KOENIG SOLUTIONS · COURSE OUTLINE

Unsupervised Machine Learning Series: Feature Engineering Methods

14 Hours	4	11	UML1 : UML161
DURATION	MODULES	TOPICS	COURSE CODE

COURSE OVERVIEW

This course discusses advanced techniques for transforming, reducing, selecting, and discovering structure in data without relying on target labels. Learners gain hands-on experience with a range of unsupervised feature engineering methods, including Principal Component Analysis (PCA), Robust PCA, Singular Value Decomposition (SVD), Autoencoders, Variable Clustering, and Non-Negative Matrix Factorization (NMF). The course also covers visualization of high-dimensional data using t-SNE and demonstrates how to deploy and score unsupervised learning models in real-world analytical workflows. Through practical demonstrations and real-world use cases, participants learn how to extract meaningful information from complex datasets and thereby improving model efficiency, uncover latent patterns, and build topic discovery and recommendation solutions. The course focuses on the data width aspect of analytics, that is, techniques related to variables and feature engineering. To explore the data depth aspect, which focuses on observations and pattern discovery, consider taking the companion course Unsupervised Machine Learning Series: Pattern Discovery Methods.

WHO THIS COURSE IS FOR

- Data Scientists, Machine Learning Practitioners.
- Predictive Modelers and Analytics Professionals.
- Business Analysts working with large and complex datasets.
- AI/ML Engineers responsible for feature engineering and model deployment
- SAS Viya users seeking to apply unsupervised machine learning techniques
- Researchers and analysts interested in dimensionality reduction and latent structure discovery

PREREQUISITES

- Before attending this course, you should have an understanding of elementary matrix algebra or linear algebra concepts and operations, including matrix dimensions, matrix addition and multiplication, matrix inversion, and scalars. You should have completed the Statistics You Need to Know for Machine Learning course or possess equivalent foundational knowledge of statistical and machine learning concepts. Experience working with tabular data and analytical workflows is helpful. Previous SAS programming knowledge is helpful but not required.
- SAS Viya

LEARNING OBJECTIVES

What You Will Learn

- Explain the role of unsupervised learning in feature engineering and pattern discovery.
- Visualize and explore high-dimensional data.
- Reduce data dimensionality while preserving important information.
- Extract meaningful features from complex datasets.
- Identify and select relevant variables without the use of a target variable.
- Discover latent structures, patterns, and relationships within data.
- Deploy and score unsupervised learning models on new data.
- Interpret and evaluate feature engineering results to improve downstream analytics and decision-making.

COURSE SYLLABUS

4 Modules, 11 Topics

01

Unraveling Patterns Using Unsupervised Learning

TOPICS

- Introduction to unsupervised learning.
- t-SNE-based visualization of high-dimensional data.

02

Feature Extraction

TOPICS

- Principal component analysis.
- Robust principal component analysis.
- Singular value decomposition.
- Autoencoders.
- Scoring unsupervised learning models.

03

Feature Selection

TOPICS

- Unsupervised selection method.
- Variable clustering.

04

Feature-Based Latent Structure Discovery and Recommendation

TOPICS

- Non-negative matrix factorization (NMF).
- AI-assisted analytics with SAS Viya Copilot.

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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