Self-driving car assignment

In the **SullyChen's** dataset we are given with front-view images of a car while driving.The video of the car was taken for 25 mins and the video is broken into pictures captured at 30 frames/second.We are tasked to predict the angle of the angle at which the steering wheel of the car should be rotating.The given problem is a Regression problem, where we use CNN for Regression.We are going to use NVIDIA's cnn architecture to train our models.Given the input images of the front view of the car we need to predict the streering angle in degrees. We will use OpenCV to visualize the predictions.

Assignment

1. hyperparameter tuning using Drop out rate as 0.5
2. Adam optimizer with learning rate 10*e-3
3. Use train-test split as 70:30
4. Use Linear activation instead of tanh

In [1]:
```
import os
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from scipy import pi
import cv2
import scipy.misc
import seaborn as sns
import tensorflow as tf
```

In [2]:
```
#### laoding data from the dataset
folder = 'driving_dataset/'
data_f = os.path.join(folder,'data.txt')
input_,output_=[],[]
with open(data_f,'rb') as f :
     for line in f :
            line = line.decode('utf-8')
            image_name,steering_angle  = line.split()
            image_loc = os.path.join(folder,image_name)
            input_.append(image_loc)
            output_.append(float(steering_angle) * (pi / 180)) ## convert to degrees to radians
```

In [3]:
```
###
input_len  = len(input_)
print('size of the input dataset:',len(input_))
```

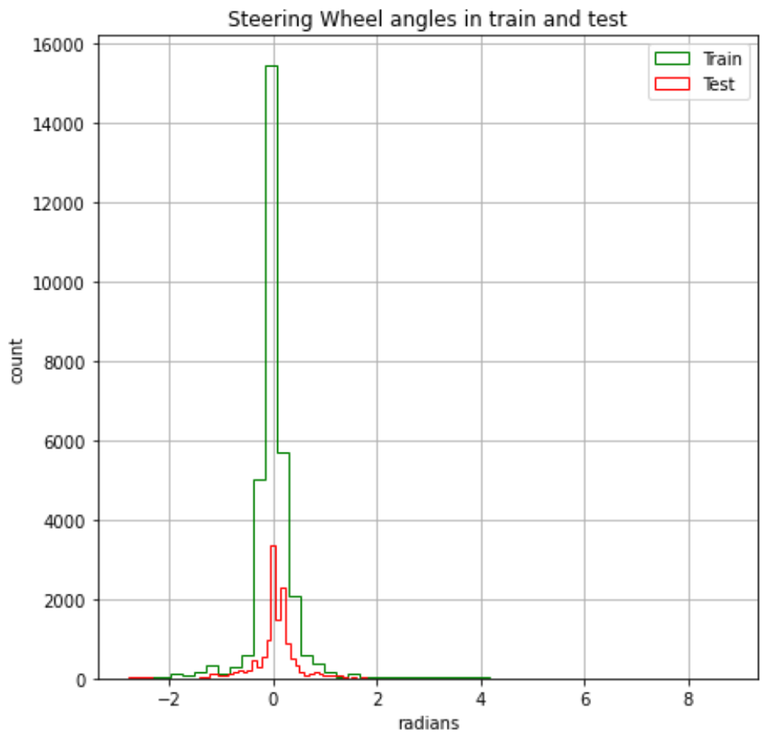
```
size of the input dataset: 45406
```

In [4]:
```
print('Sample input datapoint:',input_[0],'ouput:',output_[0])
print('Sample input datapoint:',input_[67],'ouput:',output_[67])
print('Sample input datapoint:',input_[25],'ouput:',output_[25])
```

```
Sample input datapoint: driving_dataset/0.jpg ouput: 0.0
Sample input datapoint: driving_dataset/67.jpg ouput: 0.0317649923862968
Sample input datapoint: driving_dataset/25.jpg ouput: 0.18133970928221085
```

In [5]:
```
#### train-test temporal split
x_train,y_train = input_[:int(0.70 * input_len)],output_[:int(0.70 * input_len)]
x_test,y_test = input_[int(0.70 * input_len):],output_[int(0.70 * input_len):]
```

In [6]:
```
fig = plt.figure(figsize=(7,7))
plt.hist(y_train, bins=50,color='green', histtype ='step',label='Train')
plt.hist(y_test, bins=50,color='red', histtype ='step',label='Test')
plt.title('Steering Wheel angles in train and test')
plt.legend()
plt.xlabel('radians')
plt.ylabel('count')
plt.grid()
```



by the plot we can see most of the values are 0. As most time car runs on straight road we have majority values at 0.

DataPreparation: Creating Batch Dataset

In [7]:
```
train_img_len = len(x_train)
test_img_len = len(x_test)
```

In [35]:
```
train_batch_pointer = 0
test_batch_pointer = 0
```

In [58]:

```
def load_tr_te_batch(batch_size,batch_type='train'):
    global train_batch_pointer
    global test_batch_pointer

    if batch_type=='train':
        x_out = []
        y_out = []
        for i in range(0, batch_size):
            ## let's read batch wise data ,here the train_batch_pointer increments once a batch is loaded in our
            ## input matrix.%train_img_len here makes sure train_batch_pointer+i do not exceed the number of imgaes in train
            ## as we keep adding our batch
            img_read = cv2.imread(x_train[(train_batch_pointer + i) % train_img_len])
            ### after reading the image we just want to capture the lower 150 pixels , as our steering moves
            ## based on the anglar turns of the road , we just want to capture that
            img_read_150 = img_read[-150:]
            ## our x_train imge is of size (256, 455, 3) after selecting lower  150 , it is of size (150,455,3)
            ## we resize to 200,66,3 to keep the aspect ratio same (150/455~=66/200)
            img_resize = cv2.resize(img_read_150,(200, 66))
            ### normalizing the pixels
            x_out.append(img_resize / 255.0)
            y_out.append([y_train[(train_batch_pointer + i) % train_img_len]])
        train_batch_pointer += batch_size
        return x_out, y_out
    else:
        x_out = []
        y_out = []
        for i in range(0, batch_size):
            img_read = cv2.imread(x_test[(test_batch_pointer + i) % test_img_len])
            img_read_150 = img_read[-150:]
            img_resize = cv2.resize(img_read_150,(200, 66))
            ### normalizing the pixels
            x_out.append(img_resize / 255.0)
            y_out.append([y_test[(test_batch_pointer + i) % test_img_len]])
        test_batch_pointer += batch_size
        return x_out, y_out


```

Building Model Architecture

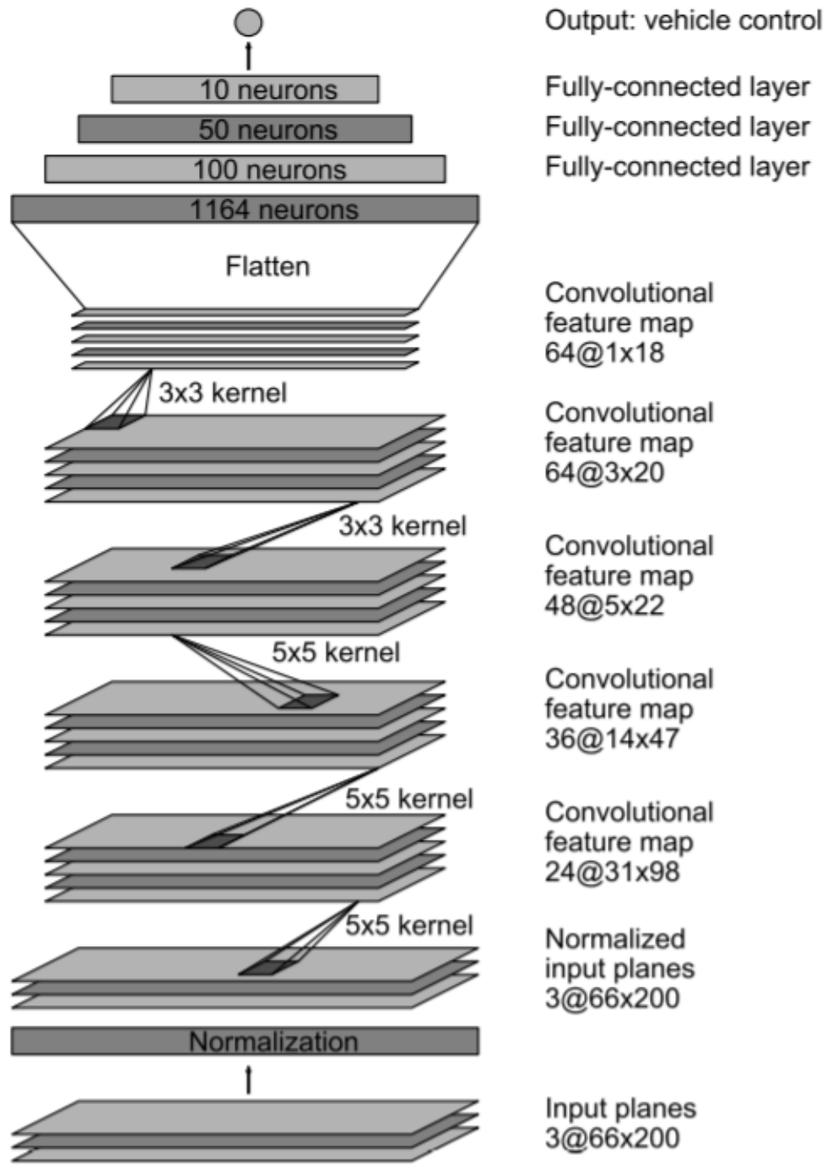


Figure 4: CNN architecture. The network has about 27 million connections and 250 thousand parameters.

In [54]:

```
def weight_variable(shape):
    initial = tf.truncated_normal(shape, stddev=0.1)
    return tf.Variable(initial)

def bias_variable(shape):
    initial = tf.constant(0.1, shape=shape)
    return tf.Variable(initial)

def conv2d(x, W, stride):
    return tf.nn.conv2d(x, W, strides=[1, stride, stride, 1], padding='VALID')

x = tf.placeholder(tf.float32, shape=[None, 66, 200, 3])
y_ = tf.placeholder(tf.float32, shape=[None, 1])

x_image = x ## shape of x_imgae == (,66*200*3)

#first convolutional layer
W_conv1 = weight_variable([5, 5, 3, 24])
b_conv1 = bias_variable([24])

h_conv1 = tf.nn.relu(conv2d(x_image, W_conv1, 2) + b_conv1) ## stride==2,shape(24@31x98)

#second convolutional layer
W_conv2 = weight_variable([5, 5, 24, 36])
b_conv2 = bias_variable([36])

h_conv2 = tf.nn.relu(conv2d(h_conv1, W_conv2, 2) + b_conv2) ## stride==2,shape(36@14x47)

#third convolutional layer
W_conv3 = weight_variable([5, 5, 36, 48])
b_conv3 = bias_variable([48])

h_conv3 = tf.nn.relu(conv2d(h_conv2, W_conv3, 2) + b_conv3) ## stride==2,shape(48@5x22)

#fourth convolutional layer
W_conv4 = weight_variable([3, 3, 48, 64])
b_conv4 = bias_variable([64])

h_conv4 = tf.nn.relu(conv2d(h_conv3, W_conv4, 1) + b_conv4) ## stride==1,shape(64@3x20)

#fifth convolutional layer
W_conv5 = weight_variable([3, 3, 64, 64])
b_conv5 = bias_variable([64])

h_conv5 = tf.nn.relu(conv2d(h_conv4, W_conv5, 1) + b_conv5) ## stride==1,shape(64@1x18)

#FCL 1
W_fc1 = weight_variable([1152, 1164]) ### 1164 nurons for faltetn layer 1
b_fc1 = bias_variable([1164])

h_conv5_flat = tf.reshape(h_conv5, [-1, 1152]) ### our flatten layer is of shape 1*1152
h_fc1 = tf.nn.relu(tf.matmul(h_conv5_flat, W_fc1) + b_fc1) ## here we are performing matrix multiplication
## between (1*1152) x (1152*1164)

keep_prob = tf.placeholder(tf.float32)
h_fc1_drop = tf.nn.dropout(h_fc1, keep_prob) ### adding a dropout layer

#FCL 2
```

```
W_fc2 = weight_variable([1164, 100]) ### 100 nurons for faltetn layer 2
b_fc2 = bias_variable([100])

h_fc2 = tf.nn.relu(tf.matmul(h_fc1_drop, W_fc2) + b_fc2)

h_fc2_drop = tf.nn.dropout(h_fc2, keep_prob)  ### adding a dropout layer

#FCL 3
W_fc3 = weight_variable([100, 50]) ### 50 nurons for flatten layer 3
b_fc3 = bias_variable([50])

h_fc3 = tf.nn.relu(tf.matmul(h_fc2_drop, W_fc3) + b_fc3)

h_fc3_drop = tf.nn.dropout(h_fc3, keep_prob)  ### adding a dropout layer

#final flatten layer 4
W_fc4 = weight_variable([50, 10]) ### 10 nurons for flatten layer 4
b_fc4 = bias_variable([10])

h_fc4 = tf.nn.relu(tf.matmul(h_fc3_drop, W_fc4) + b_fc4)

h_fc4_drop = tf.nn.dropout(h_fc4, keep_prob)  ### adding a dropout layer

#Output
W_fc5 = weight_variable([10, 1])
b_fc5 = bias_variable([1])

y = tf.identity(tf.matmul(h_fc4_drop, W_fc5) + b_fc5)  #scale the  output
```

