Course Description

Not long ago, cutting edge computer vision algorithms couldn’t differentiate between images of cats and dogs. Today, a skilled data scientist equipped with nothing more than a laptop can classify tens of thousands of objects with greater accuracy than the human eye. In this course, you will use TensorFlow 2.0 to develop, train, and make predictions with the models that have powered major advances in recommendation systems, image classification, and FinTech. You will learn both high-level APIs, which will enable you to design and train deep learning models in 15 lines of code; and low-level APIs, which will allow you to move beyond off-the-shelf routines. You will also learn to accurately predict house prices, credit card borrower defaults, and images of sign-language gestures.

1 Introduction to TensorFlow FREE

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What is graph-based computation? In this chapter, you'll learn about the engine that powers TensorFlow and what makes it such an attractive choice for data science projects. We will talk about constants and variables, basic operations, such as addition and multiplication, and advanced operations, such as differentiation. By the end of the chapter, you'll know how to construct and solve graph-based computational models.

Constants and variables	50 xp
Defining constants with convenience functions	100 xp
Defining variables	100 xp
Checking properties of tensors	50 xp
Basic operations	50 xp
Performing element-wise multiplication	100 xp
Making predictions with matrix multiplication	100 xp
Summing over tensor dimensions	50 xp
Advanced operations	50 xp
Reshaping tensors	100 xp
Optimizing with gradients	100 xp
Working with image data	100 xp

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2 Linear Regression in TensorFlow

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Here, you'll use TensorFlow to create a linear model that can predict house prices. You will start by learning how to load and manipulate data in TensorFlow. You'll then learn how to construct loss functions and minimize them to find the optimal parameter values for a linear model. Finally, you'll learn how to reduce the resource constraints of your program by using batch training.

Input data	50 xp
Setting the data type	50 xp
Load data using pandas	100 xp
Bringing everything together	100 xp
Loss functions	50 xp
Loss functions in TensorFlow	100 xp
Modifying the loss function	100 xp
Linear regression	50 xp
Set up a linear regression	100 xp
Train a linear model	100 xp
Multiple linear regression	100 xp
Batch training	50 xp
Preparing to batch train	100 xp
Training a linear model in batches	100 xp

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3 Neural Networks in TensorFlow

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In this chapter, you'll learn how to predict credit card default using neural networks defined and trained in TensorFlow. You will define dense layers, apply activation functions, select an optimizer, and apply regularization to reduce overfitting. You will take advantage of TensorFlow's flexibility by using both low-level linear algebra and high-level Keras API operations to define and train models.

Dense layers	50 xp
The linear algebra of dense layers	100 xp
The low-level approach with multiple examples	100 xp
Using the dense layer operation	100 xp
Activation functions	50 xp
Binary classification problems	100 xp
Multiclass classification problems	100 xp
Optimizers	50 xp
The dangers of local minima	100 xp
Avoiding local minima	100 xp
Training a network in TensorFlow	50 xp
Initialization in TensorFlow	100 xp
Training neural networks with TensorFlow	100 xp

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4 High Level APIs in TensorFlow

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In the final chapter, you'll use high-level APIs in TensorFlow to train a sign language letter classifier. You will use both the sequential and functional Keras APIs to train, validate, and evaluate models. You will also learn how to use the Estimators API to streamline the model definition and training process and to avoid errors.

Defining neural networks with Keras	50 xp
The sequential model in Keras	100 xp
Compiling a sequential model	100 xp
Defining a multiple input model	100 xp
Training and validation with Keras	50 xp
Training with Keras	100 xp
Metrics and validation with Keras	100 xp
Overfitting detection	100 xp
Evaluating models	100 xp
Training models with the Estimators API	50 xp
Preparing to train with Estimators	100 xp
Defining Estimators	100 xp
Congratulations!	50 xp

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