.5 | 224 | 30 |
| 0.505900025 | FALSE |  | 48 | 4 | sigmoid | TRUE | 0.2 | FALSE |  |  |  |  | 160 | sigmoid | TRUE | 64 | sigmoid | sgd | 0.001 | 0.5 | 96 | 20 |
| 0.504100025 | FALSE |  | 32 | 3 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 128 | relu | TRUE | 64 | sigmoid | sgd | 0.001 | 0.5 | 256 | 30 |
| 0.496899992 | TRUE | 0.2 | 64 | 4 | relu | FALSE |  | FALSE |  |  |  |  | 96 | sigmoid | TRUE | 96 | sigmoid | sgd | 0.002 | 0.1 | 128 | 10 |
| 0.42719999 | TRUE | 0.3 | 48 | 4 | sigmoid | FALSE |  | TRUE | 96 | relu | TRUE | 0.4 | 160 | relu | TRUE | 128 | sigmoid | sgd | 0.002 | 0.1 | 224 | 20 |
| 0.412999988 | FALSE |  | 48 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 64 | relu | TRUE | 64 | sigmoid | sgd | 0.001 | 0.5 | 224 | 20 |
| 0.404199988 | TRUE | 0.4 | 48 | 3 | relu | FALSE |  | TRUE | 112 | sigmoid | TRUE | 0.3 | 64 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 224 | 20 |
| 0.367700011 | TRUE | 0.4 | 32 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 64 | sigmoid | TRUE | 96 | sigmoid | sgd | 0.002 | 0.1 | 224 | 20 |
| 0.360100001 | FALSE |  | 48 | 5 | relu | TRUE | 0.3 | TRUE | 112 | sigmoid | TRUE | 0.2 | 128 | sigmoid | TRUE | 64 | sigmoid | sgd | 0.001 | 0.1 | 32 | 20 |
| 0.3583 | FALSE |  | 32 | 5 | sigmoid | TRUE | 0.4 | TRUE | 64 | relu | TRUE | 0.2 | 224 | sigmoid | TRUE | 128 | sigmoid | sgd | 0.002 | 0.5 | 128 | 20 |
| 0.340999991 | TRUE | 0.2 | 32 | 3 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 64 | sigmoid | TRUE | 32 | sigmoid | sgd | 0.002 | 0.5 | 160 | 10 |
| 0.337000012 | FALSE |  | 32 | 3 | relu | FALSE |  | TRUE | 96 | sigmoid | TRUE | 0.3 | 64 | sigmoid | FALSE |  |  | sgd | 0.001 | 0.1 | 96 | 10 |
| 0.270300001 | FALSE |  | 32 | 4 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 128 | sigmoid | TRUE | 64 | sigmoid | sgd | 0.001 | 0.1 | 128 | 30 |
| 0.219300002 | TRUE | 0.1 | 48 | 5 | sigmoid | TRUE | 0.5 | TRUE | 112 | sigmoid | FALSE | 0.1 | 128 | sigmoid | FALSE |  |  | sgd | 0.002 | 0.1 | 96 | 20 |
| 0.202900007 | TRUE | 0.5 | 32 | 3 | relu | FALSE |  | TRUE | 96 | sigmoid | FALSE | 0.2 | 96 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 256 | 10 |
| 0.1796 | TRUE | 0.5 | 64 | 3 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 96 | sigmoid | TRUE | 96 | relu | sgd | 0.001 | 0.1 | 224 | 10 |
| 0.167899996 | FALSE |  | 64 | 4 | sigmoid | FALSE |  | TRUE | 112 | sigmoid | FALSE | 0.2 | 224 | sigmoid | TRUE | 32 | relu | sgd | 0.001 | 0.1 | 128 | 20 |
| 0.159999996 | TRUE | 0.4 | 48 | 3 | sigmoid | TRUE | 0.5 | TRUE | 96 | sigmoid | TRUE | 0.5 | 32 | relu | TRUE | 32 | sigmoid | sgd | 0.001 | 0.1 | 128 | 10 |
| 0.151099995 | FALSE |  | 48 | 3 | sigmoid | FALSE |  | TRUE | 64 | sigmoid | TRUE | 0.5 | 256 | sigmoid | TRUE | 32 | sigmoid | sgd | 0.002 | 0.1 | 128 | 30 |
| 0.133300006 | TRUE | 0.3 | 48 | 3 | sigmoid | TRUE | 0.4 | TRUE | 64 | relu | FALSE | 0.5 | 32 | sigmoid | TRUE | 128 | relu | sgd | 0.001 | 0.5 | 256 | 20 |
| 0.124799997 | TRUE | 0.2 | 64 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 64 | sigmoid | TRUE | 32 | sigmoid | sgd | 0.001 | 0.1 | 256 | 30 |
| 0.120300002 | FALSE |  | 64 | 4 | sigmoid | FALSE |  | TRUE | 64 | sigmoid | FALSE | 0.2 | 224 | sigmoid | TRUE | 64 | sigmoid | sgd | 0.002 | 0.1 | 96 | 10 |
| 0.118100002 | TRUE | 0.3 | 64 | 3 | sigmoid | FALSE |  | TRUE | 128 | sigmoid | TRUE | 0.3 | 160 | relu | TRUE | 64 | sigmoid | sgd | 0.001 | 0.1 | 192 | 20 |
| 0.107299998 | TRUE | 0.5 | 64 | 4 | sigmoid | TRUE | 0.3 | TRUE | 96 | sigmoid | TRUE | 0.2 | 160 | relu | TRUE | 64 | relu | sgd | 0.001 | 0.5 | 96 | 10 |
| 0.100900002 | FALSE |  | 64 | 3 | sigmoid | FALSE |  | TRUE | 96 | sigmoid | TRUE | 0.5 | 128 | relu | TRUE | 96 | sigmoid | sgd | 0.001 | 0.5 | 160 | 30 |
