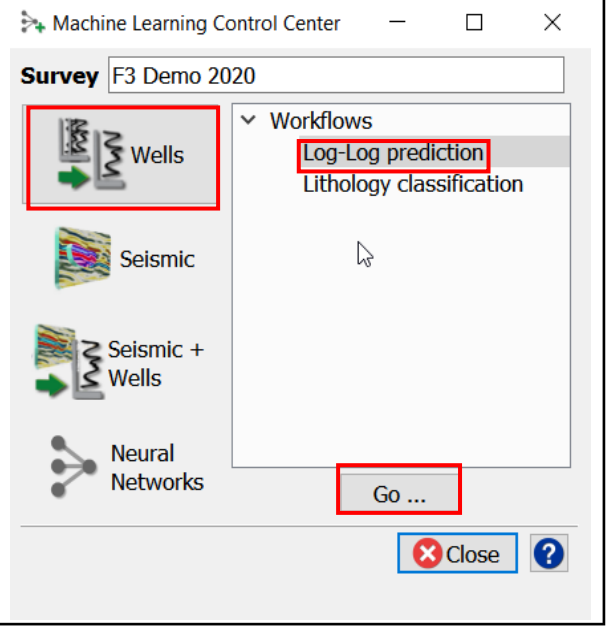
Exercise objective:

To predict missing logs using the log-log prediction tool, which is part of the machine learning plugin. In this case, we want to predict the Density log.

Well data Preparation
Well(s) need to be available in the survey. If they are not: **import** wells (track, logs, markers, optionally time-depth curve or checkshot).

Workflow:

1. **Open** the Machine Learning Control Center with the  icon.
2. **Click** on Wells.
3. **Select** Log-Log prediction, and **Hit** Go.



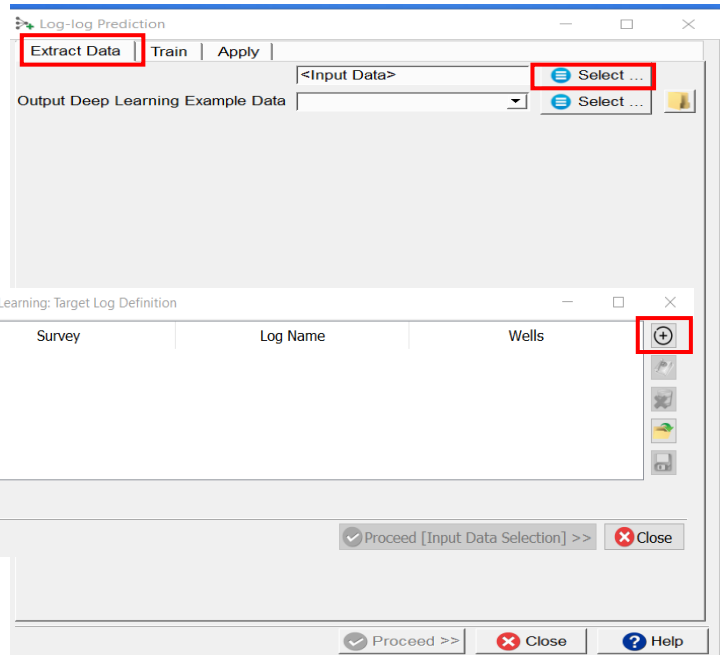
Workflow cont'd:

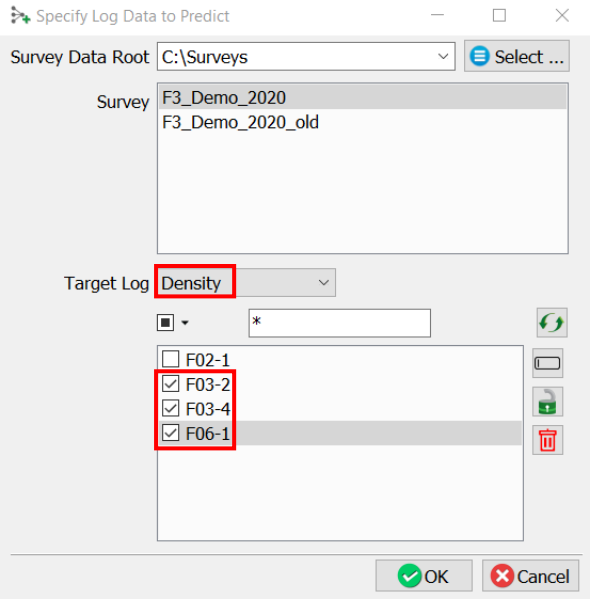
4. **Press** Select - Input Data in the ''Log-log prediction'' window. **Select**  icon in the ''Target Log Definition''.

