COURSE SYLLABUS

Python Machine Learning Advanced

Take your machine learning expertise to the next level in this comprehensive, hands-on course designed to transform foundational ML knowledge into practical, real-world applications. Move beyond standard Jupyter notebooks and explore how professional ML engineers build and deploy machine learning systems across diverse domains.

> Group classes (Live Online) and onsite training are available for this course. For more information, email onsite@graduateschool.edu or visit: https://www.graduateschool.edu/courses/advanced-machine-learning



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Course Outline

1. NLP & Sentiment Analysis

Environment Setup & NLP Fundamentals

- VS Code environment configuration, NLP libraries installation
- Tokenization, stopword removal, stemming, lemmatization
- Text representation with Bag of Words and TF-IDF

Sentiment Analysis Project

- Logistic Regression for sentiment classification
- Data splitting, model evaluation metrics (accuracy, precision, recall, confusion matrix)

2. Recommendation Systems

Collaborative Filtering

- User-based and item-based filtering
- Cosine similarity for personalized recommendations

Content-Based Movie Recommender

- Vectorizing text using TF-IDF
- Implementing content similarity algorithms

3. Flask App for Recommendations

Building an ML-Powered Web App

- Flask basics and web serving
- Developing a recommendation system Flask app

4. Forecasting & Deep Learning

Time Series with Facebook Prophet

Trend forecasting and visualization (e.g., market prices)

Deep Learning with PyTorch

- CNN basics, image classification using the CIFAR-10 dataset
- Model training, accuracy assessment, and confusion matrix interpretation

5. Object Detection

Real-Time Object Detection with YOLO

- Image detection and labeling with pretrained models
- Adapting YOLO models to video streams and real-time webcam input