Exercise objective:

To predict seismic geo-bodies using the "Seismic Classification (supervised 3D)" tool which is part of the machine learning plugin. In this exercise, we want to predict Chimney location.

Seismic data Preparation

Seismic need to be available in the survey. If not, **import** seismic, and interpret key seismic bodies locations (e.g. Chimney yes, Chimney no), or use existing trained model.

Workflow:

- **1. Open** the Machine Learning Control Center with the **b** icon.
- 2. Click on Seismic.
- **3**. **Select** Seismic Classification (Supervised) under 3D Seismic, and **Hit** Go.



4. The *"Seismic Classification"* window pops up.

5. Select *Input Data* in the "*Extract Data" tab.*

6. In the "Seismic data field, **Select** the *Original seismic, and "2 Steering BG Detailed" as an input*

7. Use the default image dimensions



- 8. Click on in Labels .
- 9. Click on add class
 and select the first and the 2nd class example locations (e.g. Chimney yes, and chimney no).
- 10. Add a name for example data output and hit on
- 11. Hit on Extract



12. Click on the Train tab

Select the example data.

13. Toggle on New for the training type

14. Give a name to the output model15. Select one of the learningalgorithm (e.g. Keras-tensorflow) totrain the extracted examples data.

16. Press on Run.

Wait till you see the training is complete and successuful.



- **17. Select** the "Apply" tab.
- 18. Select the trained model.
- **19. Press** Proceed.



- 20. In the *"Apply created training model"* window, Verify, all the default selected input 3D cubes are correct.
 - a. To optimize computation time, **Modify** "Volume sub-selection" and set it to an area of interest, where Chimneys have been interpreted (e.g. Inline range: 670-710, Crossline range: 300-1250).
 - **b.** Specify a new name for the 3D output cubes: Classification, Chimney yes, Chimney no, and Confidence. Toggle on Chimney yes.

| | 📾 Apply 'Model_Keras_Chimney' - 🗆 X |
|-------------------------------|--|
| 21. Press Run to continue | Predict using \bigcirc 2D data $\textcircled{	extbf{o}}$ 3D data |
| | Input for '1 Original Seismics' |
| 📾 Positions — 🗆 🗙 | Volume subselection 670/300-710/1250 (463 samples) |
| Specify Positions | Output prefix Model_Keras_Chimney |
| Volume subselection Range | Output 'Classification' Model_Keras_Chimney - Classification V Select CBVS V |
| | Output 'Chimneys no' Model_Keras_Chimney - Chimneys no 🗸 🕒 Select 🛇 CBVS 🗸 |
| In-line range 670 👻 710 👻 | 🗹 Output 'Chimneys yes' 🛛 Model_Keras_Chimney - Chimneys yes 🗸 🥃 Select) 🝥 CBVS 🗸 |
| Cross-line range 300 🜩 1250 🖨 | Output 'Confidence' Model_Keras_Chimney - Confidence Select CBVS |
| Time range (ms) 0 🔃 1848 ≑ | Batch size 32 V |
| OK Cancel | Predict using |
| | Execute in Batch 🔅 Options |
| | Run 🔇 Close 👔 |

QC results: display the predicted Chimney Yes probability 3D cube

- **22.** Right Click on the: Scene > Inline > Add and select Data.
- **23.** Select the predicted 3D Chimney location probability (e.g. Chimney_yes), and overlay the seismic (e.g. 1 Original Seismic).

Modify the Inline number to be within the input range.

24. Right-click on the Inline number, and Type in the Inline field: In-line 690 + .

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