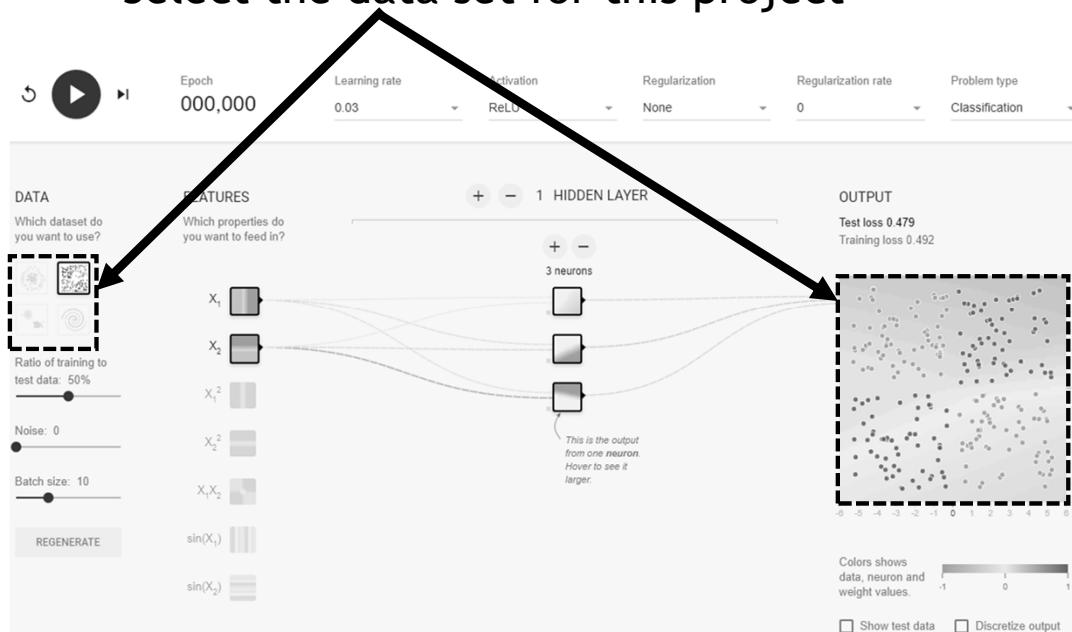


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Deep Learning Project with TensorFlow Playground Project 3

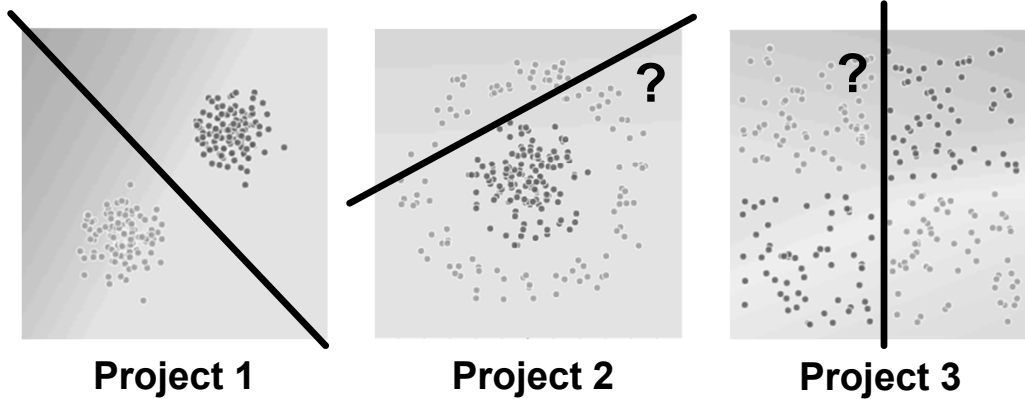
Project 3

- In project 3, we will distinguish four clusters that have square shapes
 - Select the data set for this project