Train the model

In [62]:

```
### creating a new session
save_folder = '/Save/'
session =  tf.InteractiveSession()
## let's define our loss
## loss == Mean Squared Error + L2norm
l2normconst = 0.001
train_variables = tf.trainable_variables() ## returns all the variables which are trainable i.e wweights and biases
loss  = tf.reduce_mean(tf.square(tf.subtract(y_,y))) + tf.add_n([tf.nn.l2_loss(w) for w in train_variables])*l2normconst

### optimize using Adam with learning rate 10*e-3
trainstep = tf.train.AdamOptimizer(1e-4).minimize(loss)
session.run(tf.initialize_all_variables())

saver = tf.train.Saver()

epochs = 30
batch_size = 100
save_epoch_result =[]
print('*'*5,'Epochs And losses','*'*5)
for epoch in range(epochs):
    avg_loss_test,avg_loss_train=0,0
    for i in range(int(input_len/batch_size)):
        x_batch,y_batch = load_tr_te_batch(batch_size)
        trainstep.run(feed_dict = {x:x_batch,y_:y_batch,keep_prob:0.5})  ###
        train_loss = loss.eval(feed_dict = {x:x_batch,y_:y_batch,keep_prob:1.0})
        avg_loss_train += train_loss  / batch_size


        x_batch_test,y_batch_test = load_tr_te_batch(batch_size,'test')
        test_loss = loss.eval(feed_dict = {x:x_batch_test,y_:y_batch_test,keep_prob:1.0})
        avg_loss_test += test_loss / batch_size

        if i % 10 == 0:
            print("Epoch: %d, Step: %d, val Loss: %g" % (epoch, epoch * batch_size + i, test_loss))
        if i % batch_size == 0:
            if not os.path.exists(save_folder):
                os.makedirs(save_folder)
            checkpoint_path = os.path.join(save_folder, "model.ckpt")
            filename = saver.save(session, checkpoint_path)
            print("Model saved in file: %s" % filename)

    save_epoch_result.append((epoch,train_loss,test_loss,avg_loss_train,avg_loss_test))

