## Aramco Upstream Solution Technathon 2019

## AI Challenge: Automated Seismic Interpretation with Uncertainty Analysis

**Problem:**

One of the key stages of petroleum exploration is to perform the seismic survey of the required area of subterranean structure. Seismic surveys consist of means of generating elastic waves that are transmitted into the earth and means of recording the energy that is returned from the boundaries dividing rocks with different properties. Elastic waves are bounced off underground rock formations and the waves that reflect to the surface are captured by recording sensors for later analysis. As a result of acquired data processing and interpretation, seismic surveys intend to produce detailed images of local geology to determine the location and size of possible oil and gas reservoirs. The important elements in seismic interpretation is to identify faults, horizons and structural traps which are key indicators for hydrocarbon prospects.

**Solution:**

Considering rapid development in deep machine learning algorithms related to image recognition, it is expected that participant will utilize deep learning algorithms on a set of publicly available images contained general pictures of subterranean faults, horizons and trap to apply these algorithms on the seismic cube data to recognize and identify these structural elements on given 3D dataset with uncertainty estimation.

**Details of the challenge:**

Participants are expected to build automatic seismic data interpretation algorithm that can track main horizons and faults. Using the available image datasets for hydrocarbon traps, the participants can train their deep learning algorithms for the key elements of hydrocarbon plays. Based on this training set, the recognition and identification of these structural elements needs to be done on 3D seismic cube dataset provided to the participants. The uncertainty estimations for this recognition and identification must be provided as a result of deep learning analysis.

**Evaluation of the performance:**

Participants are expected to deliver a presentation with the solution approach for training on the available images, recognition of the key structural elements on given 3D seismic cube and identification of uncertainty for the predicted elements.

**Data for challenge:**

* A set of publicly available images for key structural elements, such as faults, horizons and traps
* 3D PSTM seismic cube dataset