

Deep Learning Homework 5 Report

Epoch 1/10

Epoch 1: val_loss improved from inf to 0.28550, saving model to model.weights.best.hdf5
844/844 - 255s - loss: 0.3828 - accuracy: 0.8631 - val_loss: 0.2855 - val_accuracy: 0.8968 - 255s/epoch - 302ms/step
Epoch 2/10

Epoch 2: val_loss improved from 0.28550 to 0.24655, saving model to model.weights.best.hdf5
844/844 - 268s - loss: 0.2610 - accuracy: 0.9057 - val_loss: 0.2465 - val_accuracy: 0.9088 - 268s/epoch - 318ms/step
Epoch 3/10

Epoch 3: val_loss did not improve from 0.24655
844/844 - 260s - loss: 0.2142 - accuracy: 0.9201 - val_loss: 0.2573 - val_accuracy: 0.9070 - 260s/epoch - 308ms/step
Epoch 4/10

Epoch 4: val_loss improved from 0.24655 to 0.23426, saving model to model.weights.best.hdf5
844/844 - 259s - loss: 0.1787 - accuracy: 0.9319 - val_loss: 0.2343 - val_accuracy: 0.9160 - 259s/epoch - 307ms/step
Epoch 5/10

Epoch 5: val_loss did not improve from 0.23426
844/844 - 255s - loss: 0.1528 - accuracy: 0.9429 - val_loss: 0.2362 - val_accuracy: 0.9165 - 255s/epoch - 302ms/step
Epoch 6/10

Epoch 6: val_loss did not improve from 0.23426
844/844 - 256s - loss: 0.1236 - accuracy: 0.9530 - val_loss: 0.2577 - val_accuracy: 0.9167 - 256s/epoch - 304ms/step
Epoch 7/10

Epoch 7: val_loss did not improve from 0.23426
844/844 - 279s - loss: 0.1032 - accuracy: 0.9618 - val_loss: 0.2470 - val_accuracy: 0.9197 - 279s/epoch - 330ms/step
Epoch 8/10

Epoch 8: val_loss did not improve from 0.23426
844/844 - 280s - loss: 0.0906 - accuracy: 0.9669 - val_loss: 0.2675 - val_accuracy: 0.9173 - 280s/epoch - 332ms/step
Epoch 9/10

Epoch 9: val_loss did not improve from 0.23426
844/844 - 281s - loss: 0.0764 - accuracy: 0.9711 - val_loss: 0.2697 - val_accuracy: 0.9222 - 281s/epoch - 333ms/step
Epoch 10/10

Epoch 10: val_loss did not improve from 0.23426
844/844 - 276s - loss: 0.0642 - accuracy: 0.9766 - val_loss: 0.3251 - val_accuracy: 0.9095 - 276s/epoch - 327ms/step

```
# Evaluate the model on test set
score = model.evaluate(x_test, y_test, verbose=0)
# Print test accuracy
print('\n', 'Test accuracy:', score[1])
```

Test accuracy: 0.906000018119812

Running the code for 10 epochs and batch size 16, the results of the first 10 epochs are as shown below.

```
300/300 [=====] - 335s 1s/step - loss: 325.7618 - val_loss: 190.0385
300/300 [=====] - 354s 1s/step - loss: 186.2584 - val_loss: 162.0459
300/300 [=====] - 359s 1s/step - loss: 165.3492 - val_loss: 149.6106
300/300 [=====] - 371s 1s/step - loss: 154.1501 - val_loss: 140.6884
300/300 [=====] - 330s 1s/step - loss: 146.4238 - val_loss: 137.3114
300/300 [=====] - 315s 1s/step - loss: 141.5701 - val_loss: 137.9492
300/300 [=====] - 297s 990ms/step - loss: 137.6819 - val_loss: 135.1442
300/300 [=====] - 300s 1000ms/step - loss: 135.0363 - val_loss: 130.7928
300/300 [=====] - 358s 1s/step - loss: 132.5424 - val_loss: 130.2348
300/300 [=====] - 340s 1s/step - loss: 130.6489 - val_loss: 127.7588
```

The RMSE losses for the training, validation and test sets are as below and the test set has a loss of less than 13 years

```
Train RMSE: 11.32
Validation RMSE: 11.37
Test RMSE: 11.55
```