Select Rows — Thu Jul 26 18, 13:46:46

Data

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

Matching data

Data instances: 203
Features: 49
Meta attributes: 2

Non-matching data

Data instances: 1091
Features: 68
Meta attributes: 2

Select Columns — Thu Jul 26 18, 13:46:52

Input data

Features: Total SiCAl, Total BP, Total Late Transition, Total Early Transition, Relative to Fe SiCAl, Relative to Fe BP, 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, 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, Al, B, P, Cu, Ag, Zr, Nb, Mo, Ta, W, Annealing temperature (K), Annealing Time (s), Primary Crystallization Onset (K), Primary Crystallization Peak (K), Secondary Crystallization Peak (K), Ribbon Thickness (um), Coercivity, Curie Temp, Electrical Resistivity, Permeability, Magnetostriction, Magnetic Saturation, Grain Diameter, LogCoercivity, LogPermeability (total: 51 features)
Meta attributes: Composition ID, Reference DOI

Output data

Features: Fe, Si, B, Zr, Nb, Ta, Annealing temperature (K), Relative to Fe BP, Relative to Early BP, Early Weighted Volume, Early Weighted Mass (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetostriction

Removed: 39 (W, Relative to Late Early, Cu, Coercivity, P, Grain Diameter, Primary Crystallization Peak (K), Electrical Resistivity, Late Weighted Volume, Delta T1, Total Early Transition, Relative to Early SiCAl, Delta T0, Total Late Transition, Early Weighted Area, Relative to Fe Early, Ag, Permeability, Ribbon Thickness (um), Relative to Fe SiCAl, Early Mean Electrons, Secondary Crystallization Peak (K), Relative to Fe Late, Late Mean Electrons, Late Weighted Mass, Delta T2, Annealing Time (s), Relative to Late SiCAl, Relative to Late BP, Al, Magnetic Saturation, Curie Temp, LogPermeability, LogCoercivity, Mo, Total BP, Total SiCAl, Primary Crystallization Onset (K), Late Weighted Area)

Preprocess — Thu Jul 26 18, 13:46:56

Settings

Normalize Features: Center by Median, Scale by SD

Test & Score — Thu Jul 26 18, 13:47:11

Settings

Sampling type: Stratified 20-fold Cross validation

Scores

Method	MSE	RMSE	MAE	R2
kNN	19.152	4.376	2.296	0.790
Tree	18.563	4.309	2.362	0.796
SVM	40.227	6.342	4.744	0.559
Random Forest	16.151	4.019	2.243	0.823
Neural Network	16.763	4.094	2.204	0.816
Linear Regression	36.849	6.070	4.689	0.596

Tree

Thu Jul 26 18, 13:47:32

Name: Tree

Model parameters

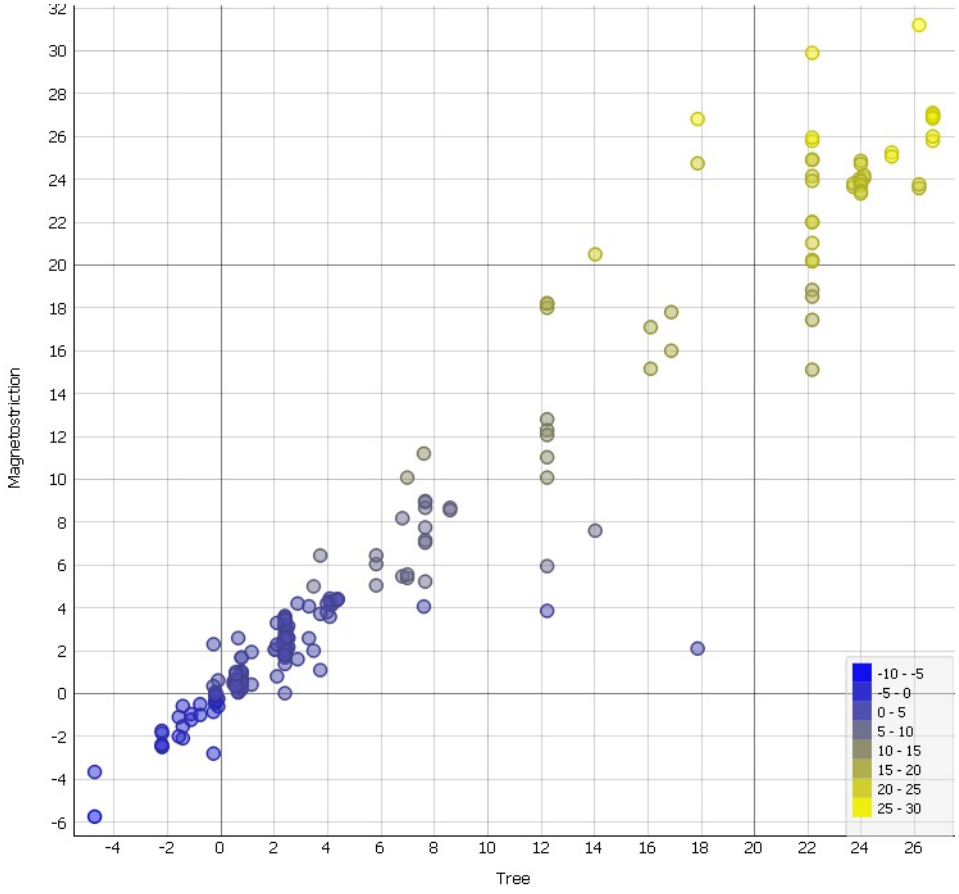
Pruning: at least two instances in leaves, at least four instances in internal nodes, maximum depth 7
Splitting: Stop splitting when majority reaches 95% (classification only)
Binary trees: Yes