5. In the *"Specify Log Data to predict" window,* **Select** *Survey**, *Target Log (e.g. Density)*, and the *Wells that will be used for the data extraction.*

> The well F02-1 is not selected, and will be used as a blind well.

6. **Press** OK.



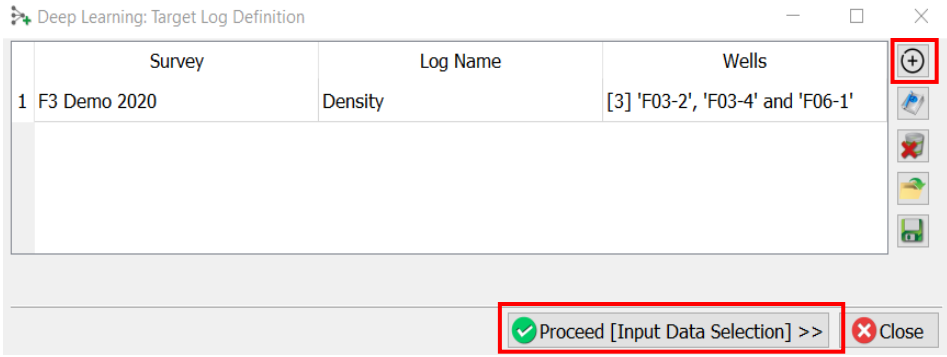


* The option to select data from other surveys is available only in commercial projects

Workflow cont'd:

7. "Deep Learning: Target Log definition" window pops up.

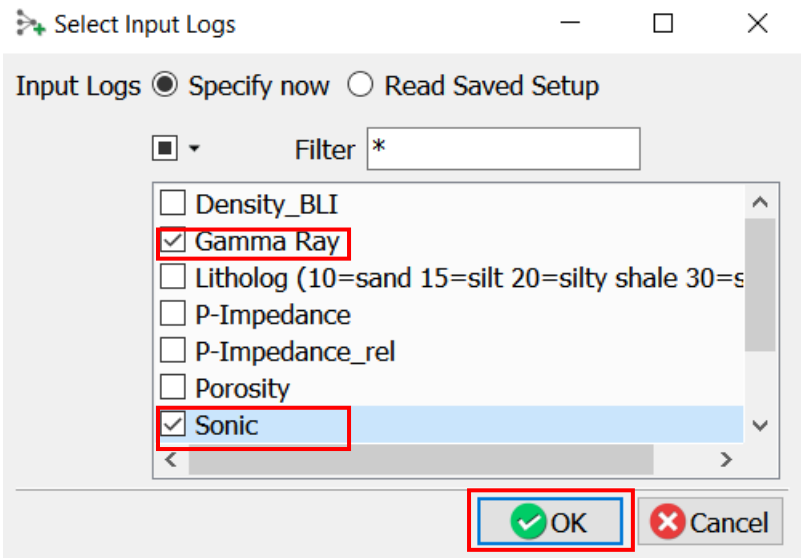
A new data from different survey* can be added by clicking on ⊕ icon.



8. **Press** Proceed [Input Data Selection].

9. In the "Select Input Logs" window, **Select** logs that will be used to predict 'Density' log (e.g. *Sonic, Gamma Ray).*

10. **Press** OK.



* The option to select data from other surveys is available only in commercial projects

Workflow cont'd:

11. *"Input Log Selection"* window pops up.

Input Logs can be modified in here. Keep the default parameters as indicated in this window.

