

## INTRODUCTION TO MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

### Course Objectives:

1. Introduction to various machine learning and artificial intelligence concepts
2. Learn machine learning, deep learning and AI concepts
3. Provide training so that students can start writing applications in AI
4. Provide ability to run real machine learning production examples
5. Understand programming techniques that underlie the production software

The concepts will be taught in Julia, the fastest and most productive modern high-level language for numerical computing and machine learning - but can be applied in any language with which the audience is familiar.

**Duration:** 8 hours

### Pre-requisites:

The audience are expected to have learnt typical first 2 years of undergrad mathematics and linear algebra and have exposure at least one programming language. Professionals with a few years of experience in data science will also benefit from this course.

### Course outline:

1. Representing Data with Models: Use of functions and parametric functions to build models
2. Model Complexity: What is learning from a computational point of view? How does a computer learn?
3. Exploring Data with Unsupervised Learning: Dimensionality reduction for image classification
4. Applications Using Unsupervised Machine Learning
5. Introduction to Supervised Machine Learning
6. Practical Applications using Supervised Machine Learning, for example object detection
7. Introduction to Neurons: Learning with a single neuron
8. Introduction to Flux.jl: Learning with a single neuron using Flux.jl
9. Introduction to Neural Networks: Building single layer neural nets with Flux.jl
10. Introduction to Deep Learning: Multi-layer neural networks with Flux.jl
11. Handwriting Recognition with Neural Networks