



Applied Linear Algebra, Calculus, and Statistics for AI, ML, and Data Science Training

Course ID #: 7000-985-ZZ-Z

Hours: 14

Course Content

Course Description:

In this course, you will cover: Understanding the core concepts of artificial intelligence, machine learning, or data science is impossible without knowing the fundamentals of linear algebra, calculus, statistics, and probability. This training course teaches the essentials in the respective fields of knowledge to prepare the learners to start or advance their careers in AI, machine learning, or data science.

Course Objectives:

Upon successful completion of this course, students will:

- Gain a deep understanding of AI, ML, and Data Science fundamentals to accelerate further development
- Solve systems of linear equations using Gaussian elimination
- Perform vector operations, such as addition, subtraction, and dot product
- Apply derivatives to optimize squared loss and log loss
- Understand probability distributions and statistical inference

Prerequisites:

None

Target Audience:

Software developers

IT architects

Technical and product managers

Designers

Data analysts

Data engineers



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Topics:

Lesson 1: Applied Linear Algebra for Artificial Intelligence, Machine Learning, and Data Science

- Systems of Linear Equations
 - Singular vs non-singular matrices
 - Linear dependence, independence, and the determinant
 - Matrix row-reduction (Gaussian elimination)
 - Rank of a matrix and row echelon form
 - Systems of Linear Equations in AI, Machine Learning, and Data Science
- Vector Operations and Linear Transformations
 - Vectors and their properties
 - Vector operations
 - Linear transformations
 - Matrix multiplication
 - Determinants and Eigenvectors
 - Machine Learning and matrices

Lesson 2: Applied Calculus for Artificial Intelligence, Machine Learning, and Data Science

- Derivatives and optimization for AI, Machine Learning, and Data Science
 - Common derivatives and derivative properties
 - Optimization of squared loss and log loss
- CGradient Descent
 - Partial derivatives, gradients, and optimization
 - Optimization using gradient descent
- Derivatives, optimization, and gradient descent in AI, Machine Learning, and Data Science

Lesson 3: Applied Probability & Statistics for Artificial Intelligence, Machine Learning, and Data Science

- Probability
 - Probability, Conditional Probability, Bayes Theorem, and Independence
 - Bayes Theorem, Naive Assumption, and The Naive Bayes Model
- Probability Distributions
 - Discrete and continuous distributions
 - Normal, Binomial, Bernoulli, Uniform, and Chi-Squared distributions
 - Probability Density Function and Probability Mass Function
 - Cumulative Probability, Cumulative Distribution, and Cumulative Distribution Function
 - Multivariate Probability Distributions and Covariance
 - Probability Distributions in AI, Machine Learning, and Data Science
- Statistical Sampling, Estimation, and Inference
 - Population and sample
 - Point Estimation
 - Maximum Likelihood Estimation
 - Linear regression
 - Regularization
 - Maximum a Posteriori Estimation
 - Central Limit Theorem
 - Statistical Inference: Confidence Intervals and Hypothesis Testing
 - A/B Testing
 - Statistical Sampling, Estimation, and Inference in AI, Machine Learning, and Data Science

Register for this class by visiting us at:

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