Select Rows — Thu Jul 26 18, 13:26:55

Data

Data instances: 1294
Features: 69
Meta attributes: 2
Condition: Permeability is defined

Matching data

Data instances: 371
Features: 61
Meta attributes: 2

Non-matching data

Data instances: 923
Features: 67
Meta attributes: 2

Feature Constructor — Thu Jul 26 18, 13:27:07

Constructed features

LogCoercivity: log(Coercivity) (numeric)
LogPermeability: log(Permeability) (numeric)

Select Columns — Thu Jul 26 18, 13:27:13

Input data

Features: Total SiCAl, Total BP, Total GaGe, Total Late Transition, Total Early Transition, Relative to Fe SiCAl, Relative to Fe BP, Relative to Fe GaGe, Relative to Fe Early, Relative to Fe Late, Relative to Late Early, Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Relative to Late BP, Relative to Late GaGe, Late Weighted Volume, Late Weighted Area, Late Weighted Mass, Late Mean Electrons, Early Weighted Volume, Early Weighted Area, Early Weighted Mass, Early Mean Electrons, Delta T0, Delta T1, Delta T2, Fe, Si, C, Al, B, P, Ge, Cu, Ag, Au, Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, W, Annealing temperature (K), Annealing Time (s), Primary Crystallization Peak (K), Secondary Crystallization Peak (K), Longitudinal Annealing field, Transverse Annealing field, Ribbon Thickness (um), Coercivity, Curie Temp, Core Loss, Electrical Resistivity, Permeability, Magnetostriction, Magnetic Saturation, Grain Diameter, LogCoercivity, LogPermeability (total: 63 features)
Meta attributes: Composition ID, Reference DOI

Output data

Features: Fe, Cu, Nb, Annealing temperature (K), Annealing Time (s), Ribbon Thickness (um), Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Early Weighted Volume, Early Mean Electrons (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: LogPermeability

Removed: 51 (Ta, Relative to Late Early, Ge, Electrical Resistivity, LogCoercivity, Late Weighted Volume, Relative to Fe GaGe, Delta T1, Delta T0, B, Early Weighted Area, Ag, Relative to Fe SiCAl, Relative to Fe Late, V, Late Weighted Mass, Delta T2, Relative to Late BP, Al, Early Weighted Mass, Zr, Mo, Core Loss, Total BP, Total SiCAl, W, Magnetostriction, Coercivity, P, Grain Diameter, Primary Crystallization Peak (K), Total Early Transition, Relative to Fe BP, Total Late Transition, Late Weighted Area, Relative to Fe Early, Permeability, Secondary Crystallization Peak (K), Late Mean Electrons, Hf, Magnetic Saturation, Ti, Longitudinal Annealing field, Transverse Annealing field, Curie Temp, Relative to Late GaGe, Si, C, Au, Total GaGe, Cr)

Preprocess — Thu Jul 26 18, 13:27:20

Settings

Normalize Features: Center by Median, Scale by SD

Test & Score

Thu Jul 26 18, 13:27:29

Settings

Sampling type: Stratified 20-fold Cross validation

Scores

Method	MSE	RMSE	MAE	R2
kNN	1.464	1.210	0.695	0.547
Tree	1.917	1.384	0.804	0.407
SVM	2.849	1.688	1.242	0.118
Random Forest	1.343	1.159	0.745	0.584
Neural Network	1.836	1.355	0.913	0.431
Linear Regression	2.876	1.696	1.279	0.110