12. Type a new name for the *Output Deep Learning Example Data (e.g. DL_Example_Density_st10).*

13. Press Proceed.

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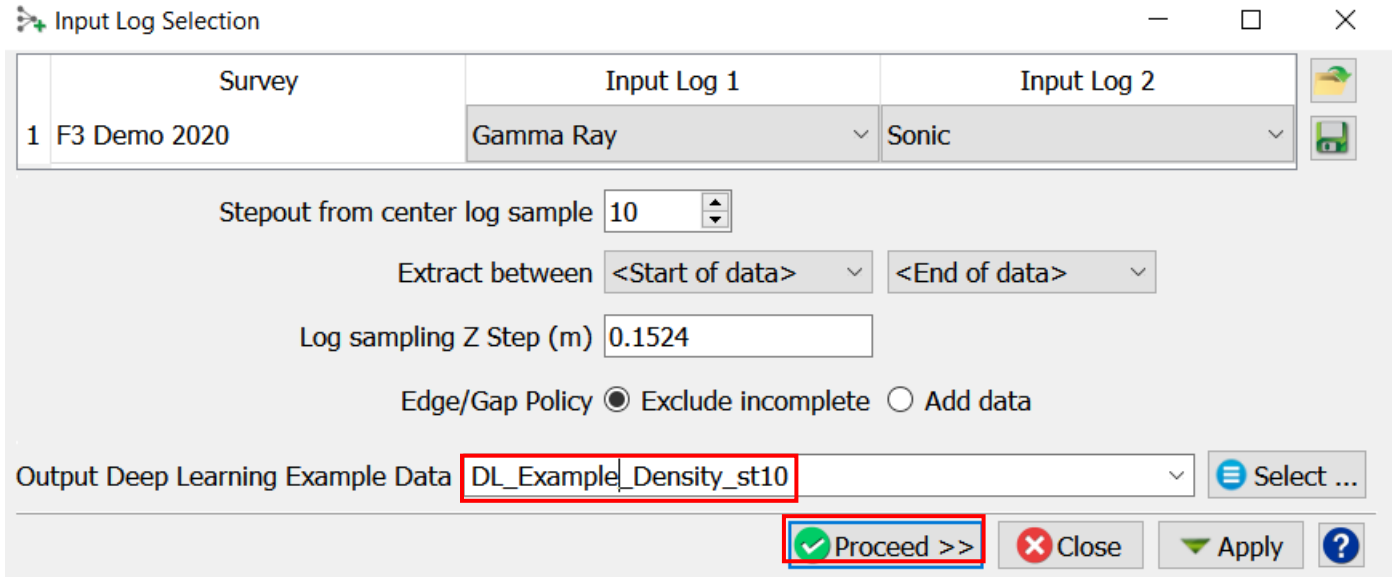


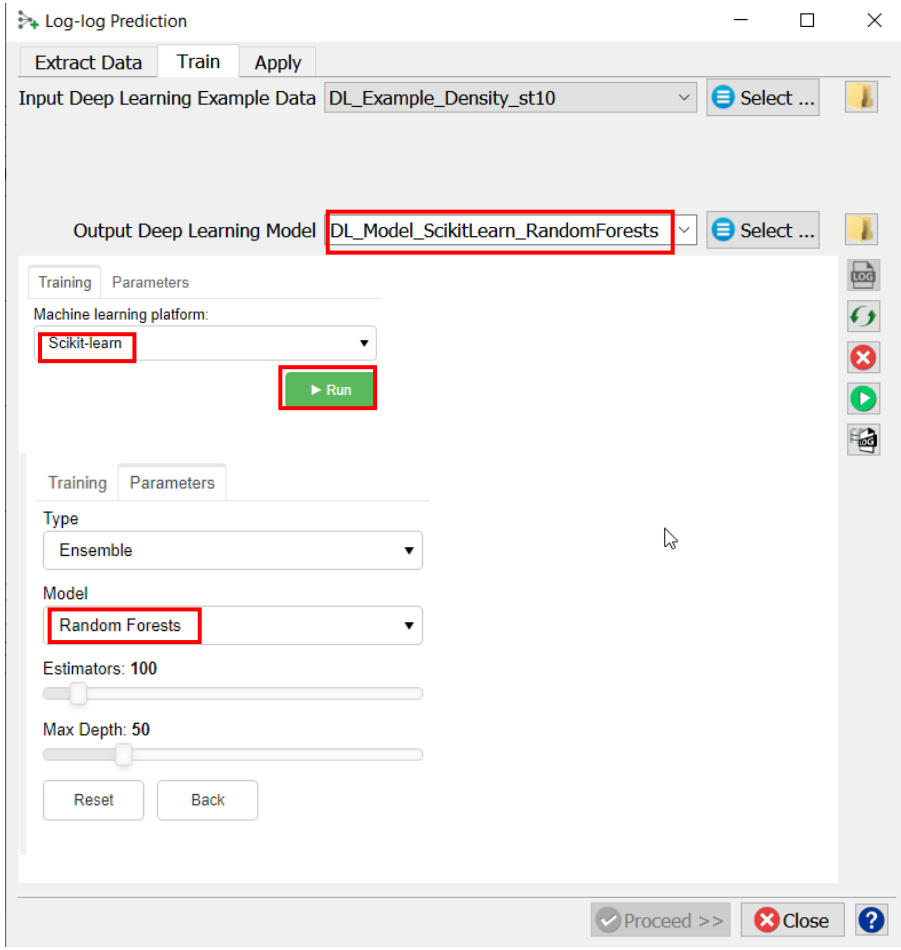
Workflow cont'd:

