Stochastic Machine Learning
Introduction to DL - Programming I

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SS 2024

Python Code Example

Keras is the high-level tool which we will use.

- ▶ It contains tensorflow, Pytorch and other platforms which can easily be started from Keras without changing a lot of code
- ▶ If we want to use GPUs, we will typically rely on CUDA
- ▶ Our first model:

```python
from keras import models  # we will use the sequential model
from keras import layers  # we want to add dense layers

model = models.Sequential()

# A dense layer
model.add(layers.Dense(32, activation = 'relu',
                           input_shape = (20,)))
model.add(layers.Dense(10, activation = 'softmax') # verallgemeinertes logit

# Note that you can also omit the initial 'Input'.
# In that case the model doesn't have any weights until the first call
# to a training/evaluation method (since it isn't yet built):
model = keras.Sequential()
model.add(keras.layers.Dense(8))
model.add(keras.layers.Dense(4))
# model.weights not created yet
```

See https://keras.io/api/models/sequential/ and https://keras.io/api/layers/

▶ Now we define the optimizer (SGD, Adam, RMSprop, ...) and then fit the model

```
from keras import optimizers

model.compile(optimizer = optimizers.SGD(learning_rate = 0.001),
              loss = 'mse',
              metrics = ['accuracy'])

model.fit(input_tensor, target_tensor, batch_size = 128, epochs = 10)
```

See https://keras.io/api/optimizers/

Examples from Github