PRAGMATIC DATA COURSES

ESSENTIAL DATA TOOLS | PRACTICAL MACHINE LEARNING | ADVANCED MACHINE LEARNING | AI WITH TENSORFLOW

Advanced Machine Learning

Take full control of your data

Advanced Machine Learning is an eight-week, part-time, online bootcamp that offers a deeper understanding of advanced machine learning techniques and how to handle unstructured data. In this course, attendees explore decision trees, neural networks, clustering, KMeans, time series, signal processing and more. At the end of this course, students will be able to handle structured data and apply these techniques to large volumes of real-world unstructured data, while harnessing the power of raw data to solve pressing business problems.

Who should attend?

Data analysts, economists, researchers, software or data engineers who want to gain hands-on experience applying machine learning techniques to real-world datasets

Key Skills Covered

NumPy, SciPy, Pandas, probability, anomaly detection, recommendation engines, classification, transformers, preprocessing, unsupervised learning, decision trees

Prerequisites

To achieve the greatest benefit from this course, attendees must take *Essential Data Tools* and *Practical Machine Learning* or possess the following skills prior to attending:

- Intermediate Python
- Linear algebra
- Statistical modeling

Register for *Advanced Machine Learning* or learn more about other courses in our data curriculum by visiting **pragmaticinstitute.com** or calling **480.515.1411**.

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What Students Learn

Over the course of eight weeks, attendees get hands-on experience with advanced machine learning techniques that can be used the very next day.

PRAGMATIC DATA CERTIFIED

Attendees earn a coveted data science certification upon successful completion of class project

WEEK 1

STUDENTS REFRESH AND EXPAND on their knowledge of Python and statistics to prepare for advanced machine learning techniques.

- Python refresher
  - NumPy, SciPy and Matplotlib
  - Pandas
  - Functions
  - Object-oriented programming
  - Error handling
- Statistics refresher
  - Probability
  - Statistics of random variables
  - Distributions
  - Estimating statistical parameters
  - Bootstrapping

WEEK 2

STUDENTS EXPLORE MACHINE LEARNING concepts, advancing skills learned in previous courses.

- Overview of machine learning
  - Predictive modeling framework
  - Scaling, normalization and standardization
  - Feature importance

WEEK 3

STUDENTS BEGIN BUILDING REGRESSION, classification and signal models using real-world data.

- Bias, variance and overfitting linear and logistic regression
  - Linear regression
  - Regularization
  - Combining signals
  - Logistic regression
  - Multiclass classification problems

WEEK 4

STUDENTS CREATE CUSTOM MODELS and programs using Python and Scikit-Learn.

- Scikit-Learn workflow
  - Writing custom estimators and transformers
  - Pipelines
  - Feature unions
  - Stochastic gradient descent

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WEEK 5

STUDENTS EXPAND THEIR KNOWLEDGE of clustering, reduction and other models to help them better understand and manage unsupervised learning programs

- Unsupervised learning
  - K-Means clustering
  - Metrics for clustering
  - Dimension reduction
  - Matrix factorization
  - Principal components analysis
  - Anomaly detection

WEEK 6

STUDENTS LEARN ADVANCED ALGORITHMS and decision-making tools that can be used for a variety of data types.

- Advanced algorithms
  - Decision trees and random forests
  - Support vector machines (SVM)
  - K nearest neighbors (KNN)
  - Naive bayes
  - Ensemble methods
- Decision making
  - Comparing machine learning algorithms
  - Decision-making flowchart
  - Unbalanced classes

WEEK 7

STUDENTS DIVE INTO NATURAL LANGUAGE processes and time series modeling for more advanced program training.

- Natural language processing
  - Text as a "bag of words"
  - TF-IDF
  - Document similarity metrics
  - Word2Vec
- Time series
  - Trends in time series data
  - Cross-validation for time series
  - Modeling drift
  - Modeling seasonality
  - Modeling "noise"
  - Using external data sources as features
  - More advanced time series modeling frameworks

WEEK 8

STUDENTS BUILD RECOMMENDATION ENGINES and explore deep learning with the help of TensorFlow.

- Recommendation engines
  - Feature engineering
  - Nearest neighbors
  - Dimensionality reduction
  - Recommendation for a user
  - Cooperative learning
  - Regression of ratings
- Deep learning and TensorFlow
  - TensorFlow
  - Neural networks

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