```

```
C:\Users\sundararaman\anaconda3\envs\tf-3\lib\site-packages\tensorflow_core\python\client\session.py:1750: UserWarning: An interactive session is already active. This c
an cause out-of-memory errors in some cases. You must explicitly call `InteractiveSession.close()` to release resources held by the other session(s).
  warnings.warn('An interactive session is already active. This can '

***** Epochs And losses *****
Epoch: 0, Step: 0, val Loss: 45.8983
Model saved in file: /Save/model.ckpt
Epoch: 0, Step: 10, val Loss: 43.7364
Epoch: 0, Step: 20, val Loss: 41.6907
Epoch: 0, Step: 30, val Loss: 41.4254
Epoch: 0, Step: 40, val Loss: 40.2671
Epoch: 0, Step: 50, val Loss: 41.3627
Epoch: 0, Step: 60, val Loss: 38.9116
```

```
Epoch: 0, Step: 70, val Loss: 38.2499
Epoch: 0, Step: 80, val Loss: 37.6567
Epoch: 0, Step: 90, val Loss: 37.0938
Epoch: 0, Step: 100, val Loss: 36.3424
Model saved in file: /Save/model.ckpt
Epoch: 0, Step: 110, val Loss: 35.7267
Epoch: 0, Step: 120, val Loss: 35.215
Epoch: 0, Step: 130, val Loss: 35.3167
Epoch: 0, Step: 140, val Loss: 35.6502
Epoch: 0, Step: 150, val Loss: 33.421
Epoch: 0, Step: 160, val Loss: 33.2357
Epoch: 0, Step: 170, val Loss: 32.3413
Epoch: 0, Step: 180, val Loss: 31.9243
Epoch: 0, Step: 190, val Loss: 31.2219
Epoch: 0, Step: 200, val Loss: 30.7225
Model saved in file: /Save/model.ckpt
Epoch: 0, Step: 210, val Loss: 30.2039
Epoch: 0, Step: 220, val Loss: 29.709
Epoch: 0, Step: 230, val Loss: 29.2233
Epoch: 0, Step: 240, val Loss: 28.7327
Epoch: 0, Step: 250, val Loss: 28.5753
Epoch: 0, Step: 260, val Loss: 27.8619
Epoch: 0, Step: 270, val Loss: 27.4347
Epoch: 0, Step: 280, val Loss: 26.8968
Epoch: 0, Step: 290, val Loss: 27.6614
Epoch: 0, Step: 300, val Loss: 26.0428
Model saved in file: /Save/model.ckpt
Epoch: 0, Step: 310, val Loss: 25.6287
Epoch: 0, Step: 320, val Loss: 25.1845
Epoch: 0, Step: 330, val Loss: 24.7856
Epoch: 0, Step: 340, val Loss: 24.382
Epoch: 0, Step: 350, val Loss: 23.9859
Epoch: 0, Step: 360, val Loss: 23.6331
Epoch: 0, Step: 370, val Loss: 23.3095
Epoch: 0, Step: 380, val Loss: 22.8527
Epoch: 0, Step: 390, val Loss: 22.6086
Epoch: 0, Step: 400, val Loss: 22.8936
Model saved in file: /Save/model.ckpt
Epoch: 0, Step: 410, val Loss: 21.9884
Epoch: 0, Step: 420, val Loss: 21.5022
Epoch: 0, Step: 430, val Loss: 21.1158
Epoch: 0, Step: 440, val Loss: 22.3267
Epoch: 0, Step: 450, val Loss: 20.4866
Epoch: 1, Step: 100, val Loss: 20.2719
Model saved in file: /Save/model.ckpt
Epoch: 1, Step: 110, val Loss: 19.9511
Epoch: 1, Step: 120, val Loss: 19.6389
Epoch: 1, Step: 130, val Loss: 19.3265
Epoch: 1, Step: 140, val Loss: 19.0331
Epoch: 1, Step: 150, val Loss: 18.7385
Epoch: 1, Step: 160, val Loss: 18.4229
Epoch: 1, Step: 170, val Loss: 18.138
Epoch: 1, Step: 180, val Loss: 17.8508
Epoch: 1, Step: 190, val Loss: 17.5711
Epoch: 1, Step: 200, val Loss: 17.5932
Model saved in file: /Save/model.ckpt
Epoch: 1, Step: 210, val Loss: 17.0257
Epoch: 1, Step: 220, val Loss: 16.8458
Epoch: 1, Step: 230, val Loss: 16.5681
```

```
Epoch: 1, Step: 240, val Loss: 16.2388
Epoch: 1, Step: 250, val Loss: 15.9894
Epoch: 1, Step: 260, val Loss: 15.7374
Epoch: 1, Step: 270, val Loss: 15.4961
Epoch: 1, Step: 280, val Loss: 15.3696
Epoch: 1, Step: 290, val Loss: 15.1224
Epoch: 1, Step: 300, val Loss: 14.798
Model saved in file: /Save/model.ckpt
Epoch: 1, Step: 310, val Loss: 14.6041
Epoch: 1, Step: 320, val Loss: 14.5507
Epoch: 1, Step: 330, val Loss: 14.3594
Epoch: 1, Step: 340, val Loss: 13.9508
Epoch: 1, Step: 350, val Loss: 13.745
Epoch: 1, Step: 360, val Loss: 13.5378
Epoch: 1, Step: 370, val Loss: 13.6072
Epoch: 1, Step: 380, val Loss: 13.0805
Epoch: 1, Step: 390, val Loss: 12.8985
Epoch: 1, Step: 400, val Loss: 12.6928
Model saved in file: /Save/model.ckpt
Epoch: 1, Step: 410, val Loss: 14.8294
Epoch: 1, Step: 420, val Loss: 12.3318
Epoch: 1, Step: 430, val Loss: 12.1302
Epoch: 1, Step: 440, val Loss: 11.9925
Epoch: 1, Step: 450, val Loss: 11.7816
Epoch: 1, Step: 460, val Loss: 12.1471
Epoch: 1, Step: 470, val Loss: 11.7834
Epoch: 1, Step: 480, val Loss: 12.2438
Epoch: 1, Step: 490, val Loss: 11.1125
Epoch: 1, Step: 500, val Loss: 10.9313
Model saved in file: /Save/model.ckpt
Epoch: 1, Step: 510, val Loss: 10.7654
Epoch: 1, Step: 520, val Loss: 10.6074
Epoch: 1, Step: 530, val Loss: 10.4539
Epoch: 1, Step: 540, val Loss: 10.3057
Epoch: 1, Step: 550, val Loss: 10.1913
Epoch: 2, Step: 200, val Loss: 10.1008
Model saved in file: /Save/model.ckpt
Epoch: 2, Step: 210, val Loss: 9.9636
Epoch: 2, Step: 220, val Loss: 9.80816
Epoch: 2, Step: 230, val Loss: 9.95696
Epoch: 2, Step: 240, val Loss: 10.2669
Epoch: 2, Step: 250, val Loss: 10.8642
Epoch: 2, Step: 260, val Loss: 9.43733
Epoch: 2, Step: 270, val Loss: 9.67786
Epoch: 2, Step: 280, val Loss: 9.00045
Epoch: 2, Step: 290, val Loss: 9.00697
Epoch: 2, Step: 300, val Loss: 8.74971
Model saved in file: /Save/model.ckpt
Epoch: 2, Step: 310, val Loss: 8.64174
Epoch: 2, Step: 320, val Loss: 8.51307
Epoch: 2, Step: 330, val Loss: 8.39472
Epoch: 2, Step: 340, val Loss: 8.30016
Epoch: 2, Step: 350, val Loss: 8.16763
Epoch: 2, Step: 360, val Loss: 8.29485
Epoch: 2, Step: 370, val Loss: 7.95061
Epoch: 2, Step: 380, val Loss: 7.83869
Epoch: 2, Step: 390, val Loss: 7.73108
Epoch: 2, Step: 400, val Loss: 8.1318
Model saved in file: /Save/model.ckpt
```

```
Epoch: 2, Step: 410, val Loss: 7.53605
Epoch: 2, Step: 420, val Loss: 7.47973
Epoch: 2, Step: 430, val Loss: 7.32629
Epoch: 2, Step: 440, val Loss: 7.231
Epoch: 2, Step: 450, val Loss: 7.13561
Epoch: 2, Step: 460, val Loss: 7.04398
Epoch: 2, Step: 470, val Loss: 6.9523
Epoch: 2, Step: 480, val Loss: 7.02512
Epoch: 2, Step: 490, val Loss: 6.78496
Epoch: 2, Step: 500, val Loss: 7.02925
Model saved in file: /Save/model.ckpt
Epoch: 2, Step: 510, val Loss: 7.34967
Epoch: 2, Step: 520, val Loss: 7.57505
Epoch: 2, Step: 530, val Loss: 6.58588
Epoch: 2, Step: 540, val Loss: 6.39558
Epoch: 2, Step: 550, val Loss: 7.02183
Epoch: 2, Step: 560, val Loss: 6.3162
Epoch: 2, Step: 570, val Loss: 6.12873
Epoch: 2, Step: 580, val Loss: 6.05113
Epoch: 2, Step: 590, val Loss: 5.9723
Epoch: 2, Step: 600, val Loss: 10.071
Model saved in file: /Save/model.ckpt
Epoch: 2, Step: 610, val Loss: 5.88345
Epoch: 2, Step: 620, val Loss: 5.76414
Epoch: 2, Step: 630, val Loss: 5.72788
Epoch: 2, Step: 640, val Loss: 5.93281
Epoch: 2, Step: 650, val Loss: 6.02885
Epoch: 3, Step: 300, val Loss: 5.55556
Model saved in file: /Save/model.ckpt
Epoch: 3, Step: 310, val Loss: 6.59643
Epoch: 3, Step: 320, val Loss: 5.41655
Epoch: 3, Step: 330, val Loss: 5.58995
Epoch: 3, Step: 340, val Loss: 5.28794
Epoch: 3, Step: 350, val Loss: 5.76489
Epoch: 3, Step: 360, val Loss: 5.16538
Epoch: 3, Step: 370, val Loss: 5.10447
Epoch: 3, Step: 380, val Loss: 5.06246
Epoch: 3, Step: 390, val Loss: 5.13247
Epoch: 3, Step: 400, val Loss: 4.94599
Model saved in file: /Save/model.ckpt
Epoch: 3, Step: 410, val Loss: 4.89344
Epoch: 3, Step: 420, val Loss: 4.85978
Epoch: 3, Step: 430, val Loss: 5.52876
Epoch: 3, Step: 440, val Loss: 5.95954
Epoch: 3, Step: 450, val Loss: 4.68166
Epoch: 3, Step: 460, val Loss: 4.96057
Epoch: 3, Step: 470, val Loss: 4.67015
Epoch: 3, Step: 480, val Loss: 4.63104
Epoch: 3, Step: 490, val Loss: 4.48591
Epoch: 3, Step: 500, val Loss: 4.4661
Model saved in file: /Save/model.ckpt
Epoch: 3, Step: 510, val Loss: 4.40096
Epoch: 3, Step: 520, val Loss: 4.36581
Epoch: 3, Step: 530, val Loss: 4.31633
Epoch: 3, Step: 540, val Loss: 4.27365
Epoch: 3, Step: 550, val Loss: 4.42839
Epoch: 3, Step: 560, val Loss: 4.24499
Epoch: 3, Step: 570, val Loss: 4.31354
Epoch: 3, Step: 580, val Loss: 4.11368
```

```
Epoch: 3, Step: 590, val Loss: 5.47273
Epoch: 3, Step: 600, val Loss: 4.06026
Model saved in file: /Save/model.ckpt
Epoch: 3, Step: 610, val Loss: 4.00926
Epoch: 3, Step: 620, val Loss: 3.95902
Epoch: 3, Step: 630, val Loss: 3.92669
Epoch: 3, Step: 640, val Loss: 3.89015
Epoch: 3, Step: 650, val Loss: 3.85472
Epoch: 3, Step: 660, val Loss: 3.86691
Epoch: 3, Step: 670, val Loss: 3.83941
Epoch: 3, Step: 680, val Loss: 3.76319
Epoch: 3, Step: 690, val Loss: 3.81148
Epoch: 3, Step: 700, val Loss: 4.20975
Model saved in file: /Save/model.ckpt
Epoch: 3, Step: 710, val Loss: 3.80969
Epoch: 3, Step: 720, val Loss: 3.9444
Epoch: 3, Step: 730, val Loss: 3.63289
Epoch: 3, Step: 740, val Loss: 5.12306
Epoch: 3, Step: 750, val Loss: 3.6102
Epoch: 4, Step: 400, val Loss: 3.53236
Model saved in file: /Save/model.ckpt
Epoch: 4, Step: 410, val Loss: 3.50563
Epoch: 4, Step: 420, val Loss: 3.47801
Epoch: 4, Step: 430, val Loss: 3.45089
Epoch: 4, Step: 440, val Loss: 3.43498
Epoch: 4, Step: 450, val Loss: 3.39873

Epoch: 4, Step: 460, val Loss: 3.37656
Epoch: 4, Step: 470, val Loss: 3.35655
Epoch: 4, Step: 480, val Loss: 3.32364
Epoch: 4, Step: 490, val Loss: 3.30525
Epoch: 4, Step: 500, val Loss: 3.41991
Model saved in file: /Save/model.ckpt
Epoch: 4, Step: 510, val Loss: 3.32455
Epoch: 4, Step: 520, val Loss: 3.28015
Epoch: 4, Step: 530, val Loss: 3.28661
Epoch: 4, Step: 540, val Loss: 3.18687
Epoch: 4, Step: 550, val Loss: 3.16626
Epoch: 4, Step: 560, val Loss: 3.14287
Epoch: 4, Step: 570, val Loss: 3.12312
Epoch: 4, Step: 580, val Loss: 3.18086
Epoch: 4, Step: 590, val Loss: 3.21347
Epoch: 4, Step: 600, val Loss: 3.07343
Model saved in file: /Save/model.ckpt
Epoch: 4, Step: 610, val Loss: 3.15303
Epoch: 4, Step: 620, val Loss: 3.18121
Epoch: 4, Step: 630, val Loss: 3.5216
Epoch: 4, Step: 640, val Loss: 3.0661
Epoch: 4, Step: 650, val Loss: 3.0124
Epoch: 4, Step: 660, val Loss: 3
Epoch: 4, Step: 670, val Loss: 3.32071
Epoch: 4, Step: 680, val Loss: 2.92093
Epoch: 4, Step: 690, val Loss: 2.91382
Epoch: 4, Step: 700, val Loss: 2.88472
Model saved in file: /Save/model.ckpt
Epoch: 4, Step: 710, val Loss: 6.30341
Epoch: 4, Step: 720, val Loss: 2.88615
Epoch: 4, Step: 730, val Loss: 2.8418
Epoch: 4, Step: 740, val Loss: 2.88561
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Epoch: 4, Step: 750, val Loss: 2.83357
Epoch: 4, Step: 760, val Loss: 3.42343
Epoch: 4, Step: 770, val Loss: 3.35004
Epoch: 4, Step: 780, val Loss: 3.45907
Epoch: 4, Step: 790, val Loss: 2.80868
Epoch: 4, Step: 800, val Loss: 2.73964
Model saved in file: /Save/model.ckpt
Epoch: 4, Step: 810, val Loss: 2.72286
Epoch: 4, Step: 820, val Loss: 2.7078
Epoch: 4, Step: 830, val Loss: 2.69366
Epoch: 4, Step: 840, val Loss: 2.68351
Epoch: 4, Step: 850, val Loss: 2.71525
Epoch: 5, Step: 500, val Loss: 2.70066
Model saved in file: /Save/model.ckpt
Epoch: 5, Step: 510, val Loss: 2.6721
Epoch: 5, Step: 520, val Loss: 2.64226
Epoch: 5, Step: 530, val Loss: 2.85364
Epoch: 5, Step: 540, val Loss: 3.45347
Epoch: 5, Step: 550, val Loss: 4.55817
Epoch: 5, Step: 560, val Loss: 2.71283
Epoch: 5, Step: 570, val Loss: 3.12142
Epoch: 5, Step: 580, val Loss: 2.57274
Epoch: 5, Step: 590, val Loss: 2.72746
Epoch: 5, Step: 600, val Loss: 2.54916
Model saved in file: /Save/model.ckpt
Epoch: 5, Step: 610, val Loss: 2.55878
Epoch: 5, Step: 620, val Loss: 2.52973
Epoch: 5, Step: 630, val Loss: 2.52016
Epoch: 5, Step: 640, val Loss: 2.52859
Epoch: 5, Step: 650, val Loss: 2.50579
Epoch: 5, Step: 660, val Loss: 2.82266
Epoch: 5, Step: 670, val Loss: 2.49705
Epoch: 5, Step: 680, val Loss: 2.48339
Epoch: 5, Step: 690, val Loss: 2.46266
Epoch: 5, Step: 700, val Loss: 3.13704
Model saved in file: /Save/model.ckpt
Epoch: 5, Step: 710, val Loss: 2.45746
Epoch: 5, Step: 720, val Loss: 2.47396
Epoch: 5, Step: 730, val Loss: 2.42814
Epoch: 5, Step: 740, val Loss: 2.41945
Epoch: 5, Step: 750, val Loss: 2.40863
Epoch: 5, Step: 760, val Loss: 2.40157
Epoch: 5, Step: 770, val Loss: 2.40316
Epoch: 5, Step: 780, val Loss: 2.53318
Epoch: 5, Step: 790, val Loss: 2.39493
Epoch: 5, Step: 800, val Loss: 2.71853
Model saved in file: /Save/model.ckpt
Epoch: 5, Step: 810, val Loss: 3.28181
Epoch: 5, Step: 820, val Loss: 3.22305
Epoch: 5, Step: 830, val Loss: 2.4547
Epoch: 5, Step: 840, val Loss: 2.37553
Epoch: 5, Step: 850, val Loss: 3.37544
Epoch: 5, Step: 860, val Loss: 2.44173
Epoch: 5, Step: 870, val Loss: 2.355
Epoch: 5, Step: 880, val Loss: 2.3143
Epoch: 5, Step: 890, val Loss: 2.30198
Epoch: 5, Step: 900, val Loss: 5.22981
Model saved in file: /Save/model.ckpt
Epoch: 5, Step: 910, val Loss: 2.32358
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Epoch: 5, Step: 920, val Loss: 2.29066
Epoch: 5, Step: 930, val Loss: 2.30209
Epoch: 5, Step: 940, val Loss: 2.61812
Epoch: 5, Step: 950, val Loss: 2.56533
Epoch: 6, Step: 600, val Loss: 2.27909
Model saved in file: /Save/model.ckpt
Epoch: 6, Step: 610, val Loss: 3.1632
Epoch: 6, Step: 620, val Loss: 2.25354
Epoch: 6, Step: 630, val Loss: 2.39043
Epoch: 6, Step: 640, val Loss: 2.26734
Epoch: 6, Step: 650, val Loss: 2.29345
Epoch: 6, Step: 660, val Loss: 2.22357
Epoch: 6, Step: 670, val Loss: 2.21483
Epoch: 6, Step: 680, val Loss: 2.21757
Epoch: 6, Step: 690, val Loss: 2.34471
Epoch: 6, Step: 700, val Loss: 2.21981
Model saved in file: /Save/model.ckpt
Epoch: 6, Step: 710, val Loss: 2.21002
Epoch: 6, Step: 720, val Loss: 2.19207
Epoch: 6, Step: 730, val Loss: 2.83399
Epoch: 6, Step: 740, val Loss: 2.91245
Epoch: 6, Step: 750, val Loss: 2.16998
Epoch: 6, Step: 760, val Loss: 2.42115
Epoch: 6, Step: 770, val Loss: 2.25878
Epoch: 6, Step: 780, val Loss: 2.22968
Epoch: 6, Step: 790, val Loss: 2.14838
Epoch: 6, Step: 800, val Loss: 2.17192
Model saved in file: /Save/model.ckpt
Epoch: 6, Step: 810, val Loss: 2.1419
Epoch: 6, Step: 820, val Loss: 2.15457
Epoch: 6, Step: 830, val Loss: 2.13315
Epoch: 6, Step: 840, val Loss: 2.13049
Epoch: 6, Step: 850, val Loss: 2.20265
Epoch: 6, Step: 860, val Loss: 2.16494
Epoch: 6, Step: 870, val Loss: 2.35841
Epoch: 6, Step: 880, val Loss: 2.13333
Epoch: 6, Step: 890, val Loss: 3.48892
Epoch: 6, Step: 900, val Loss: 2.12262
Model saved in file: /Save/model.ckpt
Epoch: 6, Step: 910, val Loss: 2.09584
Epoch: 6, Step: 920, val Loss: 2.08672
Epoch: 6, Step: 930, val Loss: 2.08243
Epoch: 6, Step: 940, val Loss: 2.07518
Epoch: 6, Step: 950, val Loss: 2.07013
Epoch: 6, Step: 960, val Loss: 2.12488
Epoch: 6, Step: 970, val Loss: 2.09447
Epoch: 6, Step: 980, val Loss: 2.06312
Epoch: 6, Step: 990, val Loss: 2.12835
Epoch: 6, Step: 1000, val Loss: 2.23789
Model saved in file: /Save/model.ckpt
Epoch: 6, Step: 1010, val Loss: 2.18321
Epoch: 6, Step: 1020, val Loss: 2.69289
Epoch: 6, Step: 1030, val Loss: 2.05154
Epoch: 6, Step: 1040, val Loss: 3.53282
Epoch: 6, Step: 1050, val Loss: 2.06655
Epoch: 7, Step: 700, val Loss: 2.0298
Model saved in file: /Save/model.ckpt
Epoch: 7, Step: 710, val Loss: 2.02118
Epoch: 7, Step: 720, val Loss: 2.02103
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Epoch: 7, Step: 730, val Loss: 2.01117
Epoch: 7, Step: 740, val Loss: 2.00891
Epoch: 7, Step: 750, val Loss: 2.00795
Epoch: 7, Step: 760, val Loss: 2.00357
Epoch: 7, Step: 770, val Loss: 2.0121
Epoch: 7, Step: 780, val Loss: 1.98933
Epoch: 7, Step: 790, val Loss: 1.99185
Epoch: 7, Step: 800, val Loss: 2.04389
Model saved in file: /Save/model.ckpt
Epoch: 7, Step: 810, val Loss: 2.17525
Epoch: 7, Step: 820, val Loss: 1.99747
Epoch: 7, Step: 830, val Loss: 2.0354
Epoch: 7, Step: 840, val Loss: 1.96548
Epoch: 7, Step: 850, val Loss: 1.96112
Epoch: 7, Step: 860, val Loss: 1.95481
Epoch: 7, Step: 870, val Loss: 1.95185
Epoch: 7, Step: 880, val Loss: 1.99393
Epoch: 7, Step: 890, val Loss: 2.09501
Epoch: 7, Step: 900, val Loss: 1.95228
Model saved in file: /Save/model.ckpt
Epoch: 7, Step: 910, val Loss: 2.14793
Epoch: 7, Step: 920, val Loss: 2.16639
Epoch: 7, Step: 930, val Loss: 2.70979
Epoch: 7, Step: 940, val Loss: 2.01489
Epoch: 7, Step: 950, val Loss: 1.95657
Epoch: 7, Step: 960, val Loss: 2.03414
Epoch: 7, Step: 970, val Loss: 2.3252
Epoch: 7, Step: 980, val Loss: 1.91287
Epoch: 7, Step: 990, val Loss: 1.91133
Epoch: 7, Step: 1000, val Loss: 1.89885
Model saved in file: /Save/model.ckpt
Epoch: 7, Step: 1010, val Loss: 6.6861
Epoch: 7, Step: 1020, val Loss: 1.94509
Epoch: 7, Step: 1030, val Loss: 1.89398
Epoch: 7, Step: 1040, val Loss: 1.94973
Epoch: 7, Step: 1050, val Loss: 1.94845
Epoch: 7, Step: 1060, val Loss: 2.55604
Epoch: 7, Step: 1070, val Loss: 2.68948
Epoch: 7, Step: 1080, val Loss: 2.28713
Epoch: 7, Step: 1090, val Loss: 1.95188
Epoch: 7, Step: 1100, val Loss: 1.86303
Model saved in file: /Save/model.ckpt
Epoch: 7, Step: 1110, val Loss: 1.85934
Epoch: 7, Step: 1120, val Loss: 1.85337
Epoch: 7, Step: 1130, val Loss: 1.8472
Epoch: 7, Step: 1140, val Loss: 1.8447
Epoch: 7, Step: 1150, val Loss: 1.89326
Epoch: 8, Step: 800, val Loss: 1.90383
Model saved in file: /Save/model.ckpt
Epoch: 8, Step: 810, val Loss: 1.85956
Epoch: 8, Step: 820, val Loss: 1.83651
Epoch: 8, Step: 830, val Loss: 1.98977
Epoch: 8, Step: 840, val Loss: 2.72735
Epoch: 8, Step: 850, val Loss: 3.92974
Epoch: 8, Step: 860, val Loss: 1.90972
Epoch: 8, Step: 870, val Loss: 2.36333
Epoch: 8, Step: 880, val Loss: 1.82539
Epoch: 8, Step: 890, val Loss: 2.00717
Epoch: 8, Step: 900, val Loss: 1.80237
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Model saved in file: /Save/model.ckpt
Epoch: 8, Step: 910, val Loss: 1.82422

Epoch: 8, Step: 920, val Loss: 1.79443
Epoch: 8, Step: 930, val Loss: 1.79134
Epoch: 8, Step: 940, val Loss: 1.7984
Epoch: 8, Step: 950, val Loss: 1.79599
Epoch: 8, Step: 960, val Loss: 2.11031
Epoch: 8, Step: 970, val Loss: 1.82492
Epoch: 8, Step: 980, val Loss: 1.79463
Epoch: 8, Step: 990, val Loss: 1.77157
Epoch: 8, Step: 1000, val Loss: 2.64818
Model saved in file: /Save/model.ckpt
Epoch: 8, Step: 1010, val Loss: 1.78004
Epoch: 8, Step: 1020, val Loss: 1.79101
Epoch: 8, Step: 1030, val Loss: 1.75769
Epoch: 8, Step: 1040, val Loss: 1.75651
Epoch: 8, Step: 1050, val Loss: 1.74853
Epoch: 8, Step: 1060, val Loss: 1.74439
Epoch: 8, Step: 1070, val Loss: 1.77396
Epoch: 8, Step: 1080, val Loss: 1.84944
Epoch: 8, Step: 1090, val Loss: 1.75244
Epoch: 8, Step: 1100, val Loss: 2.01012
Model saved in file: /Save/model.ckpt
Epoch: 8, Step: 1110, val Loss: 2.57258
Epoch: 8, Step: 1120, val Loss: 2.22528
Epoch: 8, Step: 1130, val Loss: 1.78696
Epoch: 8, Step: 1140, val Loss: 1.7448
Epoch: 8, Step: 1150, val Loss: 3.03839
Epoch: 8, Step: 1160, val Loss: 1.81244
Epoch: 8, Step: 1170, val Loss: 1.86028
Epoch: 8, Step: 1180, val Loss: 1.70634
Epoch: 8, Step: 1190, val Loss: 1.69682
Epoch: 8, Step: 1200, val Loss: 3.40622
Model saved in file: /Save/model.ckpt
Epoch: 8, Step: 1210, val Loss: 1.70073
Epoch: 8, Step: 1220, val Loss: 1.69829
Epoch: 8, Step: 1230, val Loss: 1.70517
Epoch: 8, Step: 1240, val Loss: 1.98115
Epoch: 8, Step: 1250, val Loss: 1.8038
Epoch: 9, Step: 900, val Loss: 1.69264
Model saved in file: /Save/model.ckpt
Epoch: 9, Step: 910, val Loss: 2.36561
Epoch: 9, Step: 920, val Loss: 1.66782
Epoch: 9, Step: 930, val Loss: 1.75611
