tripleten

AI & Machine Learning Program

9 months | Online | Part-time

Syllabus

2025

Table of contents

What is Machine Learning & AI

The Machine Learning and AI Program by TripleTen is a 9-month program designed for people from diverse backgrounds. You don’t need prior tech experience—just the ambition to re-skill and become a highly paid professional in one of the fastest-growing fields.

The goal is to equip you with all the skills required to land a job in the tech industry. You will learn everything from the foundations of Python and statistics to advanced topics like Neural Networks, Computer Vision, Natural Language Processing, and Large Language Models. By the end of the program, you will have 15 projects in your portfolio to show employers the exceptional specialist you have become.

And while mastering technical tools, you will also develop the soft skills that ensure success. You’ll practice time management, teamwork, and problem-solving, as well as industry-specific abilities like working with documentation and building an online presence to stand out in your job search.

Program Structure

Your journey will be divided into sprints—two week long work intensive periods grouped into thematic modules.

Each sprint will have a particular learning objective, reinforced through quizzes and tasks. Most tech companies work in this format, so you will come prepared. At the end of the sprint, you will take the skills you've learned and combine them with your existing skills to work on a project that will be assessed by industry experts.

We provide some rough time estimates to help you plan and manage your schedule, and we recommend spending around 20 hours per week studying. However, we understand that everyone has different commitments and people learn at different speeds — so, we provide you with the possibility to extend your deadlines by 18 weeks in total.

Sprint 3: Exploratory Data Analysis (EDA)

- Reading and Viewing Data
- Working with Missing and Duplicate Values
- Data Visualization
- Filtering Data
- Data Types
- Feature Engineering
- Data Transformations
- Soft Skills Lessons: Analytical & Critical Thinking
- Project

Sprint 4: Statistical Data Analysis

- Descriptive Statistics
- Probability Foundations
- Hypothesis Testing
- Confidence Intervals and Significance
- Soft Skills Lessons: Communication & Teamwork
- Project

Sprint 9: Feature Engineering and Model Optimization

- Feature Engineering
- Feature Selection
- Hyperparameter Tuning
- Cross-Validation and Robust Evaluation
- Ensembles
- Handling Imbalanced Data
- Soft Skills Lessons: Task Management
- Project

Sprint 10: APIs and Web Services for ML

- API Fundamentals and REST
- Flask for Simple ML Endpoints
- FastAPI for Production Services
- Model Serialization and Versioning
- Security, Rate Limiting, Logging, and Monitoring
- Testing with Postman and Best Practices
- Soft Skills Lessons: Business Thinking & Problem Solving
- Project

Sprint 5: Software Development Tools

Command Line and Environments

Git and GitHub

Intermediate Python

Project

Sprint 6: Integrated Project 1

A video game retailer has user and expert reviews, genre, console, and historical data on game sales available. Identify patterns that determine whether a game succeeds or not in order to spot potential big winners and plan advertising campaigns.

Sprint 7: Data Collection and Storage

Retrieving Data from Online Resources

SQL as a Tool for Working with Data

Advanced SQL Features for Analysts

Relationships Between Tables

PySpark

Soft Skills Lessons: Self-Management

Project

Sprint 11: Docker and Containerization

Docker Images, Containers, Registries, Networking, Volumes

Efficient Dockerfiles

GPU-Ready and Notebook Containers

Multi-Service Workflows with Docker Compose; Intro to Kubernetes

Project

Module 1: Python for Data Analysis and Statistics

Python for Data Analysis and Statistics covers the foundation necessary to build a career in the data space. Python is a highly popular programming language, widely used in data applications, and statistics is the mathematical field underpinning Data Science. In this module we introduce both, and focus on Python as it is applied to statistics and data analysis.

Sprint 1: Basic Python

- What Is Data Science
- Python Basics
- Strings, Lists, Tuples
- Algorithms
- Guided Case Study

Sprint 2: Working with Data in Python

- Functions
- Cleaning and Transformations
- Dictionaries
- Loading and Inspecting Datasets
- Using Pandas to Work with Data
- Project

Module 2: Machine Learning

Data Science can do many things, but one of the most magical is Machine Learning—making computer models that can predict and enable inferences about the real world. Machine Learning builds on everything we have learned so far—statistics, Python, and software engineering—to enable creating intelligent systems.

This module introduces Machine Learning, covers supervised learning (including regression and classification models), and discusses how to explain Machine Learning and apply it in practical business situations.

Sprint 8: Introduction to Machine Learning

- The ML Workflow
- Avoiding Data Leakage
- Regression and Classification Basics
- Evaluation Metrics and Error Analysis
- Iterating with Simple Improvements
- Project

Module 3: Neural Networks, Cloud, and Production Systems

Modern data products rely on deep learning, scalable cloud platforms, and reliable production practices. In this module you'll train neural networks, build applications in computer vision and NLP (including LLMs), leverage AWS for scalable training and deployment, and implement robust MLOps so models can run, be monitored, and improve in the real world.

Sprint 12: AWS for Machine Learning

- AWS Foundations
- Storage for ML
- Compute for ML
- SageMaker
- Serverless ML
- Project

Sprint 13: Neural Networks and Deep Learning

- Perceptrons, Activations, Forward/Backprop
- Optimizers and Stabilization
- TensorFlow/Keras
- PyTorch
- Advanced Training
- Project

Sprint 14: Computer Vision

- Image Processing with OpenCV
- CNNs from Scratch and Training Practices
- Modern Architectures
- Applications: Classification, Detection, Segmentation
- AWS Rekognition and Deployment on SageMaker

Project

Sprint 15: Natural Language Processing

- Text Preprocessing
- Representations
- Traditional Models
- Transformer Basics
- Applications: Classification, QA, Summarization, Translation

Project

Sprint 16: Large Language Models and Generative AI

- LLM Landscape, Capabilities, and Limitations
- Working with APIs
- Prompt Engineering
- Retrieval-Augmented Generation

Project

- Adaptation and Guardrails
- Generative Apps

Sprint 17: MLOps and Production Systems

- Versioning Code and Data
- CI/CD for ML
- Pipeline Orchestration
- Monitoring and Observability
- Experimentation
- Project

Sprint 18: Capstone Project

- Project Scope and Requirements
- End-to-End ML System
- Cloud Deployment and Monitoring
- Transformer Basics
- Documentation, Testing, and Presentation
- Stakeholder Review and Iteration

Career Preparation

From day one

Access career-focused lessons that strengthen both:

Hard skills: for job applications

Soft skills: networking, communication, self-promotion and interview techniques

Midway through

Partner with a career coach to:

- Develop a personalized job search strategy
- Perfect your resume, LinkedIn profile, and portfolio
- Practice interview & networking techniques in group and individual sessions

As you progress

- Participate in Code Jams—team competitions to apply your skills
- Complete an Externship—gain real-world business experience (you'll learn more as you advance!)

After graduation

Enter the job search phase with support from a Placement Coordinator:

- Regular check-ins to keep you on track
- Feedback to improve applications and networking
- Help connecting with recruiters and hiring managers
- AI-powered job search platform to manage applications and track progress

tripleten

Change careers. **Breathe easier.**

9 months | Online | Part-time

Syllabus

2025