Data

Data instances: 203
Features: Fe, Si, B, Zr, Nb, Ta, Annealing temperature (K), Relative to Fe BP, Relative to Early BP, Early Weighted Volume, Early Weighted Mass (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetostriction

Scatter Plot

Thu Jul 26 18, 13:48:31



Color: Magnetostriction

Random Forest

Thu Jul 26 18, 13:48:33

Name: Random Forest

Model parameters

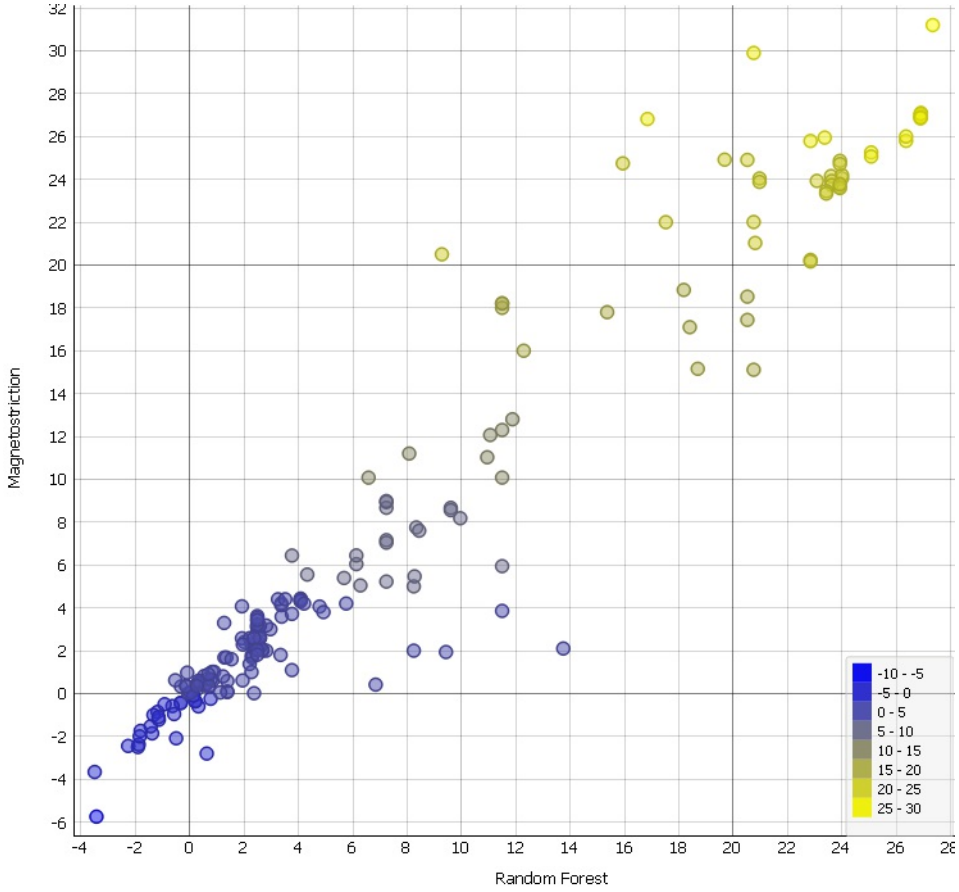
Number of trees: 9
Maximal number of considered features: unlimited
Fixed random seed: 1
Maximal tree depth: 7
Stop splitting nodes with maximum instances: 4