Epoch: 9, Step: 940, val Loss: 1.71286
Epoch: 9, Step: 950, val Loss: 1.67143
Epoch: 9, Step: 960, val Loss: 1.65715
Epoch: 9, Step: 970, val Loss: 1.6506
Epoch: 9, Step: 980, val Loss: 1.65243
Epoch: 9, Step: 990, val Loss: 1.78442
Epoch: 9, Step: 1000, val Loss: 1.69449
Model saved in file: /Save/model.ckpt
Epoch: 9, Step: 1010, val Loss: 1.65785
Epoch: 9, Step: 1020, val Loss: 1.65924
Epoch: 9, Step: 1030, val Loss: 2.13236
Epoch: 9, Step: 1040, val Loss: 1.96955
Epoch: 9, Step: 1050, val Loss: 1.62992
Epoch: 9, Step: 1060, val Loss: 1.78522
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Epoch: 9, Step: 1070, val Loss: 1.71641
Epoch: 9, Step: 1080, val Loss: 1.81892
Epoch: 9, Step: 1090, val Loss: 1.61147
Epoch: 9, Step: 1100, val Loss: 1.6374
Model saved in file: /Save/model.ckpt
Epoch: 9, Step: 1110, val Loss: 1.60619
Epoch: 9, Step: 1120, val Loss: 2.02321
Epoch: 9, Step: 1130, val Loss: 1.60295
Epoch: 9, Step: 1140, val Loss: 1.60239
Epoch: 9, Step: 1150, val Loss: 1.61562
Epoch: 9, Step: 1160, val Loss: 1.61798
Epoch: 9, Step: 1170, val Loss: 1.89888
Epoch: 9, Step: 1180, val Loss: 1.67395
Epoch: 9, Step: 1190, val Loss: 2.68792
Epoch: 9, Step: 1200, val Loss: 1.6045
Model saved in file: /Save/model.ckpt
Epoch: 9, Step: 1210, val Loss: 1.57634
Epoch: 9, Step: 1220, val Loss: 1.57136
Epoch: 9, Step: 1230, val Loss: 1.56525
Epoch: 9, Step: 1240, val Loss: 1.56044
Epoch: 9, Step: 1250, val Loss: 1.55804
Epoch: 9, Step: 1260, val Loss: 1.61207
Epoch: 9, Step: 1270, val Loss: 1.60154
Epoch: 9, Step: 1280, val Loss: 1.55307
Epoch: 9, Step: 1290, val Loss: 1.62541
Epoch: 9, Step: 1300, val Loss: 1.59262
Model saved in file: /Save/model.ckpt
Epoch: 9, Step: 1310, val Loss: 1.69595
Epoch: 9, Step: 1320, val Loss: 2.46461
Epoch: 9, Step: 1330, val Loss: 1.55178
Epoch: 9, Step: 1340, val Loss: 2.70422
Epoch: 9, Step: 1350, val Loss: 1.53638
Epoch: 10, Step: 1000, val Loss: 1.54062
Model saved in file: /Save/model.ckpt
Epoch: 10, Step: 1010, val Loss: 1.52309
Epoch: 10, Step: 1020, val Loss: 1.52778
Epoch: 10, Step: 1030, val Loss: 1.51347
Epoch: 10, Step: 1040, val Loss: 1.50872
Epoch: 10, Step: 1050, val Loss: 1.51578
Epoch: 10, Step: 1060, val Loss: 1.51523
Epoch: 10, Step: 1070, val Loss: 1.57163
Epoch: 10, Step: 1080, val Loss: 1.49722
Epoch: 10, Step: 1090, val Loss: 1.50204
Epoch: 10, Step: 1100, val Loss: 1.5121
Model saved in file: /Save/model.ckpt
Epoch: 10, Step: 1110, val Loss: 1.7692
Epoch: 10, Step: 1120, val Loss: 1.49354
Epoch: 10, Step: 1130, val Loss: 1.51765
Epoch: 10, Step: 1140, val Loss: 1.4812
Epoch: 10, Step: 1150, val Loss: 1.47505
Epoch: 10, Step: 1160, val Loss: 1.47044
Epoch: 10, Step: 1170, val Loss: 1.46706
Epoch: 10, Step: 1180, val Loss: 1.47037
Epoch: 10, Step: 1190, val Loss: 1.53593
Epoch: 10, Step: 1200, val Loss: 1.46934
Model saved in file: /Save/model.ckpt
Epoch: 10, Step: 1210, val Loss: 1.73183
Epoch: 10, Step: 1220, val Loss: 1.79102
Epoch: 10, Step: 1230, val Loss: 2.3544
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Epoch: 10, Step: 1240, val Loss: 1.58926
Epoch: 10, Step: 1250, val Loss: 1.48436
Epoch: 10, Step: 1260, val Loss: 1.77006
Epoch: 10, Step: 1270, val Loss: 1.79641
Epoch: 10, Step: 1280, val Loss: 1.43876
Epoch: 10, Step: 1290, val Loss: 1.43721
Epoch: 10, Step: 1300, val Loss: 1.42618
Model saved in file: /Save/model.ckpt
Epoch: 10, Step: 1310, val Loss: 6.80445
Epoch: 10, Step: 1320, val Loss: 1.45733
Epoch: 10, Step: 1330, val Loss: 1.42545
Epoch: 10, Step: 1340, val Loss: 1.48087
Epoch: 10, Step: 1350, val Loss: 1.55201
Epoch: 10, Step: 1360, val Loss: 1.94967
Epoch: 10, Step: 1370, val Loss: 2.37215
Epoch: 10, Step: 1380, val Loss: 1.65437
Epoch: 10, Step: 1390, val Loss: 1.51928
Epoch: 10, Step: 1400, val Loss: 1.39552
Model saved in file: /Save/model.ckpt
Epoch: 10, Step: 1410, val Loss: 1.39639
Epoch: 10, Step: 1420, val Loss: 1.38942
Epoch: 10, Step: 1430, val Loss: 1.38413
Epoch: 10, Step: 1440, val Loss: 1.38197
Epoch: 10, Step: 1450, val Loss: 1.43153
Epoch: 11, Step: 1100, val Loss: 1.45214
Model saved in file: /Save/model.ckpt
Epoch: 11, Step: 1110, val Loss: 1.41523
Epoch: 11, Step: 1120, val Loss: 1.38168
Epoch: 11, Step: 1130, val Loss: 1.43853
Epoch: 11, Step: 1140, val Loss: 2.25591
Epoch: 11, Step: 1150, val Loss: 3.32899
Epoch: 11, Step: 1160, val Loss: 1.4255
Epoch: 11, Step: 1170, val Loss: 1.84323
Epoch: 11, Step: 1180, val Loss: 1.39818
Epoch: 11, Step: 1190, val Loss: 1.61774
Epoch: 11, Step: 1200, val Loss: 1.34705
Model saved in file: /Save/model.ckpt
Epoch: 11, Step: 1210, val Loss: 1.35779
Epoch: 11, Step: 1220, val Loss: 1.34303
Epoch: 11, Step: 1230, val Loss: 1.34153
Epoch: 11, Step: 1240, val Loss: 1.34858
Epoch: 11, Step: 1250, val Loss: 1.34018
Epoch: 11, Step: 1260, val Loss: 1.64122
Epoch: 11, Step: 1270, val Loss: 1.37781
Epoch: 11, Step: 1280, val Loss: 1.35602
Epoch: 11, Step: 1290, val Loss: 1.32137
Epoch: 11, Step: 1300, val Loss: 2.12372
Model saved in file: /Save/model.ckpt
Epoch: 11, Step: 1310, val Loss: 1.34342
Epoch: 11, Step: 1320, val Loss: 1.31738
Epoch: 11, Step: 1330, val Loss: 1.31383
Epoch: 11, Step: 1340, val Loss: 1.30877
Epoch: 11, Step: 1350, val Loss: 1.30241
Epoch: 11, Step: 1360, val Loss: 1.29843
Epoch: 11, Step: 1370, val Loss: 1.34886
Epoch: 11, Step: 1380, val Loss: 1.35989
Epoch: 11, Step: 1390, val Loss: 1.31167
Epoch: 11, Step: 1400, val Loss: 1.49669
Model saved in file: /Save/model.ckpt
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Epoch: 11, Step: 1410, val Loss: 1.90509
Epoch: 11, Step: 1420, val Loss: 1.50522
Epoch: 11, Step: 1430, val Loss: 1.3315
Epoch: 11, Step: 1440, val Loss: 1.27651
Epoch: 11, Step: 1450, val Loss: 2.43863
Epoch: 11, Step: 1460, val Loss: 1.38025
Epoch: 11, Step: 1470, val Loss: 1.90767
Epoch: 11, Step: 1480, val Loss: 1.26972
Epoch: 11, Step: 1490, val Loss: 1.26014
Epoch: 11, Step: 1500, val Loss: 1.65767
Model saved in file: /Save/model.ckpt
Epoch: 11, Step: 1510, val Loss: 1.25358
Epoch: 11, Step: 1520, val Loss: 1.26136
Epoch: 11, Step: 1530, val Loss: 1.25858
Epoch: 11, Step: 1540, val Loss: 1.52718
Epoch: 11, Step: 1550, val Loss: 1.36833
Epoch: 12, Step: 1200, val Loss: 1.25442
Model saved in file: /Save/model.ckpt
Epoch: 12, Step: 1210, val Loss: 1.6816
Epoch: 12, Step: 1220, val Loss: 1.23511
Epoch: 12, Step: 1230, val Loss: 1.29317
Epoch: 12, Step: 1240, val Loss: 1.27203
Epoch: 12, Step: 1250, val Loss: 1.25145
Epoch: 12, Step: 1260, val Loss: 1.22696
Epoch: 12, Step: 1270, val Loss: 1.22061
Epoch: 12, Step: 1280, val Loss: 1.2183
Epoch: 12, Step: 1290, val Loss: 1.30334
Epoch: 12, Step: 1300, val Loss: 1.28409
Model saved in file: /Save/model.ckpt
Epoch: 12, Step: 1310, val Loss: 1.23159
Epoch: 12, Step: 1320, val Loss: 1.25062

Epoch: 12, Step: 1330, val Loss: 1.51069
Epoch: 12, Step: 1340, val Loss: 1.35123
Epoch: 12, Step: 1350, val Loss: 1.22356
Epoch: 12, Step: 1360, val Loss: 1.25436
Epoch: 12, Step: 1370, val Loss: 1.27184
Epoch: 12, Step: 1380, val Loss: 1.5981
Epoch: 12, Step: 1390, val Loss: 1.18716
Epoch: 12, Step: 1400, val Loss: 1.20737
Model saved in file: /Save/model.ckpt
Epoch: 12, Step: 1410, val Loss: 1.18241
Epoch: 12, Step: 1420, val Loss: 2.90828
Epoch: 12, Step: 1430, val Loss: 1.19296
Epoch: 12, Step: 1440, val Loss: 1.18204
Epoch: 12, Step: 1450, val Loss: 1.20924
Epoch: 12, Step: 1460, val Loss: 1.17835
Epoch: 12, Step: 1470, val Loss: 1.60741
Epoch: 12, Step: 1480, val Loss: 1.4104
Epoch: 12, Step: 1490, val Loss: 2.18041
Epoch: 12, Step: 1500, val Loss: 1.17691
Model saved in file: /Save/model.ckpt
Epoch: 12, Step: 1510, val Loss: 1.15898
Epoch: 12, Step: 1520, val Loss: 1.15095
Epoch: 12, Step: 1530, val Loss: 1.14692
Epoch: 12, Step: 1540, val Loss: 1.14403
Epoch: 12, Step: 1550, val Loss: 1.14294
Epoch: 12, Step: 1560, val Loss: 1.18665
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Epoch: 12, Step: 1570, val Loss: 1.21248
Epoch: 12, Step: 1580, val Loss: 1.1426
Epoch: 12, Step: 1590, val Loss: 1.22179
Epoch: 12, Step: 1600, val Loss: 1.13936
Model saved in file: /Save/model.ckpt
Epoch: 12, Step: 1610, val Loss: 1.29303
Epoch: 12, Step: 1620, val Loss: 2.49521
Epoch: 12, Step: 1630, val Loss: 1.13349
Epoch: 12, Step: 1640, val Loss: 2.00629
Epoch: 12, Step: 1650, val Loss: 1.11787
Epoch: 13, Step: 1300, val Loss: 1.24428
Model saved in file: /Save/model.ckpt
Epoch: 13, Step: 1310, val Loss: 1.11158
Epoch: 13, Step: 1320, val Loss: 1.12211
Epoch: 13, Step: 1330, val Loss: 1.1037
Epoch: 13, Step: 1340, val Loss: 1.09987
Epoch: 13, Step: 1350, val Loss: 1.10196
Epoch: 13, Step: 1360, val Loss: 1.11316
Epoch: 13, Step: 1370, val Loss: 1.26669
Epoch: 13, Step: 1380, val Loss: 1.09057
Epoch: 13, Step: 1390, val Loss: 1.09965
Epoch: 13, Step: 1400, val Loss: 1.09148
Model saved in file: /Save/model.ckpt
Epoch: 13, Step: 1410, val Loss: 1.33246
Epoch: 13, Step: 1420, val Loss: 1.10389
Epoch: 13, Step: 1430, val Loss: 1.13557
Epoch: 13, Step: 1440, val Loss: 1.0764
Epoch: 13, Step: 1450, val Loss: 1.07266
Epoch: 13, Step: 1460, val Loss: 1.06919
Epoch: 13, Step: 1470, val Loss: 1.06722
Epoch: 13, Step: 1480, val Loss: 1.06514
Epoch: 13, Step: 1490, val Loss: 1.17332
Epoch: 13, Step: 1500, val Loss: 1.0715
Model saved in file: /Save/model.ckpt
Epoch: 13, Step: 1510, val Loss: 1.39529
Epoch: 13, Step: 1520, val Loss: 1.48026
Epoch: 13, Step: 1530, val Loss: 1.88273
Epoch: 13, Step: 1540, val Loss: 1.17246
Epoch: 13, Step: 1550, val Loss: 1.06704
Epoch: 13, Step: 1560, val Loss: 1.47024
Epoch: 13, Step: 1570, val Loss: 1.21805
Epoch: 13, Step: 1580, val Loss: 1.04489
Epoch: 13, Step: 1590, val Loss: 1.03885
Epoch: 13, Step: 1600, val Loss: 1.02892
Model saved in file: /Save/model.ckpt
Epoch: 13, Step: 1610, val Loss: 5.67189
Epoch: 13, Step: 1620, val Loss: 1.0745
Epoch: 13, Step: 1630, val Loss: 1.03304
Epoch: 13, Step: 1640, val Loss: 1.07551
Epoch: 13, Step: 1650, val Loss: 1.22858
Epoch: 13, Step: 1660, val Loss: 1.41751
Epoch: 13, Step: 1670, val Loss: 1.91099
Epoch: 13, Step: 1680, val Loss: 1.15499
Epoch: 13, Step: 1690, val Loss: 1.1837
Epoch: 13, Step: 1700, val Loss: 1.00562
Model saved in file: /Save/model.ckpt
Epoch: 13, Step: 1710, val Loss: 1.0035
Epoch: 13, Step: 1720, val Loss: 1.00002
Epoch: 13, Step: 1730, val Loss: 1.0005
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Epoch: 13, Step: 1740, val Loss: 1.00554
Epoch: 13, Step: 1750, val Loss: 1.02572
Epoch: 14, Step: 1400, val Loss: 1.12181
Model saved in file: /Save/model.ckpt
Epoch: 14, Step: 1410, val Loss: 1.00431
Epoch: 14, Step: 1420, val Loss: 0.991514
Epoch: 14, Step: 1430, val Loss: 1.02172
Epoch: 14, Step: 1440, val Loss: 1.75029
Epoch: 14, Step: 1450, val Loss: 2.45657
Epoch: 14, Step: 1460, val Loss: 0.996947
Epoch: 14, Step: 1470, val Loss: 1.34608
Epoch: 14, Step: 1480, val Loss: 1.05871
Epoch: 14, Step: 1490, val Loss: 1.26962
Epoch: 14, Step: 1500, val Loss: 0.961398
Model saved in file: /Save/model.ckpt
Epoch: 14, Step: 1510, val Loss: 0.980772
Epoch: 14, Step: 1520, val Loss: 0.961941
Epoch: 14, Step: 1530, val Loss: 0.957046
Epoch: 14, Step: 1540, val Loss: 0.977687
Epoch: 14, Step: 1550, val Loss: 0.969224
Epoch: 14, Step: 1560, val Loss: 1.17743
Epoch: 14, Step: 1570, val Loss: 0.993238
Epoch: 14, Step: 1580, val Loss: 1.00631
Epoch: 14, Step: 1590, val Loss: 0.93926
Epoch: 14, Step: 1600, val Loss: 2.01088
Model saved in file: /Save/model.ckpt
Epoch: 14, Step: 1610, val Loss: 0.971694
Epoch: 14, Step: 1620, val Loss: 0.937315
Epoch: 14, Step: 1630, val Loss: 0.936749
Epoch: 14, Step: 1640, val Loss: 0.930743
Epoch: 14, Step: 1650, val Loss: 0.925156
Epoch: 14, Step: 1660, val Loss: 0.921573
Epoch: 14, Step: 1670, val Loss: 0.992635
Epoch: 14, Step: 1680, val Loss: 0.940934
Epoch: 14, Step: 1690, val Loss: 0.92362
Epoch: 14, Step: 1700, val Loss: 1.06986
Model saved in file: /Save/model.ckpt
Epoch: 14, Step: 1710, val Loss: 1.44537
Epoch: 14, Step: 1720, val Loss: 1.03613
Epoch: 14, Step: 1730, val Loss: 1.09975
Epoch: 14, Step: 1740, val Loss: 0.933217
Epoch: 14, Step: 1750, val Loss: 2.23361
Epoch: 14, Step: 1760, val Loss: 0.976523
Epoch: 14, Step: 1770, val Loss: 3.07557
Epoch: 14, Step: 1780, val Loss: 0.894538
Epoch: 14, Step: 1790, val Loss: 0.887451
Epoch: 14, Step: 1800, val Loss: 0.91967
Model saved in file: /Save/model.ckpt
Epoch: 14, Step: 1810, val Loss: 0.890033
Epoch: 14, Step: 1820, val Loss: 0.891657
Epoch: 14, Step: 1830, val Loss: 0.886835
Epoch: 14, Step: 1840, val Loss: 1.12104
Epoch: 14, Step: 1850, val Loss: 1.17049
Epoch: 15, Step: 1500, val Loss: 0.885361
Model saved in file: /Save/model.ckpt
Epoch: 15, Step: 1510, val Loss: 1.08962
Epoch: 15, Step: 1520, val Loss: 0.889513
Epoch: 15, Step: 1530, val Loss: 0.918995
Epoch: 15, Step: 1540, val Loss: 0.926011
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Epoch: 15, Step: 1550, val Loss: 0.86922
Epoch: 15, Step: 1560, val Loss: 0.858296
Epoch: 15, Step: 1570, val Loss: 0.85314
Epoch: 15, Step: 1580, val Loss: 0.849973
Epoch: 15, Step: 1590, val Loss: 0.917635
Epoch: 15, Step: 1600, val Loss: 0.860057
Model saved in file: /Save/model.ckpt
Epoch: 15, Step: 1610, val Loss: 0.854945
Epoch: 15, Step: 1620, val Loss: 0.908166
Epoch: 15, Step: 1630, val Loss: 1.00454
Epoch: 15, Step: 1640, val Loss: 1.04738
Epoch: 15, Step: 1650, val Loss: 0.915275
Epoch: 15, Step: 1660, val Loss: 0.892116
Epoch: 15, Step: 1670, val Loss: 0.853999
Epoch: 15, Step: 1680, val Loss: 1.17448
Epoch: 15, Step: 1690, val Loss: 0.827331
Epoch: 15, Step: 1700, val Loss: 0.823916
Model saved in file: /Save/model.ckpt
Epoch: 15, Step: 1710, val Loss: 0.83646
Epoch: 15, Step: 1720, val Loss: 3.8636
Epoch: 15, Step: 1730, val Loss: 0.831888
Epoch: 15, Step: 1740, val Loss: 0.815494
Epoch: 15, Step: 1750, val Loss: 0.854407
Epoch: 15, Step: 1760, val Loss: 0.82353
Epoch: 15, Step: 1770, val Loss: 1.20387
Epoch: 15, Step: 1780, val Loss: 1.16063
Epoch: 15, Step: 1790, val Loss: 1.5615
Epoch: 15, Step: 1800, val Loss: 0.852515
Model saved in file: /Save/model.ckpt
Epoch: 15, Step: 1810, val Loss: 0.801527
Epoch: 15, Step: 1820, val Loss: 0.806263
Epoch: 15, Step: 1830, val Loss: 0.793289
Epoch: 15, Step: 1840, val Loss: 0.787597
Epoch: 15, Step: 1850, val Loss: 0.78716
Epoch: 15, Step: 1860, val Loss: 0.836696
Epoch: 15, Step: 1870, val Loss: 0.886412
Epoch: 15, Step: 1880, val Loss: 0.791248
Epoch: 15, Step: 1890, val Loss: 0.875577
Epoch: 15, Step: 1900, val Loss: 0.795871
Model saved in file: /Save/model.ckpt
Epoch: 15, Step: 1910, val Loss: 0.907203
Epoch: 15, Step: 1920, val Loss: 2.27757
Epoch: 15, Step: 1930, val Loss: 0.766601
Epoch: 15, Step: 1940, val Loss: 1.26202
Epoch: 15, Step: 1950, val Loss: 0.772964
Epoch: 16, Step: 1600, val Loss: 1.01772
Model saved in file: /Save/model.ckpt
Epoch: 16, Step: 1610, val Loss: 0.758362
Epoch: 16, Step: 1620, val Loss: 0.767121
Epoch: 16, Step: 1630, val Loss: 0.891438
Epoch: 16, Step: 1640, val Loss: 0.75563
Epoch: 16, Step: 1650, val Loss: 0.768372
Epoch: 16, Step: 1660, val Loss: 0.753003
Epoch: 16, Step: 1670, val Loss: 1.072
Epoch: 16, Step: 1680, val Loss: 0.757663
Epoch: 16, Step: 1690, val Loss: 0.753237
Epoch: 16, Step: 1700, val Loss: 0.744527

Model saved in file: /Save/model.ckpt
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Epoch: 16, Step: 1710, val Loss: 1.2288
Epoch: 16, Step: 1720, val Loss: 0.745905
Epoch: 16, Step: 1730, val Loss: 0.749904
Epoch: 16, Step: 1740, val Loss: 0.734129
Epoch: 16, Step: 1750, val Loss: 0.736546
Epoch: 16, Step: 1760, val Loss: 0.726241
Epoch: 16, Step: 1770, val Loss: 0.724429
Epoch: 16, Step: 1780, val Loss: 0.736467
Epoch: 16, Step: 1790, val Loss: 0.828606
Epoch: 16, Step: 1800, val Loss: 0.749753
Model saved in file: /Save/model.ckpt
Epoch: 16, Step: 1810, val Loss: 1.11253
Epoch: 16, Step: 1820, val Loss: 1.47187
Epoch: 16, Step: 1830, val Loss: 1.58758
Epoch: 16, Step: 1840, val Loss: 0.804866
Epoch: 16, Step: 1850, val Loss: 0.72808
Epoch: 16, Step: 1860, val Loss: 1.46232
Epoch: 16, Step: 1870, val Loss: 0.831522
Epoch: 16, Step: 1880, val Loss: 0.713622
Epoch: 16, Step: 1890, val Loss: 0.707957
Epoch: 16, Step: 1900, val Loss: 0.699291
Model saved in file: /Save/model.ckpt
Epoch: 16, Step: 1910, val Loss: 4.1009
Epoch: 16, Step: 1920, val Loss: 0.702162
Epoch: 16, Step: 1930, val Loss: 0.695336
Epoch: 16, Step: 1940, val Loss: 0.687898
Epoch: 16, Step: 1950, val Loss: 1.18887
Epoch: 16, Step: 1960, val Loss: 0.90419
Epoch: 16, Step: 1970, val Loss: 1.67952
Epoch: 16, Step: 1980, val Loss: 0.85926
Epoch: 16, Step: 1990, val Loss: 0.832139
Epoch: 16, Step: 2000, val Loss: 0.682485
Model saved in file: /Save/model.ckpt
Epoch: 16, Step: 2010, val Loss: 0.672671
Epoch: 16, Step: 2020, val Loss: 0.672394
Epoch: 16, Step: 2030, val Loss: 0.670478
Epoch: 16, Step: 2040, val Loss: 0.665203
Epoch: 16, Step: 2050, val Loss: 0.701545
Epoch: 17, Step: 1700, val Loss: 0.787133
Model saved in file: /Save/model.ckpt
Epoch: 17, Step: 1710, val Loss: 0.672798
Epoch: 17, Step: 1720, val Loss: 0.674502
Epoch: 17, Step: 1730, val Loss: 0.662209
Epoch: 17, Step: 1740, val Loss: 1.38324
Epoch: 17, Step: 1750, val Loss: 1.61775
Epoch: 17, Step: 1760, val Loss: 0.653734
Epoch: 17, Step: 1770, val Loss: 0.94301
Epoch: 17, Step: 1780, val Loss: 0.767744
Epoch: 17, Step: 1790, val Loss: 0.736227
Epoch: 17, Step: 1800, val Loss: 0.639366
Model saved in file: /Save/model.ckpt
Epoch: 17, Step: 1810, val Loss: 0.667414
Epoch: 17, Step: 1820, val Loss: 0.637089
Epoch: 17, Step: 1830, val Loss: 0.640837
Epoch: 17, Step: 1840, val Loss: 0.649735
Epoch: 17, Step: 1850, val Loss: 0.651126
Epoch: 17, Step: 1860, val Loss: 0.759706
Epoch: 17, Step: 1870, val Loss: 0.674166
Epoch: 17, Step: 1880, val Loss: 0.72696
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Epoch: 17, Step: 1890, val Loss: 0.646303
Epoch: 17, Step: 1900, val Loss: 1.51398
Model saved in file: /Save/model.ckpt
Epoch: 17, Step: 1910, val Loss: 0.636094
Epoch: 17, Step: 1920, val Loss: 0.730938
Epoch: 17, Step: 1930, val Loss: 0.625702
Epoch: 17, Step: 1940, val Loss: 0.617304
Epoch: 17, Step: 1950, val Loss: 0.617983
Epoch: 17, Step: 1960, val Loss: 0.610803
Epoch: 17, Step: 1970, val Loss: 0.662652
Epoch: 17, Step: 1980, val Loss: 0.635775
Epoch: 17, Step: 1990, val Loss: 0.607168
Epoch: 17, Step: 2000, val Loss: 0.678657
Model saved in file: /Save/model.ckpt
Epoch: 17, Step: 2010, val Loss: 0.842133
Epoch: 17, Step: 2020, val Loss: 0.726233
Epoch: 17, Step: 2030, val Loss: 1.19065
Epoch: 17, Step: 2040, val Loss: 0.59707
Epoch: 17, Step: 2050, val Loss: 1.84058
Epoch: 17, Step: 2060, val Loss: 0.653247
Epoch: 17, Step: 2070, val Loss: 4.21348
Epoch: 17, Step: 2080, val Loss: 0.581606
Epoch: 17, Step: 2090, val Loss: 0.5787
Epoch: 17, Step: 2100, val Loss: 0.613807
