# Real Time College

Course: Fundamentals of Machine Learning

Duration: 35 Hours

Hands-On-Training: 60%

Real Time Group is a multi-disciplinary dynamic and innovative Real-Time O.S. and Software Solutions Center, established in 2007.

Providing Software solutions, professional services and consulting, end-to-end flexible system infrastructure, outsourcing, integration and training services for Hardware, Software and RT-OS Systems.

The company is divided into the following three Divisions:

Real Time Group

College	Development	Out-sourcing
rt-ed.co.il	rt-dev.com	rt-hr.co.il
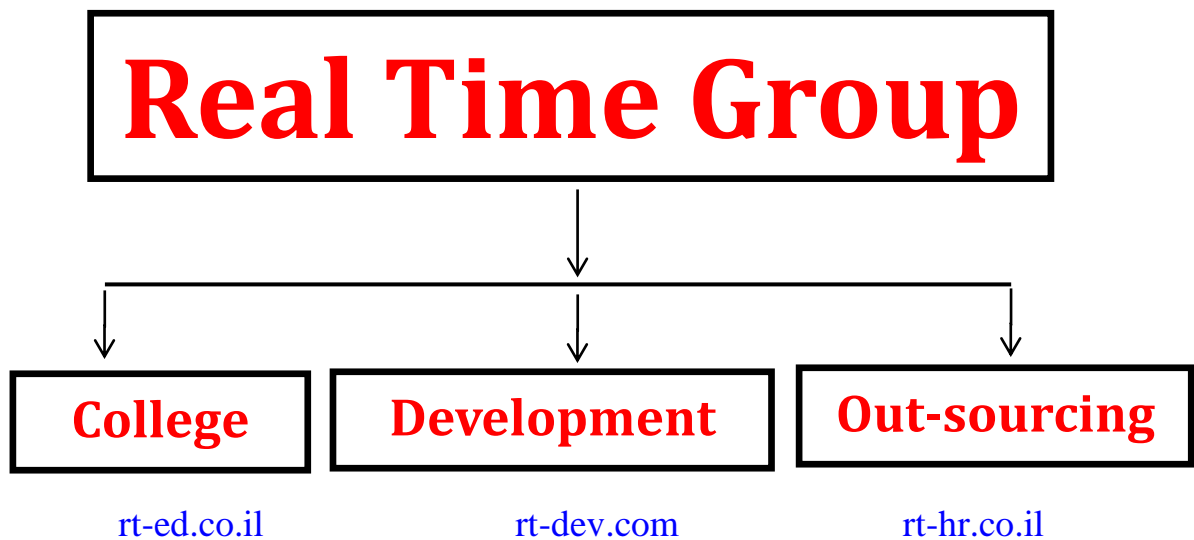
Training Division:

Professional Training Services for Hardware, Software, RT-OS and Embedded systems industries.

We provide the knowledge and experience needed to enable professional engineers to Develop, Integrate, Software and Machine Learning Projects.

In order to ensure experience, all courses are practical – hands-on-training.
The latest Development, QA and Automation equipment which are adopted by the industry are used.

All students are supplied with Development-Boards for home-work and course projects.

Course Overview:

Machine learning uses interdisciplinary techniques such as statistics, linear algebra, optimization, and computer science to create automated systems that can sift through large volumes of data at high speed to make predictions or decisions without human intervention.

Nowadays Machine learning as a field is incredibly pervasive, with applications spanning from business intelligence to homeland security, from analyzing biochemical interactions to structural monitoring of aging bridges, and from emissions to astrophysics, etc.

This class will familiarize students with a broad cross-section of models and algorithms for machine learning, and prepare students for developing industry applications using machine learning techniques..

Who should attend:

- Anyone seeking to acquire knowledge in ML\AI software development.
- No background in development of procedural languages or object-oriented programming is needed (since the course starts from scratch).

Prerequisite:

- NO prior knowledge in programming is needed.
- Basic ability to work with a computer (Windows OS).
- Knowledge in the English Language.

Fundamentals of Machine Learning: Course content

1. **Introduction:**
   a. What Is Learning?
   b. When Do We Need Machine Learning
   c. Types of Learning
      i. Supervised Learning
      ii. Reinforced Learning
      iii. Unsupervised Learning
   d. Classification Error Metrics
   e. Regression Error Metrics
   f. Machine Learning with Python

2. **Linear Regression:**
   a. Linear Regression
   b. Least Squares
   c. Linear Regression for Polynomial Regression
   d. Logistic Regression

3. **KNN: K-Nearest Neighbors**
   a. Understanding the KNN algorithm
   b. Calculating distance between points
   c. Choosing the k factor?
   d. Working on datasets

4. **Decision tree and random Forest:**
   a. Introduction to Decision Trees
   b. Overview of Random Forests
   c. Random Forest or Decision Trees

5. **SVM: Support vector machine**
   a. What is a Support Vector Machine?
   b. Hyperplanes and Support Vectors
   c. Cost Function and Gradient Updates

6. **K-means clustering:**
   a. What Is Clustering?
   b. Overview of Clustering Techniques
   c. Partitional Clustering
   d. Hierarchical Clustering
   e. Density-Based Clustering
   f. Understanding the K-Means Algorithm

7. PCA: Principal component analysis
   a. What is PCA used for?
   b. Ways to calculate PCA?
   c. Advantages and disadvantages of PCA

8. NLP: Natural language processing
   a. What is Natural language processing
   b. Supervised ML for NLP
   c. Unsupervised ML for NLP
   d. Using ML on Natural Language Sentences
   e. Hybrid Machine Learning Systems for NLP