| 0.100000001 | FALSE |  | 64 | 3 | sigmoid | FALSE |  | TRUE | 80 | relu | TRUE | 0.3 | 32 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 64 | 30 |
| 0.100000001 | TRUE | 0.3 | 32 | 3 | sigmoid | TRUE | 0.5 | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 160 | 10 |
| 0.100000001 | FALSE |  | 64 | 3 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 64 | sigmoid | FALSE |  |  | adam | 0.002 | 0.5 | 64 | 10 |
| 0.100000001 | TRUE | 0.1 | 64 | 4 | sigmoid | TRUE | 0.1 | TRUE | 64 | sigmoid | TRUE | 0.2 | 256 | sigmoid | TRUE | 32 | relu | adam | 0.002 | 0.5 | 160 | 30 |
| 0.100000001 | TRUE | 0.4 | 48 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 192 | sigmoid | TRUE | 32 | sigmoid | adam | 0.002 | 0.5 | 224 | 30 |
| 0.100000001 | FALSE |  | 32 | 4 | sigmoid | TRUE | 0.3 | TRUE | 112 | sigmoid | TRUE | 0.5 | 128 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 128 | 20 |
| 0.100000001 | TRUE | 0.2 | 64 | 3 | sigmoid | TRUE | 0.3 | FALSE |  |  |  |  | 256 | sigmoid | TRUE | 128 | sigmoid | adam | 0.002 | 0.5 | 96 | 10 |
| 0.100000001 | TRUE | 0.2 | 48 | 5 | sigmoid | TRUE | 0.1 | FALSE |  |  |  |  | 64 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 256 | 20 |
| 0.100000001 | TRUE | 0.4 | 48 | 5 | sigmoid | TRUE | 0.1 | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 64 | 20 |
| 0.100000001 | TRUE | 0.4 | 64 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 256 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 96 | 10 |
| 0.100000001 | TRUE | 0.5 | 64 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 128 | 20 |
| 0.100000001 | TRUE | 0.1 | 64 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | sigmoid | TRUE | 96 | relu | adam | 0.001 | 0.5 | 64 | 10 |
| 0.100000001 | TRUE | 0.1 | 32 | 4 | sigmoid | TRUE | 0.2 | TRUE | 96 | sigmoid | TRUE | 0.5 | 32 | relu | FALSE |  |  | sgd | 0.001 | 0.1 | 32 | 30 |
| 0.100000001 | FALSE |  | 64 | 3 | sigmoid | FALSE |  | TRUE | 64 | relu | FALSE | 0.3 | 192 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 128 | 20 |
| 0.100000001 | FALSE |  | 64 | 5 | sigmoid | FALSE |  | FALSE |  |  |  |  | 224 | sigmoid | FALSE |  |  | adam | 0.002 | 0.1 | 64 | 30 |
| 0.100000001 | TRUE | 0.4 | 64 | 4 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 224 | relu | TRUE | 32 | sigmoid | adam | 0.001 | 0.5 | 128 | 30 |
| 0.100000001 | FALSE |  | 32 | 3 | sigmoid | TRUE | 0.4 | FALSE |  |  |  |  | 64 | relu | FALSE |  |  | adam | 0.001 | 0.1 | 128 | 30 |
| 0.100000001 | TRUE | 0.1 | 32 | 5 | sigmoid | TRUE | 0.2 | TRUE | 80 | sigmoid | FALSE | 0.1 | 192 | sigmoid | TRUE | 32 | sigmoid | sgd | 0.001 | 0.5 | 224 | 10 |
| 0.100000001 | FALSE |  | 48 | 3 | sigmoid | TRUE | 0.3 | TRUE | 96 | relu | FALSE | 0.3 | 128 | sigmoid | TRUE | 96 | relu | adam | 0.002 | 0.5 | 64 | 10 |
| 0.100000001 | TRUE | 0.3 | 48 | 3 | sigmoid | TRUE | 0.2 | FALSE |  |  |  |  | 192 | relu | FALSE |  |  | adam | 0.002 | 0.5 | 160 | 10 |
| 0.100000001 | TRUE | 0.3 | 48 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 96 | sigmoid | TRUE | 32 | sigmoid | adam | 0.002 | 0.1 | 224 | 10 |
| 0.100000001 | TRUE | 0.4 | 32 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 160 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 128 | 20 |
| 0.100000001 | TRUE | 0.1 | 64 | 4 | sigmoid | FALSE |  | FALSE |  |  |  |  | 256 | sigmoid | FALSE |  |  | adam | 0.001 | 0.5 | 160 | 10 |
| 0.100000001 | FALSE |  | 32 | 4 | relu | FALSE |  | TRUE | 128 | sigmoid | FALSE | 0.1 | 64 | relu | FALSE |  |  | adam | 0.001 | 0.5 | 256 | 30 |
| 0.100000001 | TRUE | 0.1 | 32 | 3 | sigmoid | TRUE | 0.5 | TRUE | 112 | sigmoid | FALSE | 0.5 | 160 | sigmoid | TRUE | 96 | relu | adam | 0.002 | 0.1 | 160 | 20 |
| 0.100000001 | TRUE | 0.3 | 64 | 3 | sigmoid | FALSE |  | FALSE |  |  |  |  | 96 | relu | FALSE |  |  | adam | 0.002 | 0.1 | 256 | 10 |