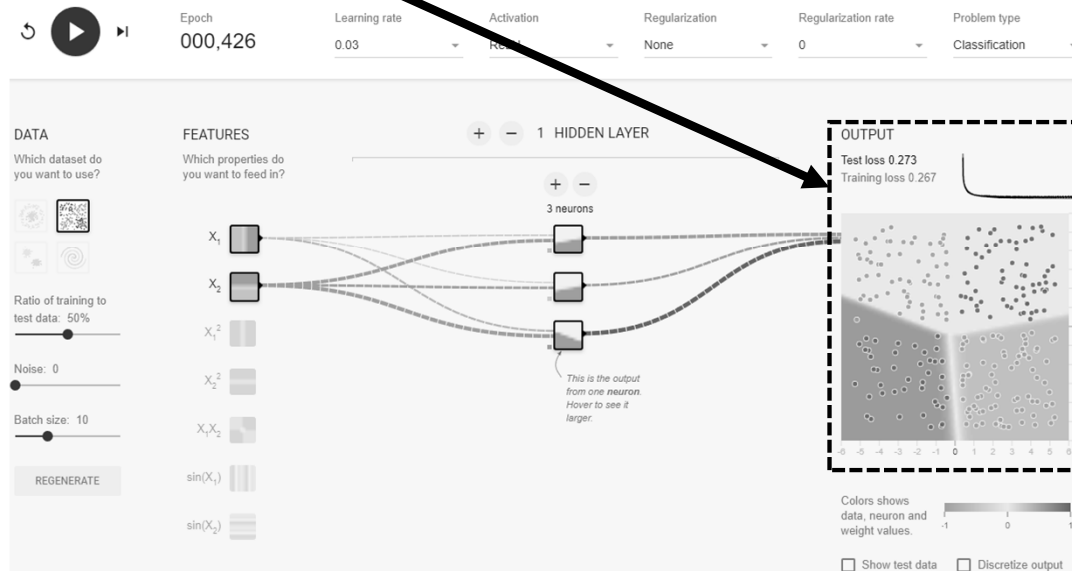
Project 3

- Like in Project 2, this problem can not be solved by drawing a single line
- Therefore, obviously more than one neuron will be needed



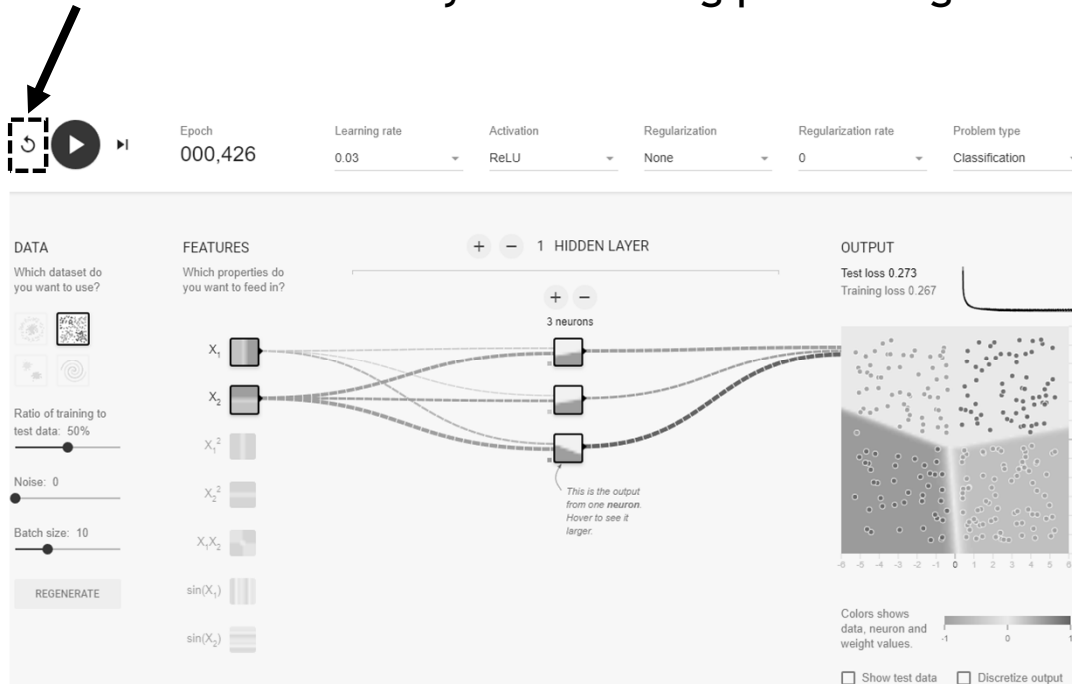
Project 3

- Use the three neuron NN model (used in Project 2) to solve this data set problem
 - You may fail the classification