14. The *Train* tab get activated. Train the extracted examples data using suitable learning algorithm. Keep the defaults parameters, ''Scikit-learn'' platform and ''Random Forest'' Model.

> Different machine learning platforms and parameters can be tested.

15. **Specify** a new *Output mode*l name (e.g. DL_Model_ScikitLearn_RandomForests).

16. **Press** Run.

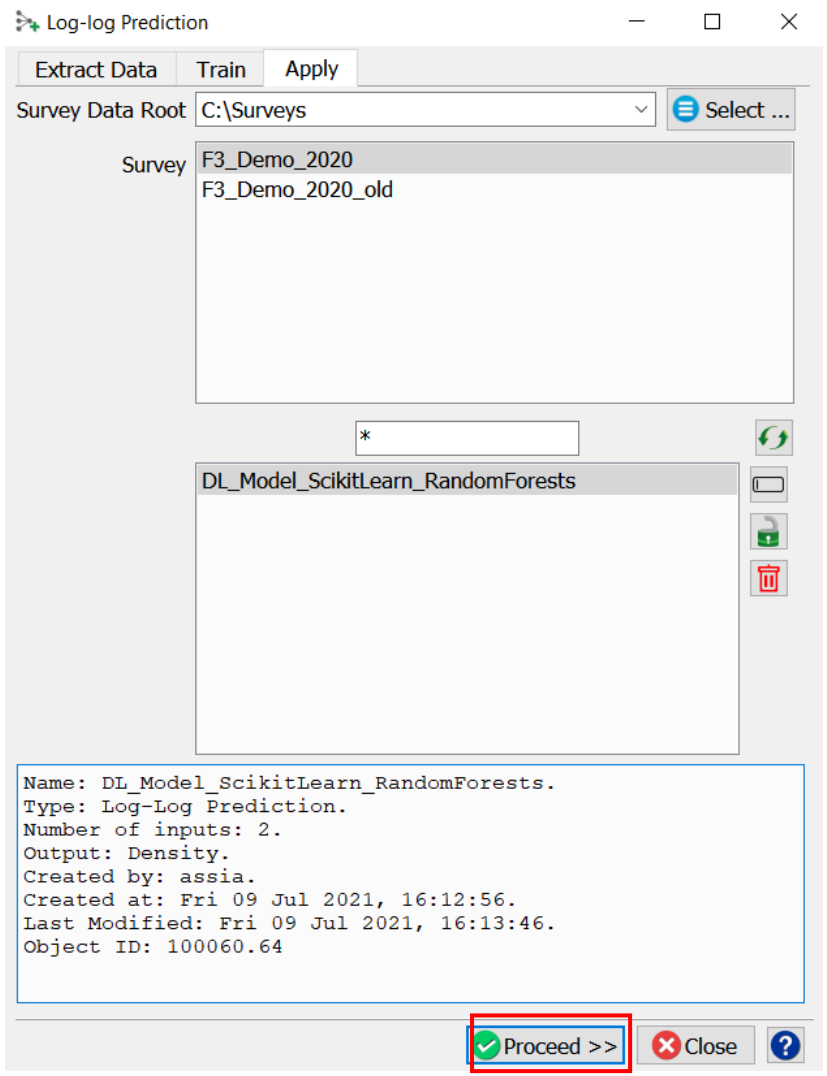


Workflow cont'd:

