Introduction to Machine Learning with Neural Networks.

With James Oswald

Format

- Grant Sanderson’s Deep Learning Series
  - But what is a Neural Network? | Deep learning, chapter 1
  - Gradient descent, how neural networks learn | Deep learning, chapter 2
  - What is backpropagation really doing? | Deep learning, chapter 3
  - Backpropagation calculus | Deep learning, chapter 4
- Let’s Look at the (Hard) Code
- Frameworks! Machine Learning Made Easy! (Tensorflow)
  - 3Blue1Brown Example
  - Convolutional Neural Networks
  - Classifying our own digits
- My Research, classifying types of data using CNN

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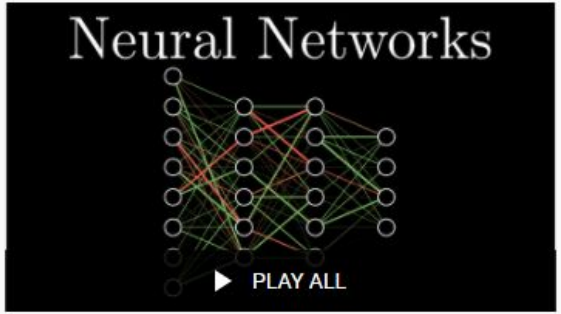

Neural networks

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SEASON 3

1 

But what is a Neural Network? | Deep learning, chapter 1
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Gradient descent, how neural networks learn | Deep learning, chapter 2
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What is backpropagation really doing? | Deep learning, chapter 3
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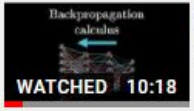
4 

Backpropagation calculus | Deep learning, chapter 4
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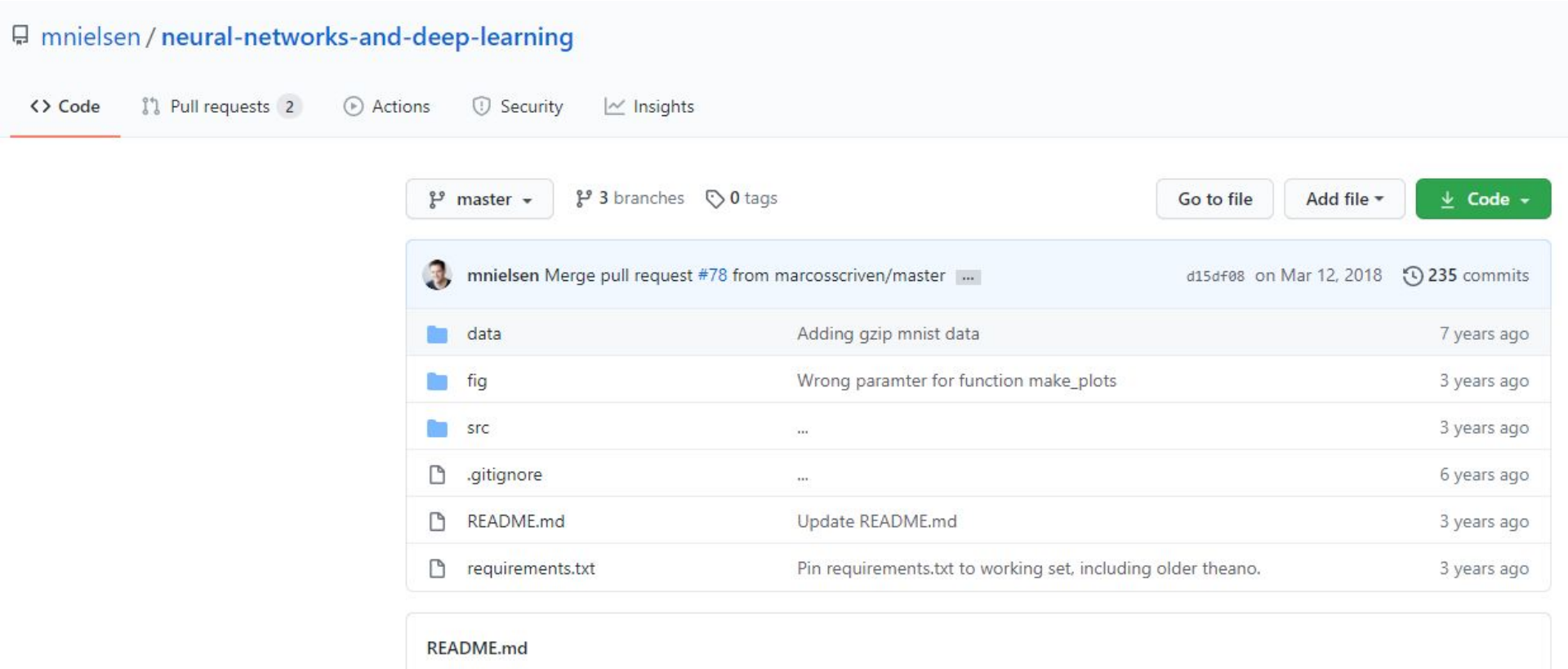
Sample Code (The hard way)



Let’s look at some BETTER code! With Tensorflow

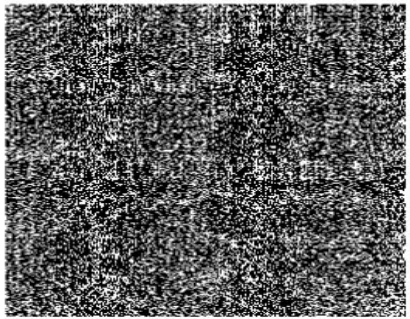
```
num_classes = 10
input_shape = (28, 28, 1)

# the data, split between train and test sets
(train_images, train_labels), (test_images, test_labels) = keras.datasets.mnist.load_data()

# convert class vectors to binary class matrices
train_labels = keras.utils.to_categorical(train_labels, num_classes)
test_labels = keras.utils.to_categorical(test_labels, num_classes)
model = keras.Sequential(
    [
        keras.Input(shape=input_shape),
        layers.Flatten(),
        layers.Dense(16, activation="sigmoid"),
        layers.Dense(16, activation="sigmoid"),
        layers.Dense(num_classes, activation="sigmoid"),
    ]
)
model.summary()
```

My Research:

Classifying Binary Data using Convolutional Neural Networks on Processed Byte Digraph Matrices

Mid Presentation

By James Oswald



Thank you for coming!