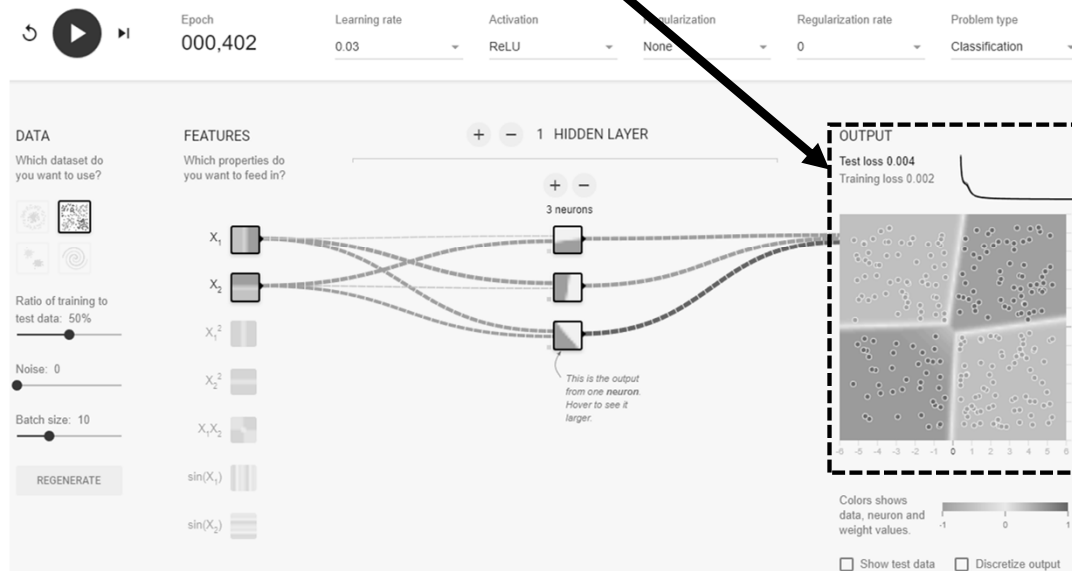
Project 3

- If a classification failure occurs, use the Refresh button to try the training process again



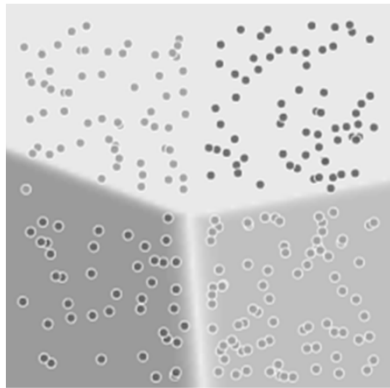
Project 3

- As shown below, the Refreshed training resulted in a successful classification result
- Why?



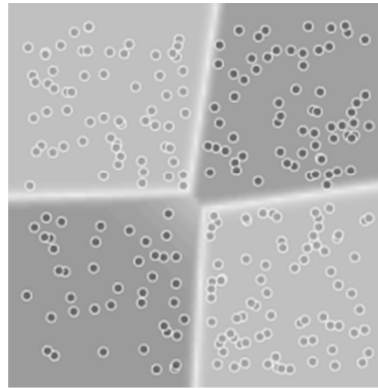
Project 3

- Proper initialization of the weights in a neural network is critical to its convergence
- Because the initial weight is set at random, a failure may occur



**Improper weight
initialization**

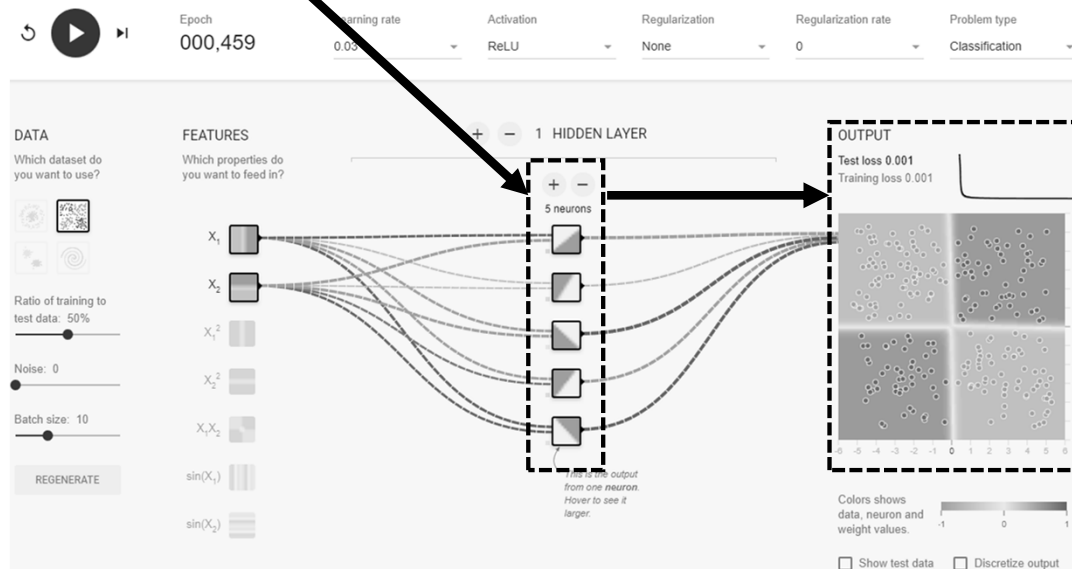
VS.