Data

Data instances: 203
Features: Fe, Si, B, Zr, Nb, Ta, Annealing temperature (K), Relative to Fe BP, Relative to Early BP, Early Weighted Volume, Early Weighted Mass (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetostriction

Scatter Plot

Thu Jul 26 18, 13:48:44



Color: Magnetostriction

Linear Regression

Thu Jul 26 18, 13:48:49

Name: Linear Regression

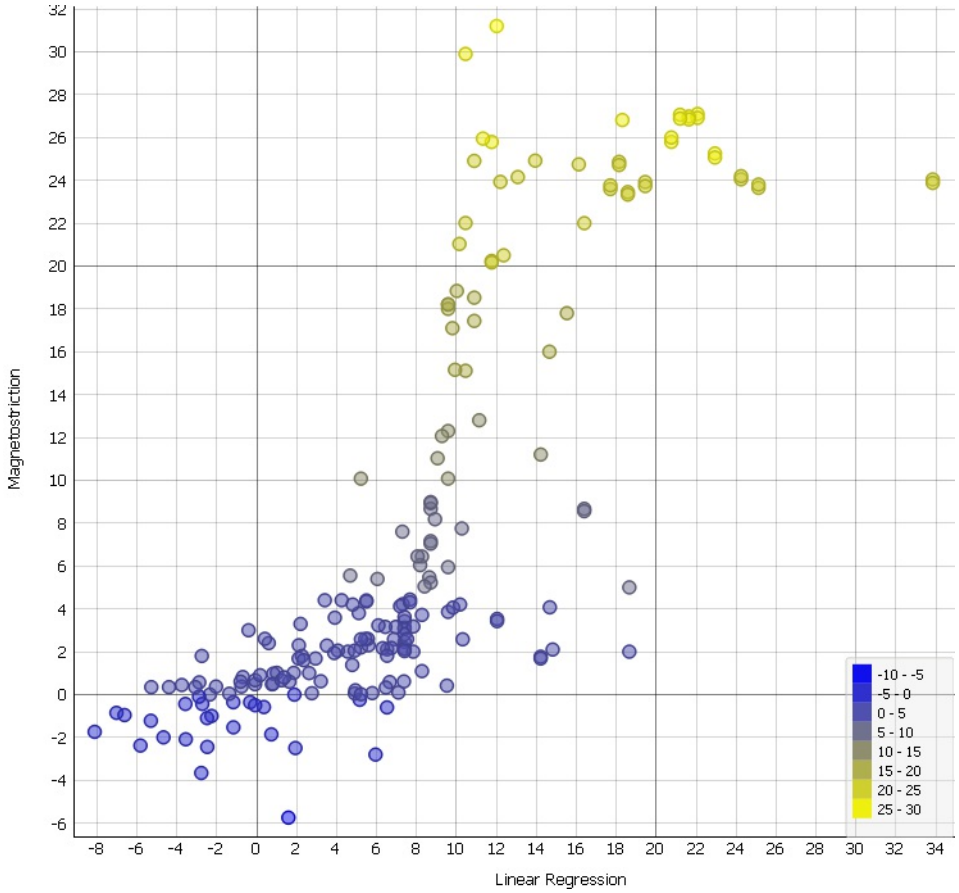
Model parameters

Regularization: No Regularization

Data

Data instances: 203
Features: Fe, Si, B, Zr, Nb, Ta, Annealing temperature (K), Relative to Fe BP, Relative to Early BP, Early Weighted Volume, Early Weighted Mass (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetostriction

