Week 4

- This week will be building sunspot prediction

Convolution

- This week would be combining convolution with LSTMs from the previous week
- Using the synthetic data from last week, here is an example of an network with `Conv1D`

```
model = tf.keras.models.Sequential([
  tf.keras.layers.Conv1D(filters=32, kernel_size=5,
                         strides=1, padding="causal",
                         activation="relu",
                         input_shape=[None, 1]),
  tf.keras.layers.LSTM(32, return_sequences=True),
  tf.keras.layers.LSTM(32, return_sequences=True),
  tf.keras.layers.Dense(1),
  tf.keras.layers.Lambda(lambda x: x * 200)
])

optimizer = tf.keras.optimizers.SGD(lr=1e-5, momentum=0.9)

model.compile(loss=tf.keras.losses.Huber(),
              optimizer=optimizer,
              metrics=["mae"])

model.fit(dataset,epochs=500)
```

- Code using CNN and LSTMs to create neural network:

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/5542d6f5-5292-404c-a029-4316bb6c5e48/cnn_and_lstm_neural_network.ipynb

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/ac5f990b-0687-4b62-92a0-6bac4a931ec1/cnn_and_lstm_neural_network.py

Using Real World Data

- The Sun Spot Data from this week is under this LINK
- This code uses creates a neural network using DNN:

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/481e5845-59b7-41a7-8f78-8240b52a6e5c/dnn_sunspots_neural_network.ipynb

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/951ea7b6-fb08-4bc2-9143-899b465902b0/dnn_sunspots_neural_network.py

- This code uses multiple layers:

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/c8a0c7d9-0243-4782-8c07-09717728cb6f/cnn_dnn_lstm_sunspots_neural_network.ipynb

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/a2c3feb8-becf-445f-822b-0d2fe003b9c6/cnn_dnn_lstm_sunspots_neural_network.py

Exercise

- Week 4 Exercise Code:

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/e48357ea-7c5a-4d7b-85d0-06e801d136fc/exercise_1_w4.py

https://s3-us-west-2.amazonaws.com/secure.notion-static.com/1678831 2-702b-448d-9cbc-ecb4aa501359/exercise_1_w4.ipynb