

# AI/ML TAILORED QUICKSTART SESSION

**Customer:** Ministry of Earth Sciences

**Course Length:** 2 Days

**Delivery Mode:** VILT

**Speaker/Instructors:** Ilene Locker Carpenter & Shaneel Sharma

**Course Objective:** This introduction-level hands-on course explores the concepts of artificial intelligence (AI) and machine learning (ML), python programming and understanding on the important libraries like Pandas, Numpy, Cartopy etc. You learn fast paced overview on AI and ML methods & techniques, and application to computational problems on mixed data sets (few weather domain data and few simple data sets).

In this course, we cut through the sample exercises/labs so you learn exactly how to approach and execute machine learning initiatives at work. Using clear explanations, EDA with Python code and step-by-step labs, you discover how to load and prepare data, and implement a suite of few algorithms & techniques. You also benefit on how to go about executing AIML based projects, which in turn lays the foundation to enable you to implement practical use cases of your domain data & use cases. For example: Working with NetCDF4, working with XArray, Time series, maps and visualizations etc. This course presents a wide variety of related technologies, concepts, and skills in a fast-paced, hands-on format. This provides a solid foundation for understanding and a jumpstart into working with artificial intelligence and machine learning. This course is 50% hands-on labs and 50% lecture and includes engaging instruction, notebooks, sample exercise labs, and image related operations.

There is also introduction & overview to Simulation techniques using SMART SIM

# Course Outline

Topic Name	Module Detail	Coverage in Module
<b>Introduction to AIML DL &amp; Industry overviews</b>	Module 1	Intro to AIML / Industry Use Cases etc.
<b>ANN &amp; Deep Learning -</b>	Module 2	Concepts of Artificial Neural Networks Loss & Activation functions Labs
<b>Python Overview / functions loops etc.</b>	Module 3	Assignment Exercises Live Exercises
<b>Pandas/ Numpy Data Wrangling</b>	Module 3	Assignment Exercises Live Exercises
<b>ML techniques with Hands on Awareness Session (Assignment Labs)</b>	Module 3	Supervised / Unsupervised Clustering etc. Key ML Techniques Labs/Assignments
<b>Introduction &amp; High Level Overview of Keras &amp; TF</b>	Module 3	Tensorflow / Keras Intro Quick Labs / Assignment (optional)
<b>Environmental Sciences Data Formats</b>	Module 4	Netcdf4/hdf/GEOTIFF/xarray /zarr/ Working with Visualizations (Optional for Matplotlib & cartopy)
<b>Basic level Working with NetCDF formats Quick Lab(With Simple Time Series from NC4)</b>	Module 4	Working with .nc and .nc4 files Hands on NetCDF simple Exercises with Time Series XARRAY & Zarr (Optional)
<b>AIML Project Management</b>	Module 5	Project Execution & Key Aspects for AIML based projects & lifecycle
<b>Basics of Data Management &amp; EDA for AIML Analytics</b>	Module 5	Hands On Data Preprocessing ML Fundamentals Lab Prediction with Time Series on ENSO Forecasts ML Based Lab Example
<b>Basics of Image processing &amp; CNN Architectures Overview</b>	Module 6	CNN Architectures Concepts / Layers / Poolings / Image & Kernel Filters Concepts Basic Hands On Labs with Computer Vision Libraries
<b>Computer Vision Based Hands On Lab</b>	Module 6	Use of AI to identify features/classes in imagery data MNIST Data Set Image Processing Example/ Land Image Classification Labs PCA & AutoEncoding Lab (Unsupervised)
<b>Building Models using CNN</b>	Module 6	CNN Sample Image Classification Example with

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Image Dat Sets Using CNN for  
Fashion Data Set or Plant or  
Satellite Land Images

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**Smart Sim Session**

Module 7

Overview & Introduction to  
Smart Sim Technology Stack

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