Scatter Plot Thu Jul 26 18, 13:48:56



Color: Magnetostriction

kNN Thu Jul 26 18, 13:49:00

Name: kNN

Model parameters

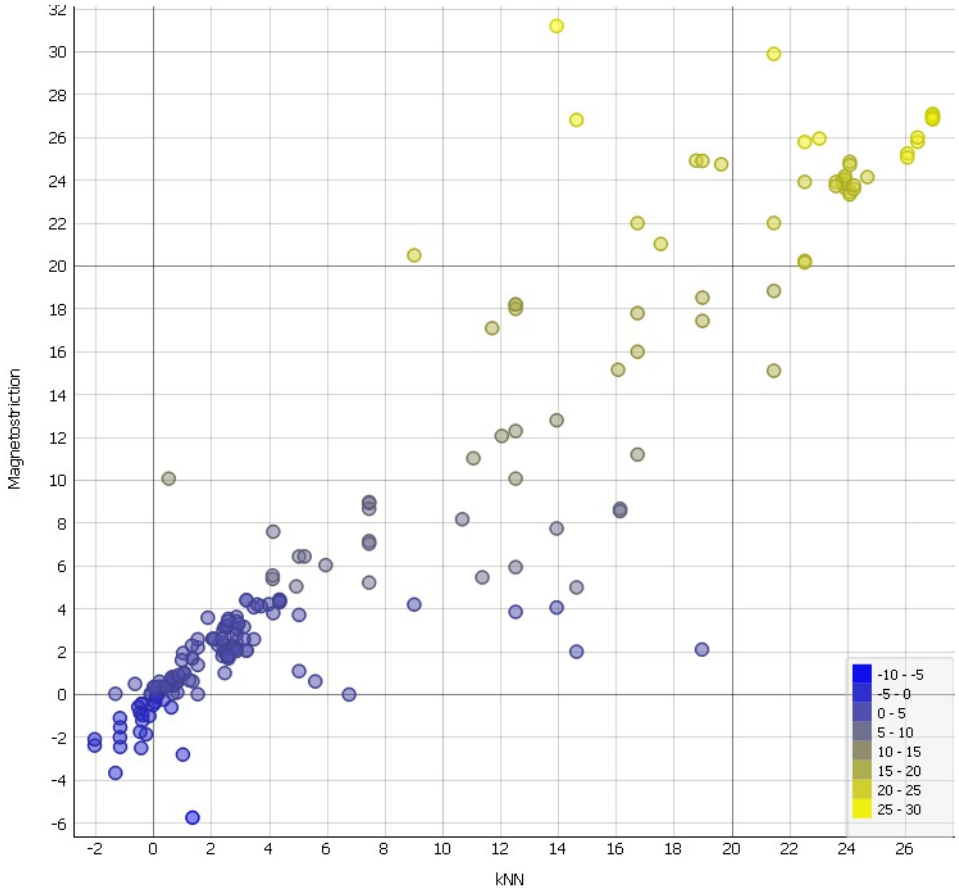
Number of neighbours: 4
Metric: Euclidean
Weight: Uniform

Data

Data instances: 203
Features: Fe, Si, B, Zr, Nb, Ta, Annealing temperature (K), Relative to Fe BP, Relative to Early BP, Early Weighted Volume, Early Weighted Mass (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetostriction

Scatter Plot

Thu Jul 26 18, 13:49:04



Color: Magnetostriction

Neural Network

Thu Jul 26 18, 13:52:22

Name: Neural Network

Model parameters

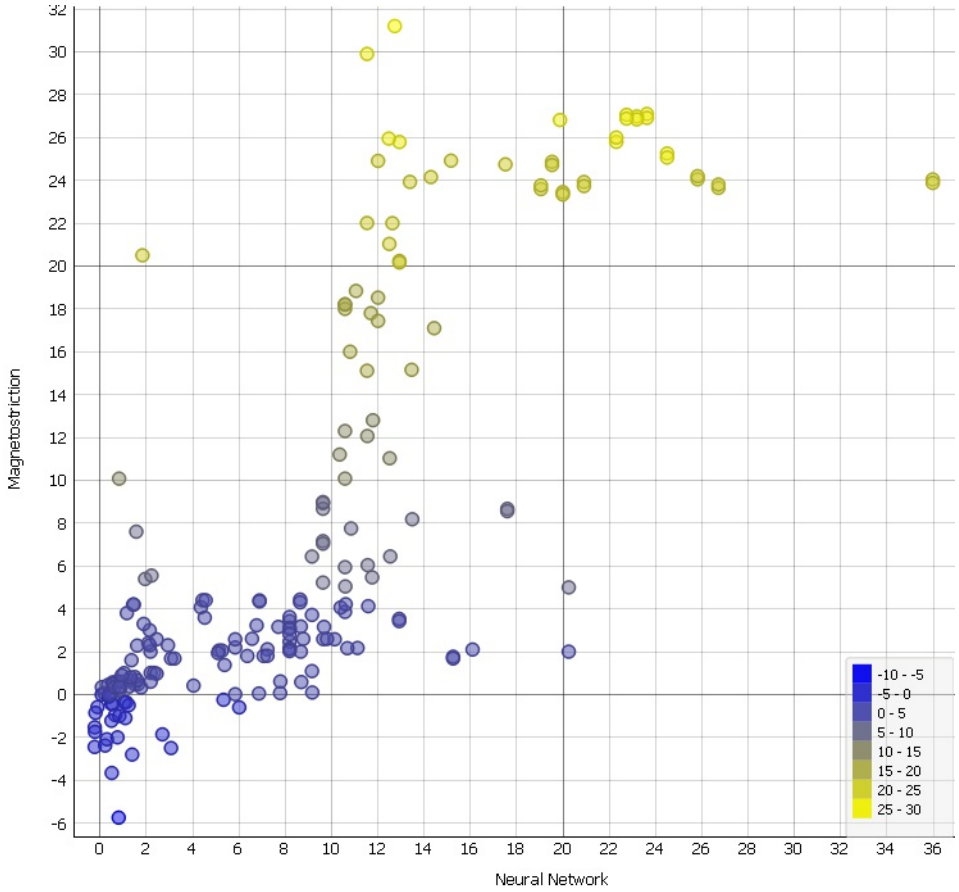
Hidden layers: 40, 20, 10
Activation: ReLu
Solver: Adam
Alpha: 1.0
Max iterations: 5000