Tree

Thu Jul 26 18, 13:28:10

Name: Tree

Model parameters

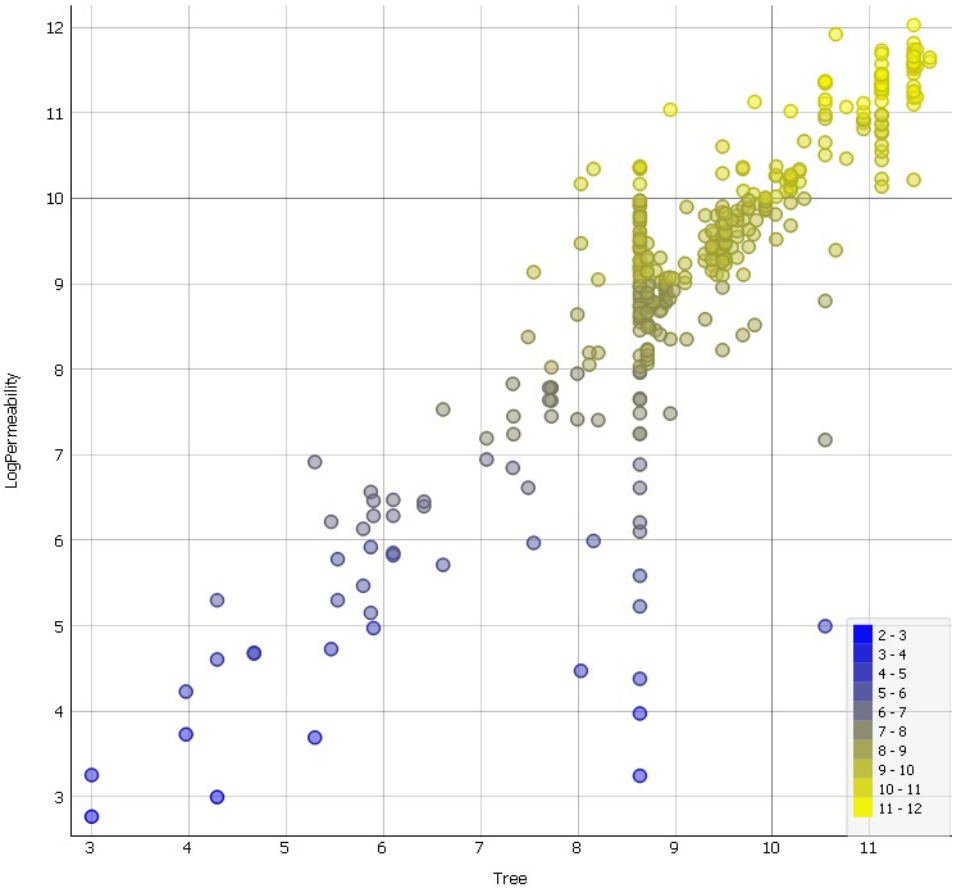
Pruning: at least two instances in leaves, at least four instances in internal nodes, maximum depth 8
Splitting: Stop splitting when majority reaches 95% (classification only)
Binary trees: Yes

Data

Data instances: 371
Features: Fe, Cu, Nb, Annealing temperature (K), Annealing Time (s), Ribbon Thickness (um), Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Early Weighted Volume, Early Mean Electrons (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: LogPermeability