**Proper weight
initialization**

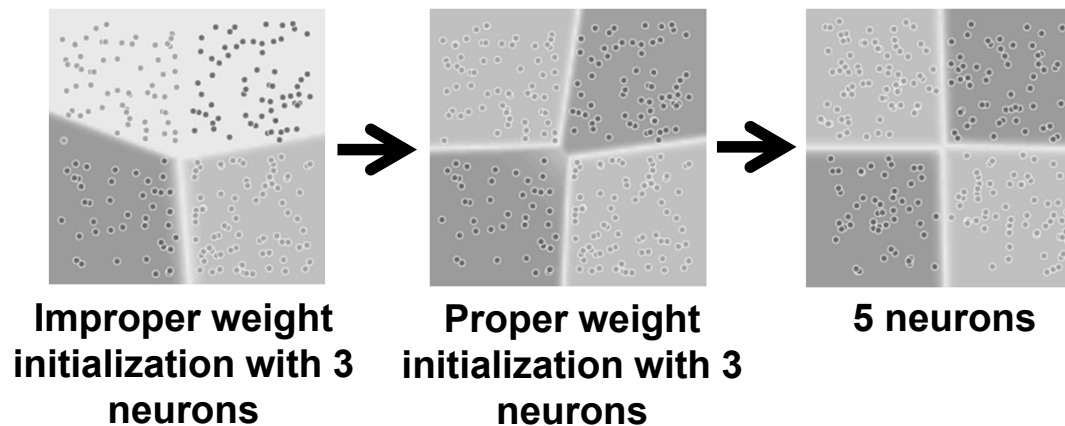
Project 3

- If you increase the number of neurons to five, you can obtain very accurate classification results



Project 3

- When 5 neurons are used, classification succeeds very reliably with accurate results
- However, if weight initialization is properly done, successful classification can be obtained with 3 or 4 neurons

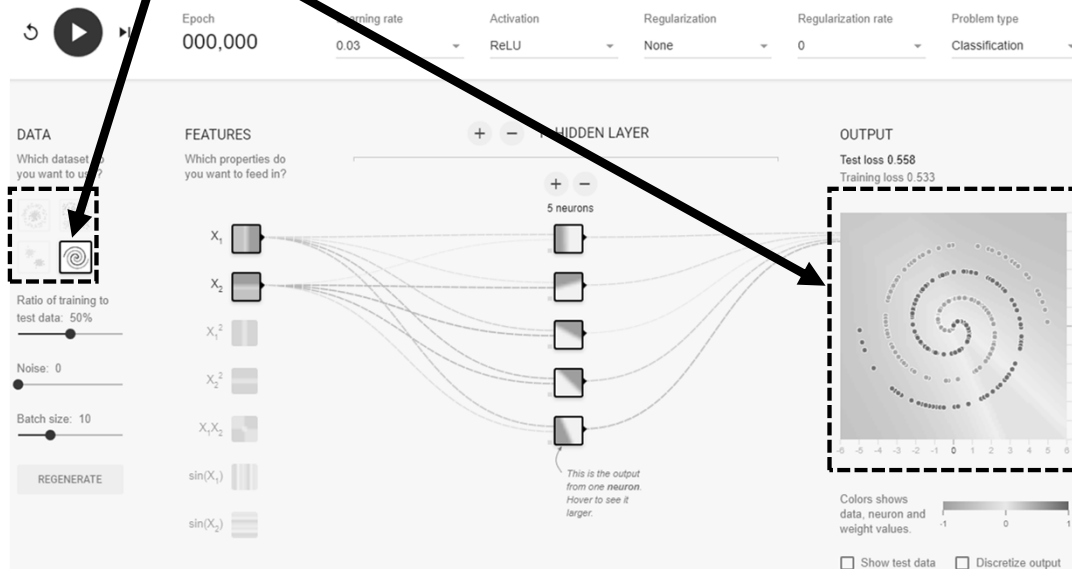


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Deep Learning Project with TensorFlow Playground Project 4