Model saved in file: /Save/model.ckpt
Epoch: 17, Step: 2110, val Loss: 0.57692
Epoch: 17, Step: 2120, val Loss: 0.590423
Epoch: 17, Step: 2130, val Loss: 0.580089
Epoch: 17, Step: 2140, val Loss: 0.784956
Epoch: 17, Step: 2150, val Loss: 1.08628
Epoch: 18, Step: 1800, val Loss: 0.582729
Model saved in file: /Save/model.ckpt
Epoch: 18, Step: 1810, val Loss: 0.690136
Epoch: 18, Step: 1820, val Loss: 0.687638
Epoch: 18, Step: 1830, val Loss: 0.575064
Epoch: 18, Step: 1840, val Loss: 0.616295
Epoch: 18, Step: 1850, val Loss: 0.574965
Epoch: 18, Step: 1860, val Loss: 0.557635
Epoch: 18, Step: 1870, val Loss: 0.577599
Epoch: 18, Step: 1880, val Loss: 0.593896
Epoch: 18, Step: 1890, val Loss: 0.612796
Epoch: 18, Step: 1900, val Loss: 0.620419
Model saved in file: /Save/model.ckpt
Epoch: 18, Step: 1910, val Loss: 0.550894
Epoch: 18, Step: 1920, val Loss: 0.702176
Epoch: 18, Step: 1930, val Loss: 0.74045
Epoch: 18, Step: 1940, val Loss: 1.23565
Epoch: 18, Step: 1950, val Loss: 0.640604
Epoch: 18, Step: 1960, val Loss: 0.587094
Epoch: 18, Step: 1970, val Loss: 0.613912
Epoch: 18, Step: 1980, val Loss: 0.955894
Epoch: 18, Step: 1990, val Loss: 0.538974
Epoch: 18, Step: 2000, val Loss: 0.53794
Model saved in file: /Save/model.ckpt
Epoch: 18, Step: 2010, val Loss: 0.528313
Epoch: 18, Step: 2020, val Loss: 4.68065
Epoch: 18, Step: 2030, val Loss: 0.55307
Epoch: 18, Step: 2040, val Loss: 0.540783
Epoch: 18, Step: 2050, val Loss: 0.601614
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Epoch: 18, Step: 2060, val Loss: 0.552223
Epoch: 18, Step: 2070, val Loss: 1.10664
Epoch: 18, Step: 2080, val Loss: 1.14515
Epoch: 18, Step: 2090, val Loss: 0.974996
Epoch: 18, Step: 2100, val Loss: 0.60971
Model saved in file: /Save/model.ckpt
Epoch: 18, Step: 2110, val Loss: 0.509884
Epoch: 18, Step: 2120, val Loss: 0.519906
Epoch: 18, Step: 2130, val Loss: 0.507209
Epoch: 18, Step: 2140, val Loss: 0.511221
Epoch: 18, Step: 2150, val Loss: 0.502624
Epoch: 18, Step: 2160, val Loss: 0.529892
Epoch: 18, Step: 2170, val Loss: 0.512757
Epoch: 18, Step: 2180, val Loss: 0.537794
Epoch: 18, Step: 2190, val Loss: 0.504937
Epoch: 18, Step: 2200, val Loss: 0.544592
Model saved in file: /Save/model.ckpt
Epoch: 18, Step: 2210, val Loss: 0.501026
Epoch: 18, Step: 2220, val Loss: 1.75016
Epoch: 18, Step: 2230, val Loss: 0.525025
Epoch: 18, Step: 2240, val Loss: 0.954496
Epoch: 18, Step: 2250, val Loss: 0.486566
Epoch: 19, Step: 1900, val Loss: 0.712764
Model saved in file: /Save/model.ckpt
Epoch: 19, Step: 1910, val Loss: 0.488196
Epoch: 19, Step: 1920, val Loss: 0.483238
Epoch: 19, Step: 1930, val Loss: 0.480594
Epoch: 19, Step: 1940, val Loss: 0.476029
Epoch: 19, Step: 1950, val Loss: 0.484535
Epoch: 19, Step: 1960, val Loss: 0.487117
Epoch: 19, Step: 1970, val Loss: 0.816048
Epoch: 19, Step: 1980, val Loss: 0.49927
Epoch: 19, Step: 1990, val Loss: 0.474714
Epoch: 19, Step: 2000, val Loss: 0.473426
Model saved in file: /Save/model.ckpt
Epoch: 19, Step: 2010, val Loss: 1.14306
Epoch: 19, Step: 2020, val Loss: 0.481202
Epoch: 19, Step: 2030, val Loss: 0.483812
Epoch: 19, Step: 2040, val Loss: 0.468064
Epoch: 19, Step: 2050, val Loss: 0.461017
Epoch: 19, Step: 2060, val Loss: 0.456065
Epoch: 19, Step: 2070, val Loss: 0.454057
Epoch: 19, Step: 2080, val Loss: 0.486407
Epoch: 19, Step: 2090, val Loss: 0.503827
Epoch: 19, Step: 2100, val Loss: 0.494808
Model saved in file: /Save/model.ckpt
Epoch: 19, Step: 2110, val Loss: 0.760892
Epoch: 19, Step: 2120, val Loss: 0.906697
Epoch: 19, Step: 2130, val Loss: 0.869536
Epoch: 19, Step: 2140, val Loss: 0.521973
Epoch: 19, Step: 2150, val Loss: 0.467989
Epoch: 19, Step: 2160, val Loss: 1.7984
Epoch: 19, Step: 2170, val Loss: 0.486416
Epoch: 19, Step: 2180, val Loss: 0.539436
Epoch: 19, Step: 2190, val Loss: 0.487755
Epoch: 19, Step: 2200, val Loss: 0.444388
Model saved in file: /Save/model.ckpt
Epoch: 19, Step: 2210, val Loss: 2.67618
Epoch: 19, Step: 2220, val Loss: 0.443294
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Epoch: 19, Step: 2230, val Loss: 0.43865
Epoch: 19, Step: 2240, val Loss: 0.438736
Epoch: 19, Step: 2250, val Loss: 0.684237
Epoch: 19, Step: 2260, val Loss: 0.567098
Epoch: 19, Step: 2270, val Loss: 0.995268
Epoch: 19, Step: 2280, val Loss: 0.691461
Epoch: 19, Step: 2290, val Loss: 0.669012
Epoch: 19, Step: 2300, val Loss: 0.419583
Model saved in file: /Save/model.ckpt
Epoch: 19, Step: 2310, val Loss: 0.43486
Epoch: 19, Step: 2320, val Loss: 0.436676
Epoch: 19, Step: 2330, val Loss: 0.412529
Epoch: 19, Step: 2340, val Loss: 0.410938
Epoch: 19, Step: 2350, val Loss: 0.455009
Epoch: 20, Step: 2000, val Loss: 0.506064
Model saved in file: /Save/model.ckpt
Epoch: 20, Step: 2010, val Loss: 0.442339
Epoch: 20, Step: 2020, val Loss: 0.433402
Epoch: 20, Step: 2030, val Loss: 0.426923
Epoch: 20, Step: 2040, val Loss: 1.00338

Epoch: 20, Step: 2050, val Loss: 0.874605
Epoch: 20, Step: 2060, val Loss: 0.448176
Epoch: 20, Step: 2070, val Loss: 0.564778
Epoch: 20, Step: 2080, val Loss: 0.509761
Epoch: 20, Step: 2090, val Loss: 0.562246
Epoch: 20, Step: 2100, val Loss: 0.410209
Model saved in file: /Save/model.ckpt
Epoch: 20, Step: 2110, val Loss: 0.403984
Epoch: 20, Step: 2120, val Loss: 0.481702
Epoch: 20, Step: 2130, val Loss: 0.633657
Epoch: 20, Step: 2140, val Loss: 0.413634
Epoch: 20, Step: 2150, val Loss: 0.391852
Epoch: 20, Step: 2160, val Loss: 0.408711
Epoch: 20, Step: 2170, val Loss: 0.431101
Epoch: 20, Step: 2180, val Loss: 0.631007
Epoch: 20, Step: 2190, val Loss: 0.446029
Epoch: 20, Step: 2200, val Loss: 1.37895
Model saved in file: /Save/model.ckpt
Epoch: 20, Step: 2210, val Loss: 0.41149
Epoch: 20, Step: 2220, val Loss: 0.385732
Epoch: 20, Step: 2230, val Loss: 0.393909
Epoch: 20, Step: 2240, val Loss: 0.379334
Epoch: 20, Step: 2250, val Loss: 0.375541
Epoch: 20, Step: 2260, val Loss: 0.373314
Epoch: 20, Step: 2270, val Loss: 0.438978
Epoch: 20, Step: 2280, val Loss: 0.411181
Epoch: 20, Step: 2290, val Loss: 0.387549
Epoch: 20, Step: 2300, val Loss: 0.474761
Model saved in file: /Save/model.ckpt
Epoch: 20, Step: 2310, val Loss: 0.431851
Epoch: 20, Step: 2320, val Loss: 0.54623
Epoch: 20, Step: 2330, val Loss: 1.19789
Epoch: 20, Step: 2340, val Loss: 0.371348
Epoch: 20, Step: 2350, val Loss: 1.48902
Epoch: 20, Step: 2360, val Loss: 0.380945
Epoch: 20, Step: 2370, val Loss: 5.18496
Epoch: 20, Step: 2380, val Loss: 0.368662
Epoch: 20, Step: 2390, val Loss: 0.406324
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Epoch: 20, Step: 2400, val Loss: 0.463071
Model saved in file: /Save/model.ckpt
Epoch: 20, Step: 2410, val Loss: 0.365953
Epoch: 20, Step: 2420, val Loss: 0.352898
Epoch: 20, Step: 2430, val Loss: 0.409358
Epoch: 20, Step: 2440, val Loss: 0.368871
Epoch: 20, Step: 2450, val Loss: 0.49421
Epoch: 21, Step: 2100, val Loss: 0.361862
Model saved in file: /Save/model.ckpt
Epoch: 21, Step: 2110, val Loss: 0.372303
Epoch: 21, Step: 2120, val Loss: 0.596895
Epoch: 21, Step: 2130, val Loss: 0.442723
Epoch: 21, Step: 2140, val Loss: 0.389763
Epoch: 21, Step: 2150, val Loss: 0.342177
Epoch: 21, Step: 2160, val Loss: 0.365045
Epoch: 21, Step: 2170, val Loss: 0.349625
Epoch: 21, Step: 2180, val Loss: 0.340869
Epoch: 21, Step: 2190, val Loss: 0.34905
Epoch: 21, Step: 2200, val Loss: 0.378658
Model saved in file: /Save/model.ckpt
Epoch: 21, Step: 2210, val Loss: 0.341724
Epoch: 21, Step: 2220, val Loss: 0.58449
Epoch: 21, Step: 2230, val Loss: 0.516387
Epoch: 21, Step: 2240, val Loss: 0.972414
Epoch: 21, Step: 2250, val Loss: 0.441313
Epoch: 21, Step: 2260, val Loss: 0.35532
Epoch: 21, Step: 2270, val Loss: 0.457718
Epoch: 21, Step: 2280, val Loss: 0.706374
Epoch: 21, Step: 2290, val Loss: 0.335379
Epoch: 21, Step: 2300, val Loss: 0.33048
Model saved in file: /Save/model.ckpt
Epoch: 21, Step: 2310, val Loss: 0.32366
Epoch: 21, Step: 2320, val Loss: 5.69373
Epoch: 21, Step: 2330, val Loss: 0.34953
Epoch: 21, Step: 2340, val Loss: 0.321442
Epoch: 21, Step: 2350, val Loss: 0.333077
Epoch: 21, Step: 2360, val Loss: 0.383554
Epoch: 21, Step: 2370, val Loss: 0.659829
Epoch: 21, Step: 2380, val Loss: 0.865837
Epoch: 21, Step: 2390, val Loss: 0.528042
Epoch: 21, Step: 2400, val Loss: 0.323782
Model saved in file: /Save/model.ckpt
Epoch: 21, Step: 2410, val Loss: 0.326935
Epoch: 21, Step: 2420, val Loss: 0.309848
Epoch: 21, Step: 2430, val Loss: 0.385408
Epoch: 21, Step: 2440, val Loss: 0.319579
Epoch: 21, Step: 2450, val Loss: 0.319395
Epoch: 21, Step: 2460, val Loss: 0.329215
Epoch: 21, Step: 2470, val Loss: 0.372016
Epoch: 21, Step: 2480, val Loss: 0.308482
Epoch: 21, Step: 2490, val Loss: 0.345394
Epoch: 21, Step: 2500, val Loss: 0.337364
Model saved in file: /Save/model.ckpt
Epoch: 21, Step: 2510, val Loss: 0.329024
Epoch: 21, Step: 2520, val Loss: 1.50234
Epoch: 21, Step: 2530, val Loss: 0.299796
Epoch: 21, Step: 2540, val Loss: 0.487253
Epoch: 21, Step: 2550, val Loss: 0.315417
Epoch: 22, Step: 2200, val Loss: 0.574713
```

```
Model saved in file: /Save/model.ckpt
Epoch: 22, Step: 2210, val Loss: 0.297977
Epoch: 22, Step: 2220, val Loss: 0.325998
Epoch: 22, Step: 2230, val Loss: 0.294494
Epoch: 22, Step: 2240, val Loss: 0.293446
Epoch: 22, Step: 2250, val Loss: 0.30526
Epoch: 22, Step: 2260, val Loss: 0.302497
Epoch: 22, Step: 2270, val Loss: 0.598803
Epoch: 22, Step: 2280, val Loss: 0.336887
Epoch: 22, Step: 2290, val Loss: 0.302405
Epoch: 22, Step: 2300, val Loss: 0.312867
Model saved in file: /Save/model.ckpt
Epoch: 22, Step: 2310, val Loss: 0.655745
Epoch: 22, Step: 2320, val Loss: 0.313077
Epoch: 22, Step: 2330, val Loss: 0.305362
Epoch: 22, Step: 2340, val Loss: 0.281858
Epoch: 22, Step: 2350, val Loss: 0.344786
Epoch: 22, Step: 2360, val Loss: 0.307379
Epoch: 22, Step: 2370, val Loss: 0.516955
Epoch: 22, Step: 2380, val Loss: 0.31053
Epoch: 22, Step: 2390, val Loss: 0.379088
Epoch: 22, Step: 2400, val Loss: 0.281805
Model saved in file: /Save/model.ckpt
Epoch: 22, Step: 2410, val Loss: 0.429427
Epoch: 22, Step: 2420, val Loss: 0.756546
Epoch: 22, Step: 2430, val Loss: 0.540557
Epoch: 22, Step: 2440, val Loss: 0.327543
Epoch: 22, Step: 2450, val Loss: 0.279222
Epoch: 22, Step: 2460, val Loss: 0.907312
Epoch: 22, Step: 2470, val Loss: 0.446341
Epoch: 22, Step: 2480, val Loss: 0.552047
Epoch: 22, Step: 2490, val Loss: 0.345176
Epoch: 22, Step: 2500, val Loss: 0.273823
Model saved in file: /Save/model.ckpt
Epoch: 22, Step: 2510, val Loss: 1.03684
Epoch: 22, Step: 2520, val Loss: 0.271174
Epoch: 22, Step: 2530, val Loss: 0.289022
Epoch: 22, Step: 2540, val Loss: 0.289453
Epoch: 22, Step: 2550, val Loss: 0.505314
Epoch: 22, Step: 2560, val Loss: 0.368448
Epoch: 22, Step: 2570, val Loss: 0.740623
Epoch: 22, Step: 2580, val Loss: 0.605419
Epoch: 22, Step: 2590, val Loss: 0.572182
Epoch: 22, Step: 2600, val Loss: 0.266141
Model saved in file: /Save/model.ckpt
Epoch: 22, Step: 2610, val Loss: 0.276969
Epoch: 22, Step: 2620, val Loss: 0.272785
Epoch: 22, Step: 2630, val Loss: 0.285139
Epoch: 22, Step: 2640, val Loss: 0.269863
Epoch: 22, Step: 2650, val Loss: 0.272681
Epoch: 23, Step: 2300, val Loss: 0.28862
Model saved in file: /Save/model.ckpt
Epoch: 23, Step: 2310, val Loss: 0.303977
Epoch: 23, Step: 2320, val Loss: 0.256134
Epoch: 23, Step: 2330, val Loss: 0.449175
Epoch: 23, Step: 2340, val Loss: 0.379568
Epoch: 23, Step: 2350, val Loss: 0.363276
Epoch: 23, Step: 2360, val Loss: 0.279035
Epoch: 23, Step: 2370, val Loss: 0.333818
```

```
Epoch: 23, Step: 2380, val Loss: 0.292595
Epoch: 23, Step: 2390, val Loss: 0.506878
Epoch: 23, Step: 2400, val Loss: 0.272918
Model saved in file: /Save/model.ckpt
Epoch: 23, Step: 2410, val Loss: 0.255501
Epoch: 23, Step: 2420, val Loss: 0.261766
Epoch: 23, Step: 2430, val Loss: 1.24713
Epoch: 23, Step: 2440, val Loss: 0.260474
Epoch: 23, Step: 2450, val Loss: 0.250717
Epoch: 23, Step: 2460, val Loss: 0.289148
Epoch: 23, Step: 2470, val Loss: 0.255653
Epoch: 23, Step: 2480, val Loss: 0.431812
Epoch: 23, Step: 2490, val Loss: 0.360014
Epoch: 23, Step: 2500, val Loss: 0.980076
Model saved in file: /Save/model.ckpt
Epoch: 23, Step: 2510, val Loss: 0.266594
Epoch: 23, Step: 2520, val Loss: 0.248602
Epoch: 23, Step: 2530, val Loss: 0.245367
Epoch: 23, Step: 2540, val Loss: 0.245704
Epoch: 23, Step: 2550, val Loss: 0.240433
Epoch: 23, Step: 2560, val Loss: 0.243246
Epoch: 23, Step: 2570, val Loss: 0.266076
Epoch: 23, Step: 2580, val Loss: 0.259974
Epoch: 23, Step: 2590, val Loss: 0.23553
Epoch: 23, Step: 2600, val Loss: 0.371174
Model saved in file: /Save/model.ckpt
Epoch: 23, Step: 2610, val Loss: 0.291275
Epoch: 23, Step: 2620, val Loss: 0.297147
Epoch: 23, Step: 2630, val Loss: 1.42349
Epoch: 23, Step: 2640, val Loss: 0.281998
Epoch: 23, Step: 2650, val Loss: 0.970296
Epoch: 23, Step: 2660, val Loss: 0.357499
Epoch: 23, Step: 2670, val Loss: 5.50752
Epoch: 23, Step: 2680, val Loss: 0.255103
Epoch: 23, Step: 2690, val Loss: 0.244271
Epoch: 23, Step: 2700, val Loss: 0.302269
Model saved in file: /Save/model.ckpt
Epoch: 23, Step: 2710, val Loss: 0.23817
Epoch: 23, Step: 2720, val Loss: 0.256798
Epoch: 23, Step: 2730, val Loss: 0.235821
Epoch: 23, Step: 2740, val Loss: 0.375191
Epoch: 23, Step: 2750, val Loss: 0.995201

Epoch: 24, Step: 2400, val Loss: 0.241993
Model saved in file: /Save/model.ckpt
Epoch: 24, Step: 2410, val Loss: 0.24405
Epoch: 24, Step: 2420, val Loss: 0.4325
Epoch: 24, Step: 2430, val Loss: 0.229093
Epoch: 24, Step: 2440, val Loss: 0.235194
Epoch: 24, Step: 2450, val Loss: 0.245497
Epoch: 24, Step: 2460, val Loss: 0.224552
Epoch: 24, Step: 2470, val Loss: 0.223472
Epoch: 24, Step: 2480, val Loss: 0.22074
Epoch: 24, Step: 2490, val Loss: 0.222857
Epoch: 24, Step: 2500, val Loss: 0.32464
Model saved in file: /Save/model.ckpt
Epoch: 24, Step: 2510, val Loss: 0.236783
Epoch: 24, Step: 2520, val Loss: 0.547955
Epoch: 24, Step: 2530, val Loss: 0.496182
```

```
Epoch: 24, Step: 2540, val Loss: 0.805678
Epoch: 24, Step: 2550, val Loss: 0.374443
Epoch: 24, Step: 2560, val Loss: 0.301108
Epoch: 24, Step: 2570, val Loss: 0.340432
Epoch: 24, Step: 2580, val Loss: 0.530788
Epoch: 24, Step: 2590, val Loss: 0.255759
Epoch: 24, Step: 2600, val Loss: 0.302136
Model saved in file: /Save/model.ckpt
Epoch: 24, Step: 2610, val Loss: 0.320654
Epoch: 24, Step: 2620, val Loss: 8.05432
Epoch: 24, Step: 2630, val Loss: 0.242041
Epoch: 24, Step: 2640, val Loss: 0.223803
Epoch: 24, Step: 2650, val Loss: 0.252865
Epoch: 24, Step: 2660, val Loss: 0.38813
Epoch: 24, Step: 2670, val Loss: 0.709432
Epoch: 24, Step: 2680, val Loss: 1.28611
Epoch: 24, Step: 2690, val Loss: 0.419056
Epoch: 24, Step: 2700, val Loss: 0.337536
Model saved in file: /Save/model.ckpt
Epoch: 24, Step: 2710, val Loss: 0.208064
Epoch: 24, Step: 2720, val Loss: 0.22541
Epoch: 24, Step: 2730, val Loss: 0.21306
Epoch: 24, Step: 2740, val Loss: 0.206007
Epoch: 24, Step: 2750, val Loss: 0.205626
Epoch: 24, Step: 2760, val Loss: 0.262527
Epoch: 24, Step: 2770, val Loss: 0.275183
Epoch: 24, Step: 2780, val Loss: 0.228981
Epoch: 24, Step: 2790, val Loss: 0.25619
Epoch: 24, Step: 2800, val Loss: 0.247965
Model saved in file: /Save/model.ckpt
Epoch: 24, Step: 2810, val Loss: 0.2469
Epoch: 24, Step: 2820, val Loss: 1.34645
Epoch: 24, Step: 2830, val Loss: 0.203594
Epoch: 24, Step: 2840, val Loss: 0.335263
Epoch: 24, Step: 2850, val Loss: 0.213235
Epoch: 25, Step: 2500, val Loss: 0.48415
Model saved in file: /Save/model.ckpt
Epoch: 25, Step: 2510, val Loss: 0.203673
Epoch: 25, Step: 2520, val Loss: 0.214009
Epoch: 25, Step: 2530, val Loss: 0.336054
Epoch: 25, Step: 2540, val Loss: 0.243612
Epoch: 25, Step: 2550, val Loss: 0.212457
Epoch: 25, Step: 2560, val Loss: 0.238959
Epoch: 25, Step: 2570, val Loss: 0.626997
Epoch: 25, Step: 2580, val Loss: 0.470665
Epoch: 25, Step: 2590, val Loss: 0.236438
Epoch: 25, Step: 2600, val Loss: 0.23144
Model saved in file: /Save/model.ckpt
Epoch: 25, Step: 2610, val Loss: 0.731263
Epoch: 25, Step: 2620, val Loss: 0.221582
Epoch: 25, Step: 2630, val Loss: 0.205152
Epoch: 25, Step: 2640, val Loss: 0.199518
Epoch: 25, Step: 2650, val Loss: 0.381507
Epoch: 25, Step: 2660, val Loss: 0.199243
Epoch: 25, Step: 2670, val Loss: 0.192679
Epoch: 25, Step: 2680, val Loss: 0.303102
Epoch: 25, Step: 2690, val Loss: 0.241052
Epoch: 25, Step: 2700, val Loss: 0.219666
Model saved in file: /Save/model.ckpt
```

```
Epoch: 25, Step: 2710, val Loss: 0.361369
Epoch: 25, Step: 2720, val Loss: 0.742597
Epoch: 25, Step: 2730, val Loss: 0.361724
Epoch: 25, Step: 2740, val Loss: 0.334596
Epoch: 25, Step: 2750, val Loss: 0.202354
Epoch: 25, Step: 2760, val Loss: 1.09121
Epoch: 25, Step: 2770, val Loss: 0.297732
Epoch: 25, Step: 2780, val Loss: 1.6653
Epoch: 25, Step: 2790, val Loss: 0.200648
Epoch: 25, Step: 2800, val Loss: 0.188342
Model saved in file: /Save/model.ckpt
Epoch: 25, Step: 2810, val Loss: 0.235793
Epoch: 25, Step: 2820, val Loss: 0.189275
Epoch: 25, Step: 2830, val Loss: 0.191942
Epoch: 25, Step: 2840, val Loss: 0.235458
Epoch: 25, Step: 2850, val Loss: 0.202354
Epoch: 25, Step: 2860, val Loss: 0.233314
Epoch: 25, Step: 2870, val Loss: 0.405104
Epoch: 25, Step: 2880, val Loss: 0.495209
Epoch: 25, Step: 2890, val Loss: 0.222736
Epoch: 25, Step: 2900, val Loss: 0.341053
Model saved in file: /Save/model.ckpt
Epoch: 25, Step: 2910, val Loss: 0.230963
Epoch: 25, Step: 2920, val Loss: 0.21269
Epoch: 25, Step: 2930, val Loss: 0.288086
Epoch: 25, Step: 2940, val Loss: 0.201033
Epoch: 25, Step: 2950, val Loss: 0.191994
Epoch: 26, Step: 2600, val Loss: 0.256424
Model saved in file: /Save/model.ckpt
Epoch: 26, Step: 2610, val Loss: 0.27151
Epoch: 26, Step: 2620, val Loss: 0.184396
Epoch: 26, Step: 2630, val Loss: 0.242671
Epoch: 26, Step: 2640, val Loss: 0.393058
Epoch: 26, Step: 2650, val Loss: 0.338327
Epoch: 26, Step: 2660, val Loss: 0.219048
Epoch: 26, Step: 2670, val Loss: 0.230239
Epoch: 26, Step: 2680, val Loss: 0.249003
Epoch: 26, Step: 2690, val Loss: 0.601718
Epoch: 26, Step: 2700, val Loss: 0.191261
Model saved in file: /Save/model.ckpt
Epoch: 26, Step: 2710, val Loss: 0.220537
Epoch: 26, Step: 2720, val Loss: 0.178351
Epoch: 26, Step: 2730, val Loss: 2.58281
Epoch: 26, Step: 2740, val Loss: 0.196018
Epoch: 26, Step: 2750, val Loss: 0.195529
Epoch: 26, Step: 2760, val Loss: 0.237318
Epoch: 26, Step: 2770, val Loss: 0.193666
Epoch: 26, Step: 2780, val Loss: 0.566373
Epoch: 26, Step: 2790, val Loss: 0.32442
Epoch: 26, Step: 2800, val Loss: 0.363105
Model saved in file: /Save/model.ckpt
Epoch: 26, Step: 2810, val Loss: 0.211829
Epoch: 26, Step: 2820, val Loss: 0.184763
Epoch: 26, Step: 2830, val Loss: 0.176058
Epoch: 26, Step: 2840, val Loss: 0.25502
Epoch: 26, Step: 2850, val Loss: 0.176859
Epoch: 26, Step: 2860, val Loss: 0.345606
Epoch: 26, Step: 2870, val Loss: 0.308529
Epoch: 26, Step: 2880, val Loss: 0.292996
```