Scatter Plot

Thu Jul 26 18, 13:28:18



Color: LogPermeability

Random Forest — Thu Jul 26 18, 13:28:25

Name: Random Forest

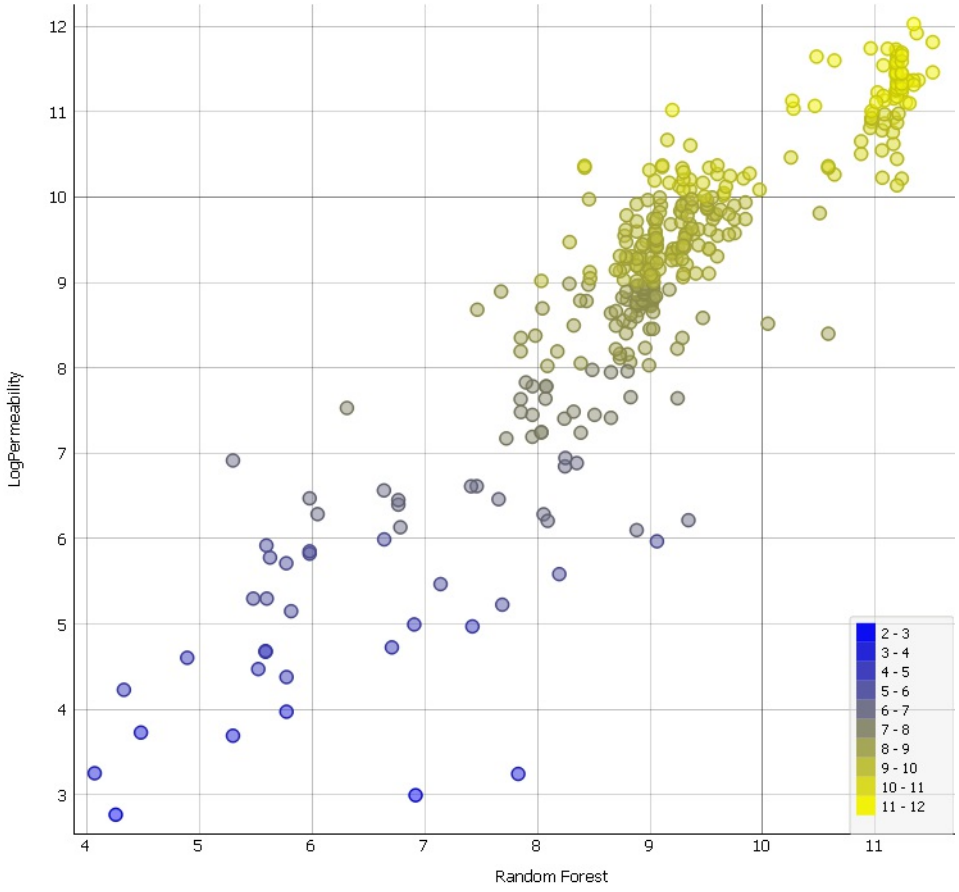
Model parameters

Number of trees: 10
Maximal number of considered features: unlimited
Fixed random seed: 3
Maximal tree depth: 8
Stop splitting nodes with maximum instances: 4

Data

Data instances: 371
Features: Fe, Cu, Nb, Annealing temperature (K), Annealing Time (s), Ribbon Thickness (um), Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Early Weighted Volume, Early Mean Electrons (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: LogPermeability