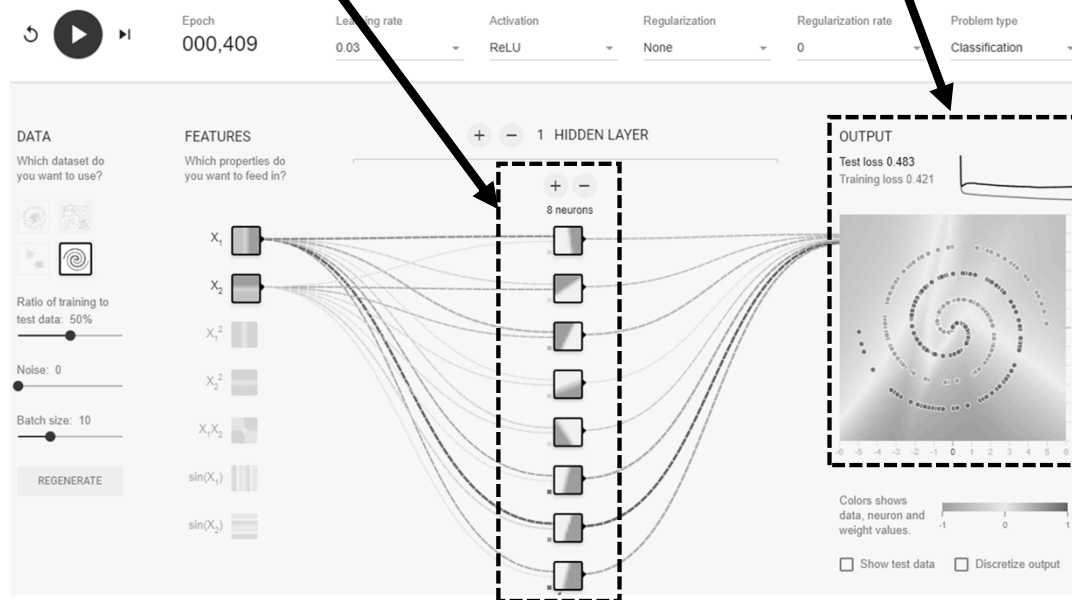
Project 4

- Now we will try to classify the most complex data set pattern
- The swirled structure of orange and blue data points is a challenging problem



Project 4

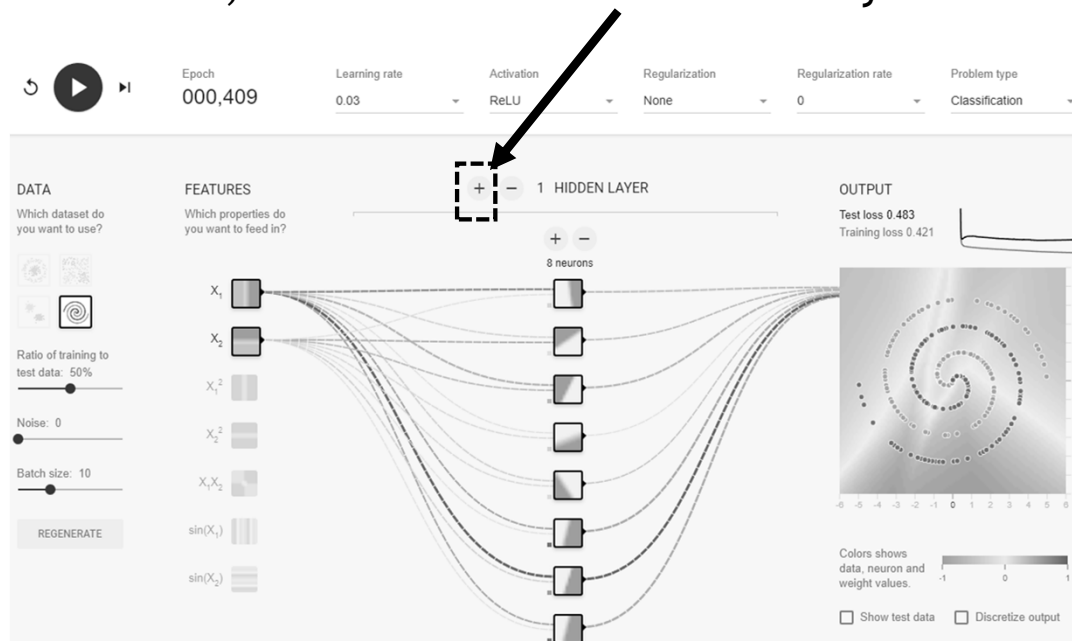
- Even if you increase the number of neurons to its maximum 8, still the classification will fail