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Epoch: 26, Step: 2890, val Loss: 0.258486
Epoch: 26, Step: 2900, val Loss: 0.226508
Model saved in file: /Save/model.ckpt
Epoch: 26, Step: 2910, val Loss: 0.192724
Epoch: 26, Step: 2920, val Loss: 0.263861
Epoch: 26, Step: 2930, val Loss: 1.48151
Epoch: 26, Step: 2940, val Loss: 0.182997
Epoch: 26, Step: 2950, val Loss: 0.587336
Epoch: 26, Step: 2960, val Loss: 0.187457
Epoch: 26, Step: 2970, val Loss: 4.59427
Epoch: 26, Step: 2980, val Loss: 0.23189
Epoch: 26, Step: 2990, val Loss: 0.171132
Epoch: 26, Step: 3000, val Loss: 0.237861
Model saved in file: /Save/model.ckpt
Epoch: 26, Step: 3010, val Loss: 0.199862
Epoch: 26, Step: 3020, val Loss: 0.213953
Epoch: 26, Step: 3030, val Loss: 0.175658
Epoch: 26, Step: 3040, val Loss: 0.243682
Epoch: 26, Step: 3050, val Loss: 1.01075
Epoch: 27, Step: 2700, val Loss: 0.176587
Model saved in file: /Save/model.ckpt
Epoch: 27, Step: 2710, val Loss: 0.18401
Epoch: 27, Step: 2720, val Loss: 0.539587
Epoch: 27, Step: 2730, val Loss: 0.180201
Epoch: 27, Step: 2740, val Loss: 0.179337
Epoch: 27, Step: 2750, val Loss: 0.187158
Epoch: 27, Step: 2760, val Loss: 0.226979
Epoch: 27, Step: 2770, val Loss: 0.210912
Epoch: 27, Step: 2780, val Loss: 0.204504
Epoch: 27, Step: 2790, val Loss: 0.169683
Epoch: 27, Step: 2800, val Loss: 0.27826
Model saved in file: /Save/model.ckpt
Epoch: 27, Step: 2810, val Loss: 0.174447
Epoch: 27, Step: 2820, val Loss: 0.262836
Epoch: 27, Step: 2830, val Loss: 0.695319
Epoch: 27, Step: 2840, val Loss: 0.731036
Epoch: 27, Step: 2850, val Loss: 0.267455
Epoch: 27, Step: 2860, val Loss: 0.207182
Epoch: 27, Step: 2870, val Loss: 0.582893
Epoch: 27, Step: 2880, val Loss: 0.27172
Epoch: 27, Step: 2890, val Loss: 0.174093
Epoch: 27, Step: 2900, val Loss: 0.221089
Model saved in file: /Save/model.ckpt
Epoch: 27, Step: 2910, val Loss: 0.174633
Epoch: 27, Step: 2920, val Loss: 4.29847
Epoch: 27, Step: 2930, val Loss: 0.180632
Epoch: 27, Step: 2940, val Loss: 0.169492
Epoch: 27, Step: 2950, val Loss: 0.191417
Epoch: 27, Step: 2960, val Loss: 0.29325
Epoch: 27, Step: 2970, val Loss: 0.374525
Epoch: 27, Step: 2980, val Loss: 0.831579
Epoch: 27, Step: 2990, val Loss: 0.297242
Epoch: 27, Step: 3000, val Loss: 0.368662
Model saved in file: /Save/model.ckpt
Epoch: 27, Step: 3010, val Loss: 0.164362
Epoch: 27, Step: 3020, val Loss: 0.206804
Epoch: 27, Step: 3030, val Loss: 0.171669
Epoch: 27, Step: 3040, val Loss: 0.161468
Epoch: 27, Step: 3050, val Loss: 0.163397
```

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Epoch: 27, Step: 3060, val Loss: 0.186692
Epoch: 27, Step: 3070, val Loss: 0.167205
Epoch: 27, Step: 3080, val Loss: 0.209591
Epoch: 27, Step: 3090, val Loss: 0.188808
Epoch: 27, Step: 3100, val Loss: 0.214737

Model saved in file: /Save/model.ckpt
Epoch: 27, Step: 3110, val Loss: 0.215617
Epoch: 27, Step: 3120, val Loss: 0.598393
Epoch: 27, Step: 3130, val Loss: 0.169722
Epoch: 27, Step: 3140, val Loss: 0.230464
Epoch: 27, Step: 3150, val Loss: 0.293157
Epoch: 28, Step: 2800, val Loss: 0.338457
Model saved in file: /Save/model.ckpt
Epoch: 28, Step: 2810, val Loss: 0.417877
Epoch: 28, Step: 2820, val Loss: 0.270314
Epoch: 28, Step: 2830, val Loss: 0.307838
Epoch: 28, Step: 2840, val Loss: 0.203017
Epoch: 28, Step: 2850, val Loss: 0.16886
Epoch: 28, Step: 2860, val Loss: 0.163957
Epoch: 28, Step: 2870, val Loss: 0.337167
Epoch: 28, Step: 2880, val Loss: 0.200319
Epoch: 28, Step: 2890, val Loss: 0.199825
Epoch: 28, Step: 2900, val Loss: 0.168026
Model saved in file: /Save/model.ckpt
Epoch: 28, Step: 2910, val Loss: 0.398381
Epoch: 28, Step: 2920, val Loss: 0.192315
Epoch: 28, Step: 2930, val Loss: 0.187394
Epoch: 28, Step: 2940, val Loss: 0.189653
Epoch: 28, Step: 2950, val Loss: 0.17217
Epoch: 28, Step: 2960, val Loss: 0.157702
Epoch: 28, Step: 2970, val Loss: 0.160831
Epoch: 28, Step: 2980, val Loss: 0.215751
Epoch: 28, Step: 2990, val Loss: 0.195711
Epoch: 28, Step: 3000, val Loss: 0.164367
Model saved in file: /Save/model.ckpt
Epoch: 28, Step: 3010, val Loss: 0.257929
Epoch: 28, Step: 3020, val Loss: 0.322416
Epoch: 28, Step: 3030, val Loss: 0.272158
Epoch: 28, Step: 3040, val Loss: 0.611433
Epoch: 28, Step: 3050, val Loss: 0.465034
Epoch: 28, Step: 3060, val Loss: 0.476554
Epoch: 28, Step: 3070, val Loss: 0.230341
Epoch: 28, Step: 3080, val Loss: 2.49301
Epoch: 28, Step: 3090, val Loss: 0.195164
Epoch: 28, Step: 3100, val Loss: 0.3041
Model saved in file: /Save/model.ckpt
Epoch: 28, Step: 3110, val Loss: 0.353602
Epoch: 28, Step: 3120, val Loss: 0.157157
Epoch: 28, Step: 3130, val Loss: 0.186597
Epoch: 28, Step: 3140, val Loss: 0.188691
Epoch: 28, Step: 3150, val Loss: 0.162999
Epoch: 28, Step: 3160, val Loss: 0.413123
Epoch: 28, Step: 3170, val Loss: 0.406489
Epoch: 28, Step: 3180, val Loss: 0.431008
Epoch: 28, Step: 3190, val Loss: 0.562543
Epoch: 28, Step: 3200, val Loss: 0.158099
Model saved in file: /Save/model.ckpt
Epoch: 28, Step: 3210, val Loss: 0.485355
```

```
Epoch: 28, Step: 3220, val Loss: 0.165647
Epoch: 28, Step: 3230, val Loss: 0.163396
Epoch: 28, Step: 3240, val Loss: 0.175013
Epoch: 28, Step: 3250, val Loss: 0.273272
Epoch: 29, Step: 2900, val Loss: 0.201065
Model saved in file: /Save/model.ckpt
Epoch: 29, Step: 2910, val Loss: 0.362946
Epoch: 29, Step: 2920, val Loss: 0.17764
Epoch: 29, Step: 2930, val Loss: 0.312067
Epoch: 29, Step: 2940, val Loss: 0.31065
Epoch: 29, Step: 2950, val Loss: 0.452106
Epoch: 29, Step: 2960, val Loss: 0.220213
Epoch: 29, Step: 2970, val Loss: 0.237073
Epoch: 29, Step: 2980, val Loss: 0.20432
Epoch: 29, Step: 2990, val Loss: 0.575757
Epoch: 29, Step: 3000, val Loss: 0.158974
Model saved in file: /Save/model.ckpt
Epoch: 29, Step: 3010, val Loss: 0.158447
Epoch: 29, Step: 3020, val Loss: 0.193434
Epoch: 29, Step: 3030, val Loss: 4.12904
Epoch: 29, Step: 3040, val Loss: 0.173305
Epoch: 29, Step: 3050, val Loss: 0.161927
Epoch: 29, Step: 3060, val Loss: 0.173727
Epoch: 29, Step: 3070, val Loss: 0.39951
Epoch: 29, Step: 3080, val Loss: 0.57813
Epoch: 29, Step: 3090, val Loss: 0.701649
Epoch: 29, Step: 3100, val Loss: 0.835134
Model saved in file: /Save/model.ckpt
Epoch: 29, Step: 3110, val Loss: 0.197424
Epoch: 29, Step: 3120, val Loss: 0.154642
Epoch: 29, Step: 3130, val Loss: 0.162701
Epoch: 29, Step: 3140, val Loss: 0.155389
Epoch: 29, Step: 3150, val Loss: 0.149971
Epoch: 29, Step: 3160, val Loss: 0.14985
Epoch: 29, Step: 3170, val Loss: 0.223347
Epoch: 29, Step: 3180, val Loss: 0.284882
Epoch: 29, Step: 3190, val Loss: 0.165776
Epoch: 29, Step: 3200, val Loss: 0.264579
Model saved in file: /Save/model.ckpt
Epoch: 29, Step: 3210, val Loss: 0.190695
Epoch: 29, Step: 3220, val Loss: 0.271556
Epoch: 29, Step: 3230, val Loss: 1.69095
Epoch: 29, Step: 3240, val Loss: 0.153051
Epoch: 29, Step: 3250, val Loss: 0.674015
Epoch: 29, Step: 3260, val Loss: 0.151042
Epoch: 29, Step: 3270, val Loss: 3.42386
Epoch: 29, Step: 3280, val Loss: 0.149093
Epoch: 29, Step: 3290, val Loss: 0.148491
Epoch: 29, Step: 3300, val Loss: 0.184048
Model saved in file: /Save/model.ckpt
Epoch: 29, Step: 3310, val Loss: 0.184072
Epoch: 29, Step: 3320, val Loss: 0.218705
Epoch: 29, Step: 3330, val Loss: 0.157149
Epoch: 29, Step: 3340, val Loss: 0.169209
Epoch: 29, Step: 3350, val Loss: 0.93274
```