Scatter Plot — Thu Jul 26 18, 13:28:29



Color: LogPermeability

Linear Regression — Thu Jul 26 18, 13:28:32

Name: Linear Regression

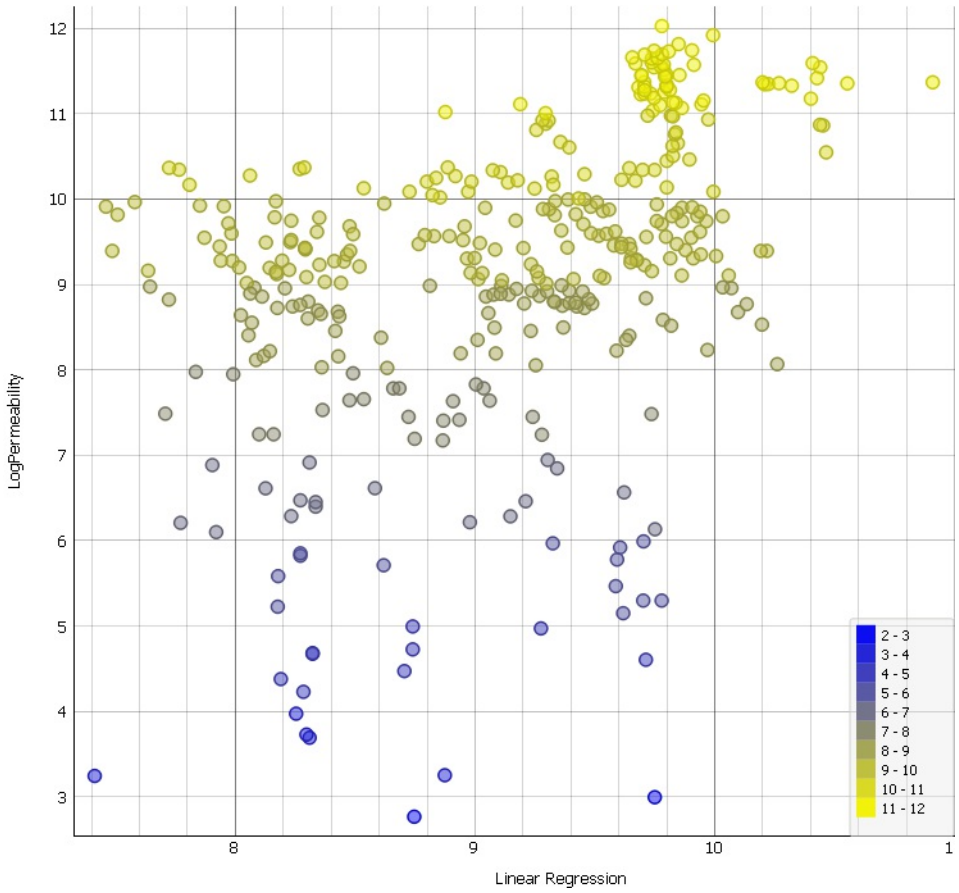
Model parameters

Regularization: No Regularization

Data

Data instances: 371
Features: Fe, Cu, Nb, Annealing temperature (K), Annealing Time (s), Ribbon Thickness (um), Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Early Weighted Volume, Early Mean Electrons (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: LogPermeability

Scatter Plot — Thu Jul 26 18, 13:28:39



Color: LogPermeability

kNN — Thu Jul 26 18, 13:28:46

Name: kNN

Model parameters

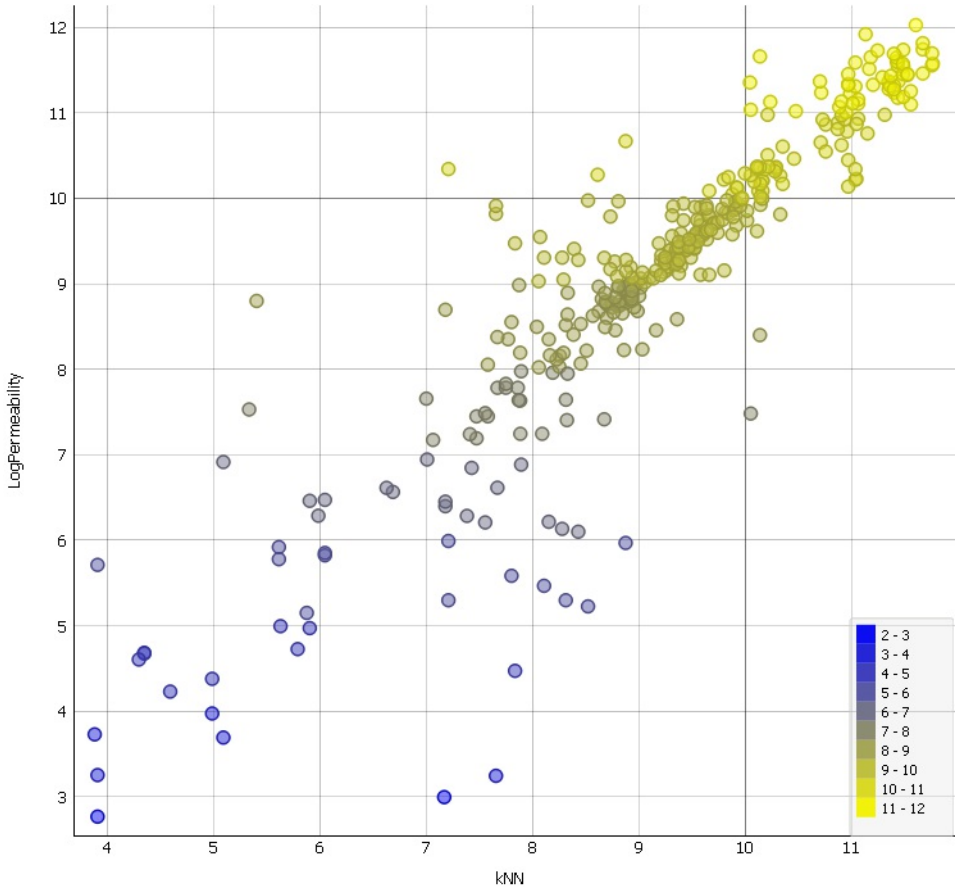
Number of neighbours: 3
Metric: Euclidean
Weight: Uniform

