TDT4171 — Artificial Intelligence Methods
Assignment 8 - Deep Learning

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Intro

In this assignment a feedforward and a recurrent neural network is implemented and trained using keras. I have testet several different architectures and hyperparameters, and the best performing model is presented in this report.

Feedforward Neural Network

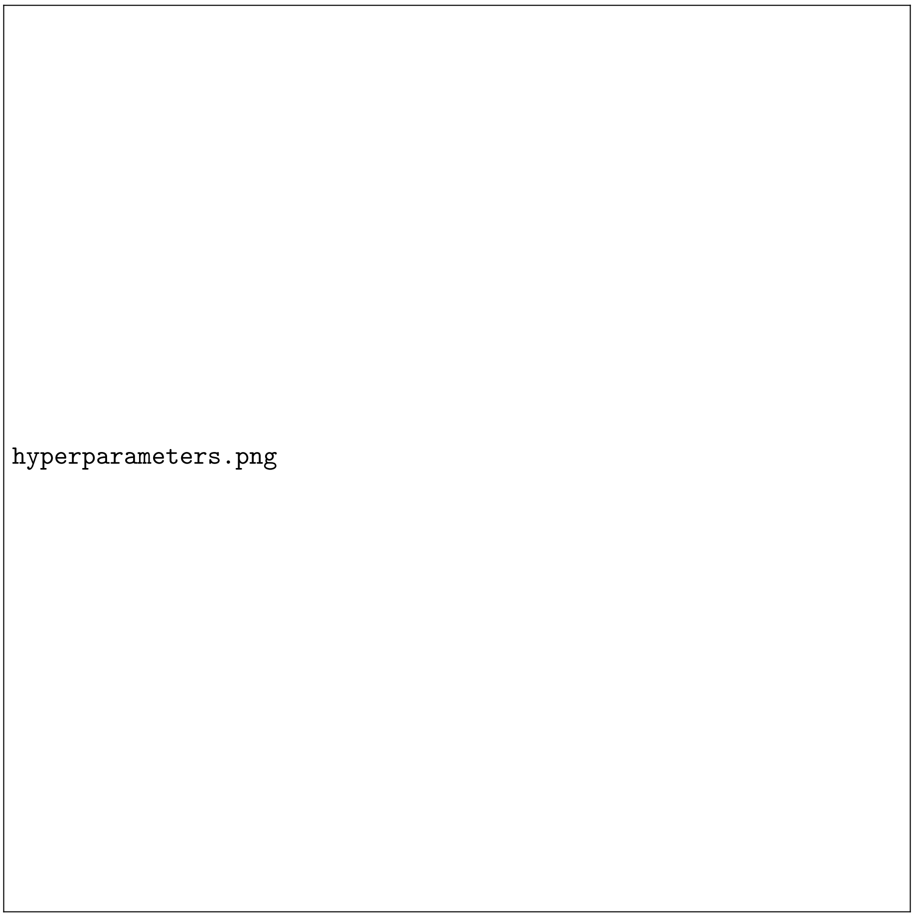
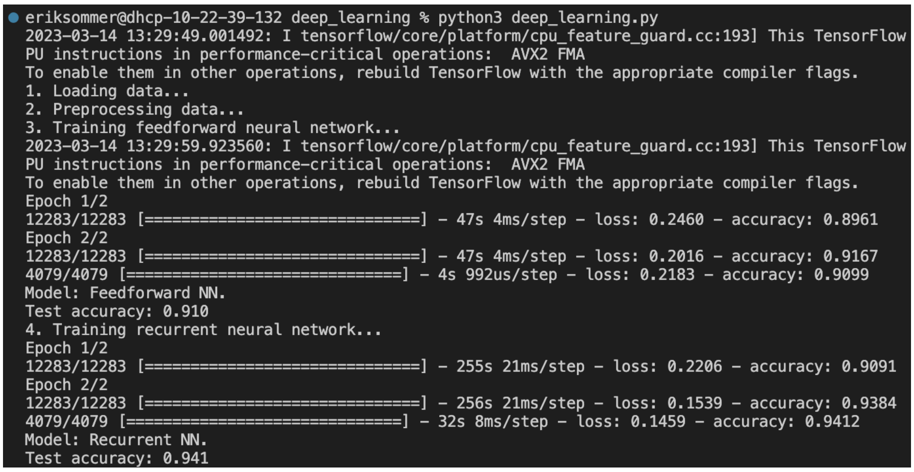


Figure 1: Hyperparameters used for the neural network



```
eriksommer@dhcp-10-22-39-132 deep_learning % python3 deep_learning.py
2023-03-14 13:29:49.001492: I tensorflow/core/platform/cpu_feature_guard.cc:193] This TensorFlow
PU instructions in performance-critical operations:  AVX2 FMA
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
1. Loading data...
2. Preprocessing data...
3. Training feedforward neural network...
2023-03-14 13:29:59.923560: I tensorflow/core/platform/cpu_feature_guard.cc:193] This TensorFlow
PU instructions in performance-critical operations:  AVX2 FMA
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
Epoch 1/2
12283/12283 [==============================] - 47s 4ms/step - loss: 0.2460 - accuracy: 0.8961
Epoch 2/2
12283/12283 [==============================] - 47s 4ms/step - loss: 0.2016 - accuracy: 0.9167
4079/4079 [==============================] - 4s 992us/step - loss: 0.2183 - accuracy: 0.9099
Model: Feedforward NN.
Test accuracy: 0.910
4. Training recurrent neural network...
Epoch 1/2
12283/12283 [==============================] - 255s 21ms/step - loss: 0.2206 - accuracy: 0.9091
Epoch 2/2
12283/12283 [==============================] - 256s 21ms/step - loss: 0.1539 - accuracy: 0.9384
4079/4079 [==============================] - 32s 8ms/step - loss: 0.1459 - accuracy: 0.9412
Model: Recurrent NN.
Test accuracy: 0.941
```

Figure 2: Output from running the attached python file