In [67]:
```
# epoch,train_loss,test_loss,avg_loss_train,avg_loss_test)
pd.DataFrame.from_records(save_epoch_result).rename(columns={0:'Epoch',1:'train_loss',
                                                             2: 'test_loss',3: 'avg_loss_train',
                                                             4 : 'avg_loss_test'
                                                    })
```

Out[67]:

	Epoch	train_loss	test_loss	avg_loss_train	avg_loss_test
0	0	20.309345	20.450747	138.312175	138.158582
1	1	10.222139	10.270148	67.179377	67.063772
2	2	5.709777	5.542916	35.780934	35.154106
3	3	4.982380	3.708878	21.111501	21.092149
4	4	2.671522	2.820400	15.538116	14.905212
5	5	2.317737	2.267380	12.200914	12.122510
6	6	2.020299	2.216355	11.352155	10.821257
7	7	1.869701	1.961733	10.032722	9.852861
8	8	1.674673	1.682330	9.180265	9.005918
9	9	1.668034	1.770391	8.910349	8.358817
10	10	2.763655	1.454522	7.709211	7.648177
11	11	1.246111	1.248093	7.634929	6.922884
12	12	1.192724	1.213966	6.415407	6.417499
13	13	0.989114	1.071197	6.356956	5.798448
14	14	0.925557	0.882221	5.449582	5.197202
15	15	0.762021	0.923271	4.851921	4.745573
16	16	0.727476	0.689283	4.797118	4.298677
17	17	1.970827	0.581438	3.844275	3.761324
18	18	0.482741	0.721011	4.010288	3.472341
19	19	0.461234	0.414204	3.044689	3.038812
20	20	0.357175	0.403170	3.163561	2.669884
21	21	0.313994	0.687932	2.565940	2.406316
22	22	0.279552	0.259634	2.265749	2.260633
23	23	0.235468	0.290219	2.457047	1.951627
24	24	1.138978	0.558422	1.901297	2.014974
25	25	0.182678	0.188737	2.202500	1.810952
26	26	0.178860	0.260791	1.648605	1.733425
27	27	0.161804	0.677091	1.899185	1.672185
28	28	0.195746	0.188379	1.558580	1.801850
29	29	0.184682	0.204311	1.549030	1.637015