Data

Data instances: 371
Features: Fe, Cu, Nb, Annealing temperature (K), Annealing Time (s), Ribbon Thickness (um), Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Early Weighted Volume, Early Mean Electrons (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: LogPermeability

Scatter Plot

Thu Jul 26 18, 13:28:52



Color: LogPermeability

Neural Network

Thu Jul 26 18, 13:29:00

Name: Neural Network

Model parameters

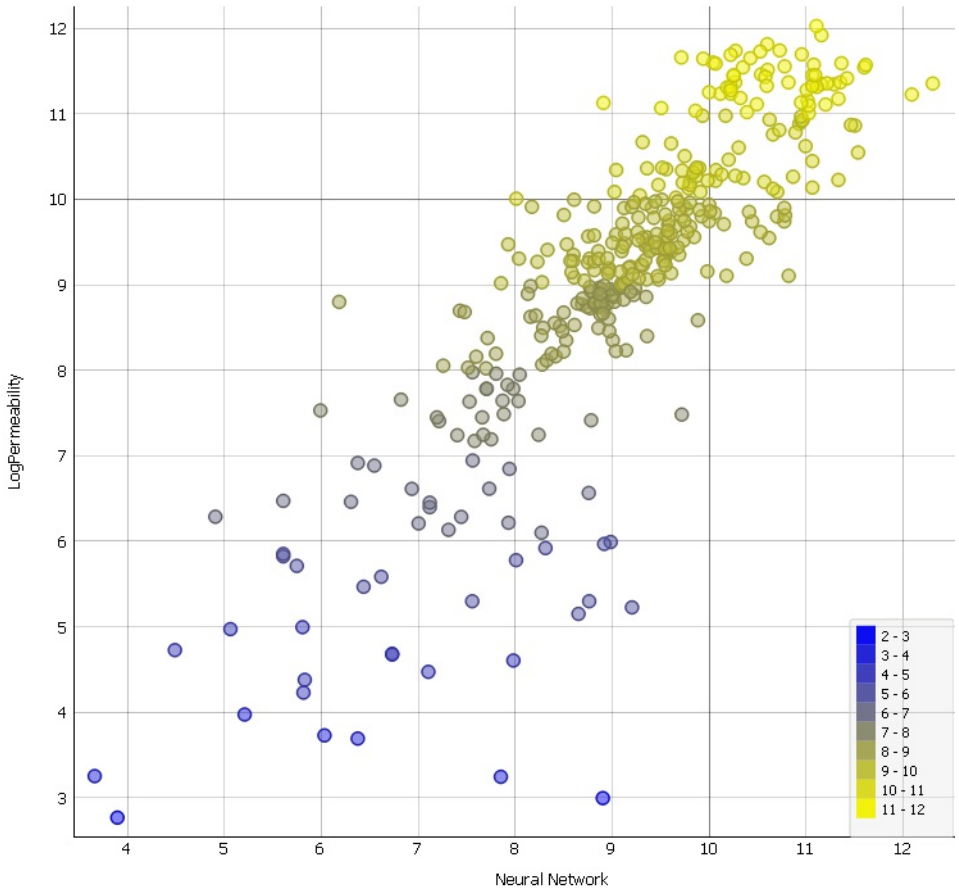
Hidden layers: 40, 20, 10
Activation: ReLu
Solver: Adam
Alpha: 1.0
Max iterations: 5000

