**Instruction guide**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*the name of the program\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

% Lithology identification with wireline logs based on SDEM

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*the details of the manuscript\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

% Title：Lithology identification with wireline logs based on stacked-driven ensemble method for complex carbonate reservoirs

% Corresponding author: Yan Zhang

% Contact address: zhyan\_07@163.com

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Software and main libraries \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

% Program language: Python

% Anaconda3, JetBrains PyCharm 2019.1 x64

% sklearn (>=0.20), NumPy (>=1.8.2), SciPy (>= 0.13.3) and Matplotlib (>=3.0.0)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Source codes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

% Two files are mainly included, namely Base model and optimization.py and Litho\_SDEM.py.

% Base model and optimization.py -Mainly used for the optimization of parameters for the each base model used in the SDEM.

% Litho\_SDEM.py -the SDEM proposed of the paper.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Data files\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

% TrainSet.txt: training data for both two source files.

% TrainSet\_SVM\_TrainSets.txt: the output file for training sets of SVR method.

% TrainSet\_SVM\_TestSets.txt: the output file for testing sets of SVR method.

% TrainSet\_BP\_TrainSets.txt: the output file for training sets of BP method.

% TrainSet\_BP\_TestSets.txt: the output file for testing sets of BP method.

% TrainSet\_DT\_TrainSets.txt: the output file for training sets of DT method.

% TrainSet\_DT\_TestSets.txt: the output file for testing sets of DT method.

% Pic\_testCM\_SVR.jpg: confusion matrix for SVR method.

% Pic\_testCM\_BP.jpg: confusion matrix for BP method.

% Pic\_testCM\_DT.jpg: confusion matrix for DT method.

% Pic\_testCM\_SDEM.jpg: confusion matrix for SDEM method (proposed method).

% STACK\_CV.txt: the results of 10 folds cross validation for each base model and SDEM.

% Well1.txt: the input file of case1 for the proposed paper.

% CM\_Well1.txt: the evaluation result of case1 for different method.

% Well1\_pre.txt: the prediction result of case1 for different method.

% Well2.txt: the input file of case2 for the proposed paper.

% CM\_Well2.txt: the evaluation result of case2 for different method.

% Well2\_pre.txt: the prediction result of case2 for different method.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*other description\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

(1) the start of Base model and optimization.py

if \_\_name\_\_ == '\_\_main\_\_':

depth1, x\_allData,y\_allLable = getData('TrainSet.txt')

(2) the start of Litho\_SDEM.py

if \_\_name\_\_ == '\_\_main\_\_':

depth1, x\_allData, y\_allLable = getData('TrainSet.txt')

model = StackingMethod(x\_allData, y\_allLable)