17. **Press** "Apply'' tab
    Check all the selected default parameters are Ok.

*The Survey and Training model can be modified in here.

18. **Press** Proceed.



* The option to select data from other surveys and training model is available only in commercial projects

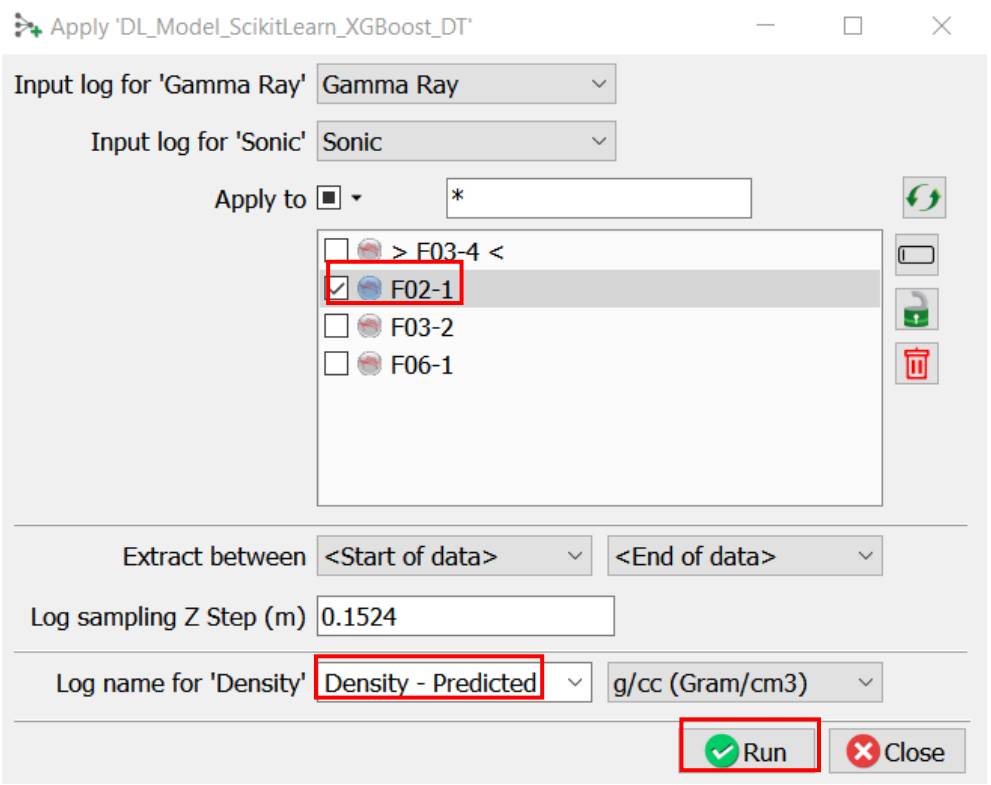
Workflow cont'd:

19. "Apply training model" window pops up.

20. Apply the trained model to a blind well. **Select** F02-1.

21. **Type** a new name for the predicted log (e.g. Density_Predicted).

