Implementing Custom Layers and Models

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Overview

Defining custom layers using the Layer base class

Layers with trainable and non-trainable weights

Inferring the input shape

Recursively composing custom layers

Building and training custom models

Saving and loading custom models

Keras Building Blocks

Sequential Models

Functional APIs

Model Subclassing

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Custom Layers

Model

tf.keras.Model

Can be trained

Can encapsulate multiple layers

Can be subclassed

- Model subclassing

Model Subclassing

Subclass tf.keras.Model and only define your own forward pass imperatively - particularly useful with eager execution.

Eager Execution

Evaluate models immediately (“build-and-run”) rather than first building graphs that are run later (“build-then-run”)

Keras Building Blocks

Sequential Models

Functional APIs

Model Subclassing

Custom Layers

tf.keras.layers.Layer

Contains a call method which defines the transformation applied to input to obtain the output. Also contains a set of weights.

Layers

The call method defines forward pass

Weights can be

- Trainable
- Non-trainable

Non-trainable weights will be unchanged during back-propagation

Best practice: Defer weight creation until shape of inputs is known

Layers

Layers can be recursively combined

- One layer as part of state of another
- Outer layer will depend on weights of inner layer

Layers

Layers recursively collect losses created during the forward pass

- Regularization losses

Custom Layers

Subclass tf.keras.layers.Layer

Implement specific methods

_ _init_ _

build

call

get_config/from_config

Demo

Building custom layers and models in Keras

Demo

Performing regression using a custom model with custom layers

Summary

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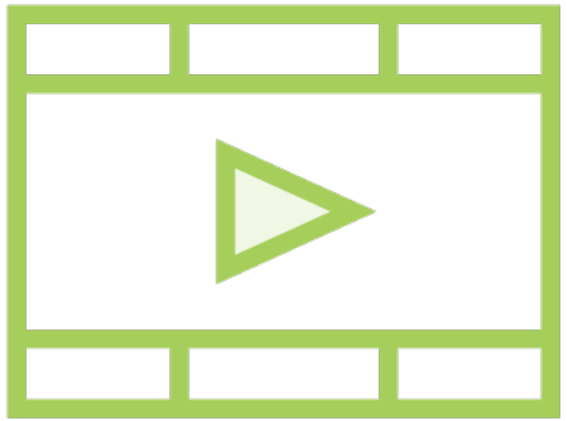

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