# Using the Functional API and Model Subclassing in Keras



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## Overview

The Functional API

Model subclassing

Building a binary classifier using the Functional API

Building a multi-class classifier using Model subclassing

**Sequential Models** 

**Functional APIs** 

**Model Subclassing** 

**Sequential Models** 

**Functional APIs** 

**Model Subclassing** 

# Keras Functional API

Used to build complex model topologies that cannot be constructed using the Sequential APIs.

# Functional API



#### **Use Functional API for**

- Multi-input models
- Multi-output models
- Models with shared layers
- Models with non-sequential data flows

# Functional API



The Sequential API is inherently objectoriented

The Functional API is more functional

- Built around models that can be called (like functions)

# Functional API: Keras models can be "called" on any tensor, just like layers

## Functional API



# Keras models created using Functional APIs are callable

- Hence the name Functional API

#### Define tf.keras.Model instance

- Train just like Sequential model

#### Invoke on input tensors

- To get output tensor

**Sequential Models** 

**Functional APIs** 

**Model Subclassing** 

# 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.

**Sequential Models** 

**Functional APIs** 

**Model Subclassing** 

# 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.

## Demo

Build and train a binary classification model using the Keras Functional API

## Demo

Build and train a multi-class classification model using Keras model subclassing

# Summary

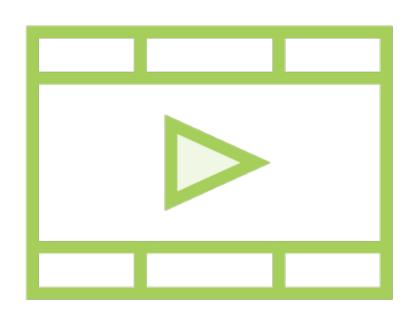
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## Related Courses



Build a Machine Learning Workflow with Keras TensorFlow 2.0

**Building Your First PyTorch Solution**