Comprehensive Machine Learning: From Fundamentals to AI

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Casablanca (Morocco)



Comprehensive Machine Learning: From Fundamentals to AI

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Why This Course

Machine learning is transforming industries by enabling data-driven decision-making, predictive insights, and intelligent automation. This intensive 1-week program equips participants with a solid foundation in machine learning concepts, algorithms, and practical applications. Through hands-on exercises using Python-based tools and frameworks, learners will gain the skills to develop, evaluate, and deploy machine learning models for real-world problems.

What You'll Learn and Practice

By participating in this course, you will:

- Understand core machine learning concepts and algorithms.
- Gain proficiency in Python for data analysis and model development.
- Build and evaluate supervised and unsupervised learning models.
- Explore neural networks, deep learning techniques, and advanced architectures.
- Implement end-to-end machine learning projects from data preprocessing to deployment.

Program Flow

Day 1: Introduction to Machine Learning and Python

- Overview of machine learning and its applications
- Python fundamentals for data science
- Data preprocessing and exploratory data analysis
- Introduction to scikit-learn and key Python libraries

Day 2: Supervised Learning - Classification and Regression

- Linear and logistic regression
- Decision trees and random forests
- Support Vector Machines SVM
- Model evaluation, cross-validation, and performance metrics



Day 3: Unsupervised Learning and Dimensionality Reduction

- Clustering algorithms: K-means, hierarchical clustering
- Principal Component Analysis PCA for dimensionality reduction
- Feature selection and engineering techniques
- Anomaly detection methods

Day 4: Neural Networks and Deep Learning

- Fundamentals of Artificial Neural Networks ANN
- Deep learning architectures for complex tasks
- Convolutional Neural Networks CNN for image processing
- Recurrent Neural Networks RNN for sequence and time-series data

Day 5: Advanced Topics and Project Implementation

- Ensemble methods and boosting algorithms
- Introduction to Natural Language Processing NLP
- Basics of reinforcement learning
- End-to-end machine learning project implementation

Training Methodology

This course combines theory with hands-on practice to ensure practical, real-world application:

- Interactive coding exercises using Python and popular ML libraries
- Real-world datasets for supervised, unsupervised, and deep learning projects
- Group discussions and problem-solving sessions on modeling challenges
- Capstone project to implement a complete machine learning workflow

Beyond the Course

Participants will leave the program able to:

- Build predictive models for real-world scenarios, such as customer churn analysis.
- Develop image classification systems using deep learning techniques.
- Create recommendation engines and collaborative filtering solutions.
- Implement sentiment analysis tools for social media and textual data.
- Confidently manage end-to-end machine learning projects from concept to deployment.