22. Keep default parameters and **Press** Run to continue.



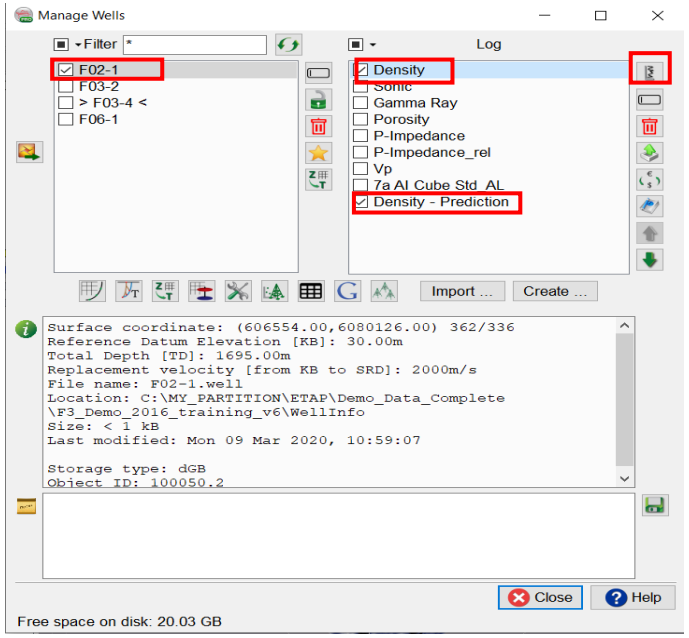
Workflow cont'd:

23. QC results by displaying the predicted log adjacent to the recorded log

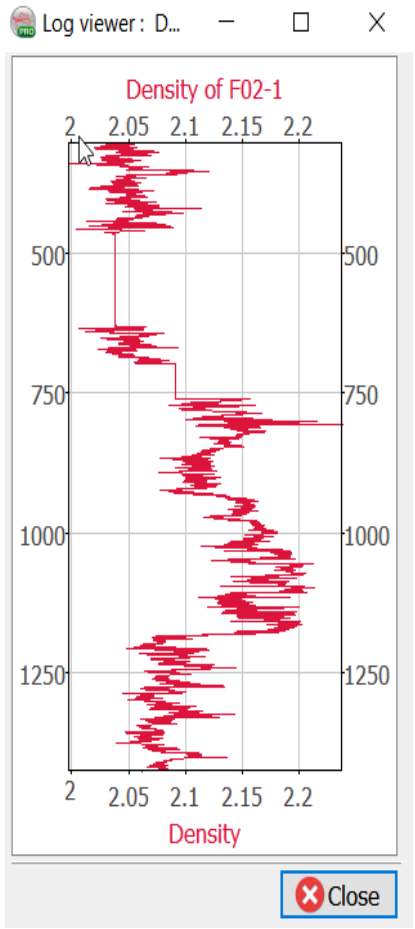
24. **Click** on the Well Manager icon .

25. **Select** the well ''F02-1'' and the logs ''Density'' and ''Density-Predicted''.

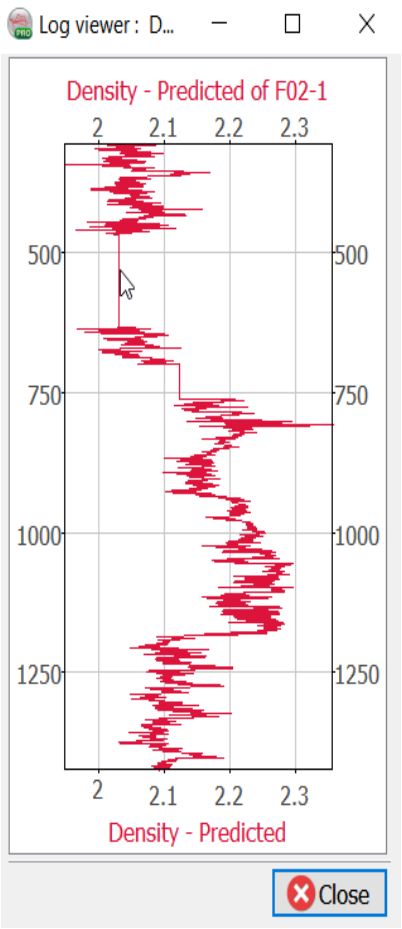
26. **Click** on view logs icon .



Density



Density-Predicted



Workflow cont'd:

If result is satisfactory, go back to the ''Apply training'' window, and apply the trained model to all the wells where you want to predict density log.

27. **Select** all wells.

28. **Type** a new name (e.g. Density_ Predicted). Keep default parameters and **Press** Run to continue.