Introduction to Keras

Max Pumperla - Skymind

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What is Keras?

- Deep learning framework written in Python

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- ▶ Open source, created in 2015
- ▶ Documentation: keras.io
- ▶ Code: github.com/fchollet/keras

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Why Keras? - Community

- ▶ Very popular library

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- ▶ Slack: keras-slack-autojoin.herokuapp.com

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Why Keras? - Design

- ▶ Intuitive high-level API, easy to get started

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- ▶ Modular building blocks
- ▶ Easy to extend

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Why Keras? - Ecosystem

▶ Extensions: `github.com/fchollet/keras-resources`

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- ► Examples:
  github.com/fchollet/keras/tree/master/examples

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- ► Examples:
  github.com/fchollet/keras/tree/master/examples
- ► Models: github.com/fchollet/deep-learning-models

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Why Keras? - Ecosystem

- ▶ Extensions: github.com/fchollet/keras-resources
- ▶ Examples:
  github.com/fchollet/keras/tree/master/examples
- ▶ Models: github.com/fchollet/deep-learning-models
- ▶ Data: github.com/fchollet/keras/tree/master/keras/
  datasets

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Why Keras? - Backends

- ▶ View Keras as deep learning front-end

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- ▶ Tensorflow, theano, CNTK

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Why Keras? - Backends

- ▶ View Keras as deep learning front-end
- ▶ Choice of backends available:
- ▶ Tensorflow, theano, CNTK
- ▶ Swap backends easily, run on CPUs or GPUs

A minimal Keras example

```
from keras.models import Sequential
from keras.layers import Dense
from keras.optimizers import SGD

# Load data
from keras.datasets import mnist
(x_train, y_train), (x_test, y_test) = mnist.load_data()
# ... more preprocessing

# Define model
model = Sequential()
```

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A minimal Keras example

```
# Add layers
model.add(Dense(256, activation='sigmoid',
                input_shape=(784,)))
model.add(Dense(10, activation='softmax'))

# Compile model with loss and optimizer
model.compile(loss='categorical_crossentropy',
              optimizer=SGD(), metrics=['accuracy'])

# Train network
model.fit(x_train, y_train, batch_size=128,
          epochs=10, validation_data=(x_test, y_test))
```

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Install Keras

```
# Install tensorflow backend
pip install tensorflow

# Optionally install other dependencies
pip install h5py graphviz pydot

# Install keras
pip install keras
```