- We can observe that as the epoch increases test loss test and average test loss decreases

Running the model

In [1]:

```
# Let's run our model

## let's restore our model after training

sess = tf.InteractiveSession()
saver = tf.train.Saver()
saver.restore(sess, "save/model.ckpt")


## read the steering wheel image
steering_image = cv2.imread('steering_wheel_image.jpg',0)
rows,cols = steering_image.shape

## we want to see the test predicted values


test_idx = math.ceil(input_len*0.8)

print('*'*100)
print('\n\n\n')
print('Displaying video frame from '+' datapoint '+ str(int(test_idx)))
print('\n\n\n')
print('*'*100)

smoothed_angle=0
while(cv2.waitKey(50) != ord('q')):
    full_image = scipy.misc.imread('driving_dataset/'+str(test_idx)+'.jpg',mode='RGB')
    ## extracting just the below 150 pixels and resizing it into 66,200 and normalizing the image
    image_150 =  full_image[-150:]
    resize_img = scipy.misc.imresize(image_150,(66,200))
    ## normalize img
    norm_img = resize_img / 255

    ## evaluate and convert to degrees

    degrees_predicted = y.eval(feed_dict={x: [norm_img], keep_prob: 1.0})[0][0] * 180.0 / scipy.pi
    degrees_actual = str(output_[test_idx]*180/scipy.pi)

    print("Steering angle: " + str(degrees_predicted) + " (pred)\t" + degrees_actual + " (actual)"
          + "  absolute error : "+ str(round(abs(float(degrees_actual)-float(degrees_predicted)),2)))

    cv2.imshow("frame", cv2.cvtColor(full_image, cv2.COLOR_RGB2BGR))
    smoothed_angle += 0.2 * pow(abs((degrees_predicted - smoothed_angle)), 2.0 / 3.0) * (degrees_predicted - smoothed_angle) / abs(degrees_predicted - smoothed_angl
    M = cv2.getRotationMatrix2D((cols/2,rows/2),-smoothed_angle,1)
    ## performing affine transformation using cv2.wrapAffine (i.e) using this we preserve
    ## collinearity, parallelism as well as the ratio of distances between the points  after rotation
    dst = cv2.warpAffine(steering_image,M,(cols,rows))
    cv2.imshow("steering wheel", dst)
    test_idx += 1
```

run the file self_driving_assignment.py in command prompt to visualize the output

In [ ]:

```
1
```