Data

Data instances: 203
Features: Fe, Si, B, Zr, Nb, Ta, Annealing temperature (K), Relative to Fe BP, Relative to Early BP, Early Weighted Volume, Early Weighted Mass (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetostriction

Scatter Plot

Thu Jul 26 18, 13:52:31



Color: Magnetostriction

SVM

Thu Jul 26 18, 13:52:36

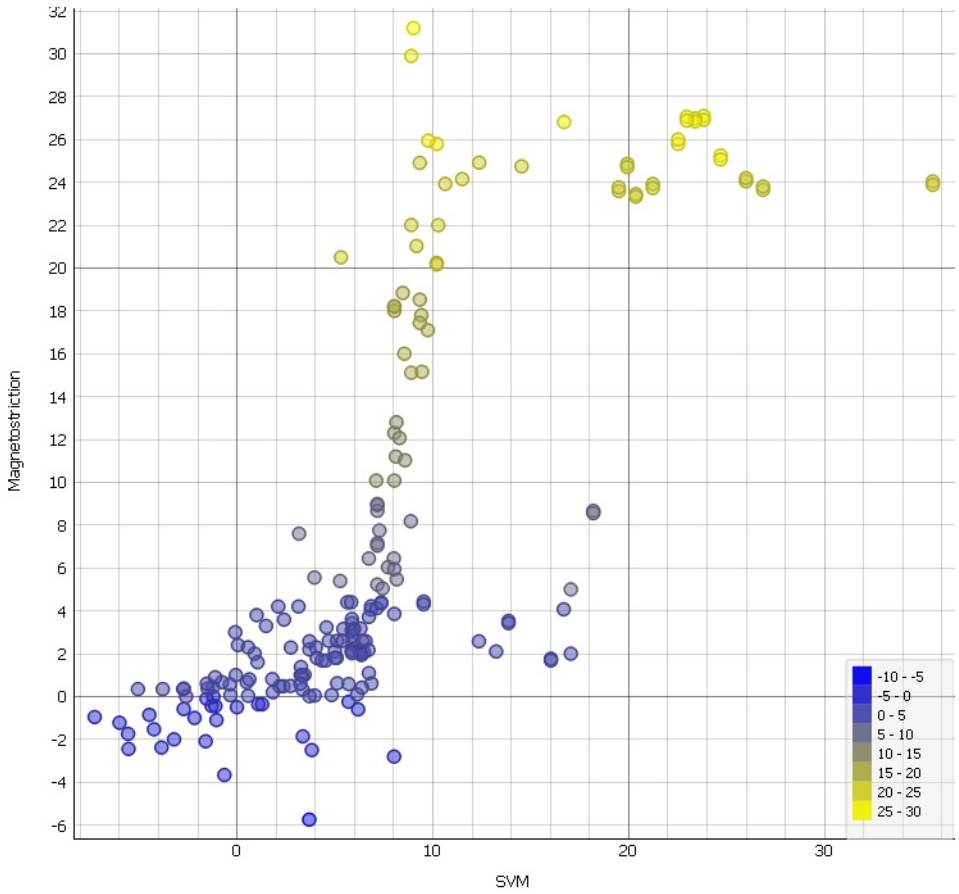
Name: SVM

Model parameters

SVM type: ν-SVM, ν=0.49999999999999994, C=2.600000000000001
Kernel: Linear
Numerical tolerance: 0.001
Iteration limt: 5000

Data

Data instances: 203
Features: Fe, Si, B, Zr, Nb, Ta, Annealing temperature (K), Relative to Fe BP, Relative to Early BP, Early Weighted Volume, Early Weighted Mass (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetostriction



Color: Magnetostriction