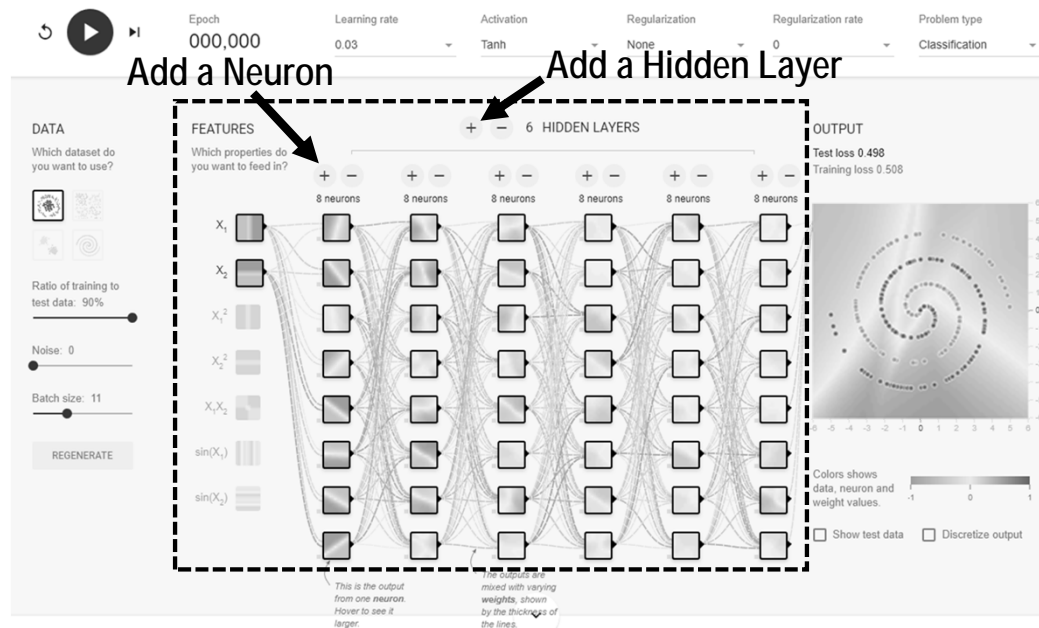
Project 4

- Even if you increase the number of neurons to its maximum 8, still the classification will fail
- Therefore, we must add more Hidden Layers



Project 4

- Gradually add more Hidden layers & Neurons
 - Up to 6 hidden layers can be used
 - Up to 8 neurons per hidden layer can be set



Discussion Prompt on Project 4

DL (Deep Learning) NN Design Challenge

- DL NN Classification Objectives
 - Test loss ≤ 0.05
 - Training loss ≤ 0.02
- Example of a successful classification

OUTPUT

Test loss 0.034

Training loss 0.008



Discussion Prompt on Project 4

- In order to succeed in the classification of Project 4, you will need to make the NN (Neural Network) Deeper by adding hidden layers and neurons. What is the smallest number of Hidden Layers and total number of Neurons (in the hidden layers) you had to use to succeed in the classification of Project 4? You must mention the Test Loss and Training Loss output values for your NN model. In addition, give helpful tips so your friends can learn more and use the TensorFlow Playground more fluently.

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Deep Learning Project with
TensorFlow Playground

References

References

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<https://cloud.google.com/blog/big-data/2016/07/understanding-neural-networks-with-tensorflow-playground>
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 - *Special Thanks to my Teaching Assistants*
 - Younghwan Shin*, Taeyoung Ha, Sunho Seo, Junsung Kim, Changsung Lee
- * Special contributions to the TensorFlow Playground Project