PetroSkills

Introduction to Machine Learning/Data Analytics for Subsurface Engineering and Geoscience Applications - IMLD

COURSE

About the Course

The interpretation of rich, heterogeneous and even real-time data has become possible because of recent advances in machine learning and the broader availability of computational power. The oil and gas industry is harnessing the power of this data-driven revolution to create actionable insights from real-time production, drilling, and completions data, SCADA data streams, 3D and 4D seismic, well data such as cores, well-logs, thin-sections and SEM images and even the advent of newer data type such as DTS/DAS measurements.

This 2-day course will introduce participants tthe concepts of exploratory data analyses, machine learning workflows and most importantly, data analytics and machine learning use cases for subsurface applications.

The course is presented in three modules:

1. Introduction to data-driven workflows including data types, data quality checks and exploratory data analyses
2. Unsupervised learning and clustering with emphasis on the use cases and workflows
3. Supervised learning (including regression and classification) focusing on the use cases and workflows.

Target Audience

Geoscientists, petrophysicists, engineers, or anyone interested in subsurface engineering and geoscience applications of machine learning and data analytics

You Will Learn

- Essential terminology specific to data analytics and machine learning
- Data type and reporting protocols in the oil and gas industry
- Practical approaches tensuring and verifying data quality
- Exploratory data analyses to visualize and quantify relationships as well as identifying outliers
- The basic principles of common machine learning tools in the petroleum industry
- Unsupervised learning
- Supervised learning
- Reinforcement learning
- Use cases of subsurface geoscience and engineering data-driven applications
- Recognize and address pitfalls of data-driven methods in the oil and gas industry

Course Content

- Introduction to machine learning terminology and workflows
- Data types, QA/QC, exploratory data analyses and its relation tinsights gained from data-driven workflows
- In-depth discussion of use cases with the more popular unsupervised and supervised machine learning algorithms

Unsupervised machine learning algorithms and applications, including:

- Seismic facies identification from 3D seismic attributes; Rocktype prediction from cores/well log data
- Identifying hydraulic fracture locations from well-log or seismic data
- Well clustering tidentify common attributes of productive wells

Supervised machine learning algorithms and applications. This is a list of a few applications:

- Linear regression
- Production forecasting
- Upscaling core-derived rocktypes twell-scale for 3D geomodelling
- Synthetic log generation (for instance: sonic log) from triple-combo data
- Predicting lost-time drilling incidents ahead of time, such as stuck-pipe or stick-slip, among others
- Real-time analytics for failure mitigation and prevention in artificial lift applications
- Identifying key geologic, petrophysical and completions-related variables driving well productivity

- Data collection, management, storage and accessibility with a specific focus on the oil and gas industry
- Challenges and pitfalls of data-driven methods in the oil and gas industry

Product Details

Categories: Upstream

Disciplines: Data Management, Science and Analytics   Petrophysics

Levels: Foundation

Product Type: Course

Formats Available: In-Classroom   Virtual

Instructors: Deepak Devegowda

In-Classroom Format

22 Oct '24   23 Oct '24   - | Course | In-Classroom (in Houston) $2,825.00

Virtual Format

1 Apr '24   4 Apr '24   - | Course | Virtual (Houston UTC) $2,440.00