



DE225: Machine Learning and Data Science for Upstream Professionals

Training Description:

The training course aims to provide upstream professionals with a comprehensive introduction to the main machine learning methods and builds hands-on experience in data science and machine learning. Through the training course, participant will develop a solid understanding of supervised and unsupervised learning algorithms including advanced topics such as deep learning and machine learning models explainability.

This intensive training course is designed to build up your confidence from scratch: starting with an introduction of each method in simple terms, followed by detailed guidelines on how to apply different machine learning methods for solving actual problems from reservoir engineering, geo-modelling, and petrophysics. The knowledge obtained from the course - in combination with carefully designed code examples - can be applied by the participants in ongoing and future projects, thus increasing their overall performance.

Training Objectives:

- The main machine learning methods will be discussed and illustrated with multiple re-usable code examples and real data sets
- Solutions of multiple problems related to reservoir engineering, geology and petrophysics will be demonstrated using state-of-the-art machine learning libraries

By the end of the training, participants will be able to:

- ✓ Core concepts of machine learning and data science
- ✓ Identifying existing bottlenecks for machine learning methods application in your professional domain
- ✓ Choosing the most appropriate machine learning methods to solve a particular problem
- ✓ Applying the main machine learning methods in practice

Training Designed for:

This course is intended for reservoir engineer, geologist or petrophysicist, and keen to obtain a fundamental understanding and practical knowledge on scientific programming, data science and machine learning.

Prerequisite:

Participants should have upstream domain knowledge. Prior programming experience is a plus, but not required.

Training Requirement:

"Hand's on practical sessions, equipment and software" will be applied during the course if required and as per the client's request." (This hands-on, highly-interactive training includes simulator, real-life case studies and exercises). **Participant is encouraged to provide his/her own laptop with excel, audio and excellent internet connection.**

Content can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ Introduction to Machine Learning ecosystem
- ❖ Python crash course
- ❖ Data wrangling (using Pandas and SQL)
- ❖ Data visualisation
- ❖ Exercises:
 - Production data analysis and visualization
 - Data preparation for material balance calculations
 - Reservoir simulation model QC
 - Well log data visualization

DAY TWO:

- ❖ Numerical optimisation
- ❖ Statistics refresher
- ❖ Exploratory data analysis
- ❖ Uncertainty evaluation and decision making
- ❖ Exercises:
 - Decline curve analysis
 - PVT data preparation for reservoir simulation
 - Volume-in-place probabilistic estimation
 - Static model upscaling
 - Waterflood optimization

DAY THREE:

- ❖ Machine learning introduction
- ❖ Dimensionality reduction methods
- ❖ Clustering methods
- ❖ Anomaly detection methods
- ❖ Exercises:
 - Electrofacies identification based on well log data
 - Static model realisations screening
 - Numerical well testing

DAY FOUR:

- ❖ Machine learning core concepts
- ❖ Regression methods
- ❖ Tuning of machine learning models
- ❖ Exercises:
 - Production forecast of unconventional reservoir
 - Saturation pressure prediction

DAY FIVE:

- ❖ Classification methods
- ❖ Neural networks and Deep learning

- ❖ Advanced machine learning topics:
 - Imbalanced datasets
 - Interpretability of machine learning models
- ❖ Exercises:
 - Lithofacies identification
 - Screening of enhanced oil recovery (EOR) methods
- ❖ Course Conclusion
- ❖ POST-TEST and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Daily Training Timings:

08:00 - 10:00	First Session
10:00 - 10:20	Recess
10:20 - 12:20	Second Session
12:20 - 12:40	Recess (Prayer Break)
12:40 - 14:00	Third Session
14:00 - 14:20	Recess
14:20 - 17:00	Last Session

Please note that this training course has lots of practical exercises. To ensure that all topics and exercises must be covered, this training course timing is extended from 8am to 5pm daily.

For training registrations or in-house enquiries, please contact:

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Training & Career Development Department