Data

Data instances: 371
Features: Fe, Cu, Nb, Annealing temperature (K), Annealing Time (s), Ribbon Thickness (um), Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Early Weighted Volume, Early Mean Electrons (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: LogPermeability

Scatter Plot

Thu Jul 26 18, 13:29:05



Color: LogPermeability

SVM

Thu Jul 26 18, 13:29:11

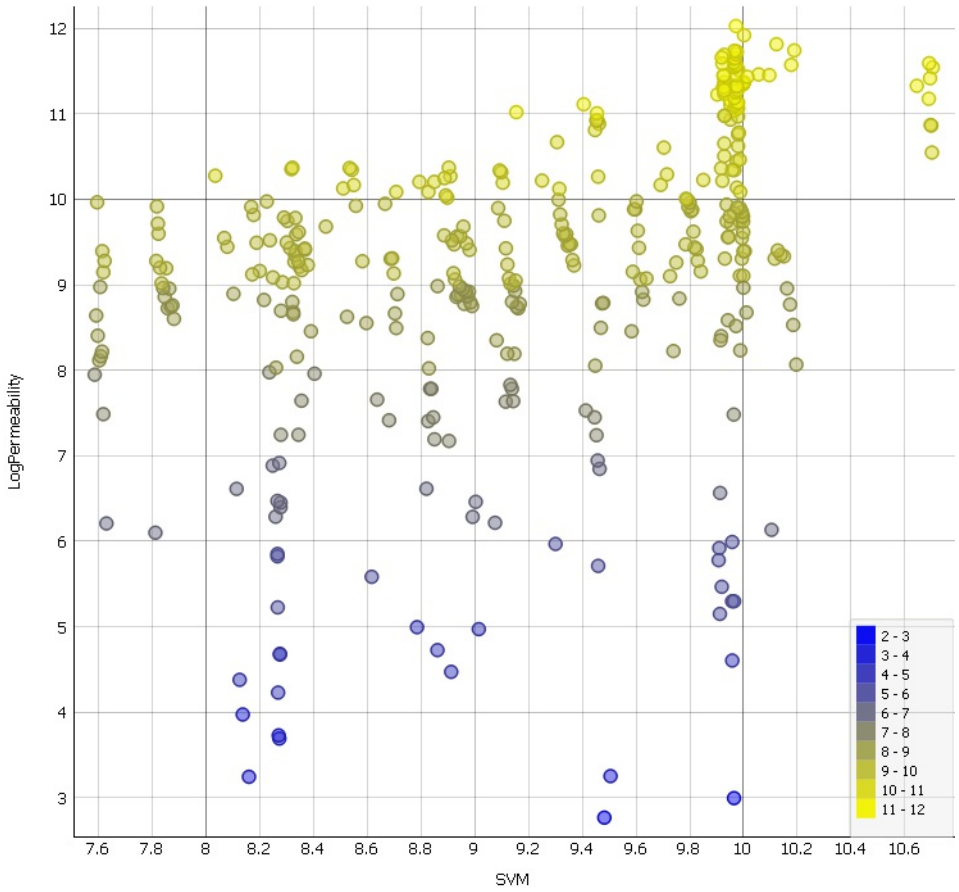
Name: SVM

Model parameters

SVM type: ν-SVM, ν=0.35, C=1.8000000000000003
Kernel: Linear
Numerical tolerance: 0.001
Iteration limt: 5000

Data

Data instances: 371
Features: Fe, Cu, Nb, Annealing temperature (K), Annealing Time (s), Ribbon Thickness (um), Relative to Early SiCAl, Relative to Late SiCAl, Relative to Early BP, Early Weighted Volume, Early Mean Electrons (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: LogPermeability



Color: LogPermeability