Data

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

Matching data

Data instances: 294
Features: 62
Meta attributes: 2

Non-matching data

Data instances: 1000
Features: 67
Meta attributes: 2

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 Early GaGe, 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, Ti, V, Zr, Nb, Mo, Hf, Ta, W, Ce, Annealing temperature (K), Annealing Time (s), Primary Crystallization Onset (K), 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, ... (total: 64 features)
Meta attributes: Composition ID, Reference DOI

Output data

Features: Fe, Si, B, P, Zr, Nb, Annealing temperature (K), Annealing Time (s), Secondary Crystallization Peak (K), Ribbon Thickness (um), Total BP (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetic Saturation

Removed: 52 (Ta, Relative to Late Early, Ge, Electrical Resistivity, Late Weighted Volume, Relative to Fe GaGe, Delta T1, Delta T0, Early Weighted Area, Ag, Relative to Fe SiCAl, Relative to Fe Late, V, Late Weighted Mass, Delta T2, Relative to Late SiCAl, Relative to Late BP, Al, Early Weighted Mass, Mo, Core Loss, Total SiCAl, Primary Crystallization Onset (K), W, Cu, Magnetostriction, Coercivity, Grain Diameter, Primary Crystallization Peak (K), Total Early Transition, Relative to Early SiCAl, Relative to Fe BP, Total Late Transition, Relative to Early BP, Relative to Fe Early, Relative to Early GaGe, Permeability, Early Mean Electrons, Late Mean Electrons, Hf, LogPermeability, Ti, Longitudinal Annealing field, LogCoercivity, Transverse Annealing field, Curie Temp, Relative to Late GaGe, Early Weighted Volume, C, Ce, Total GaGe, Late Weighted Area)

Settings

Normalize Features: Center by Median, Scale by SD

Settings

Sampling type: Stratified 20-fold Cross validation

Scores

Method	MSE	RMSE	MAE	R2
kNN	0.030	0.172	0.100	0.801
Tree	0.027	0.165	0.100	0.818
SVM	0.063	0.250	0.187	0.583
Random Forest	0.021	0.144	0.086	0.862
Neural Network	0.028	0.166	0.112	0.815
Linear Regression	0.064	0.254	0.192	0.571

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)
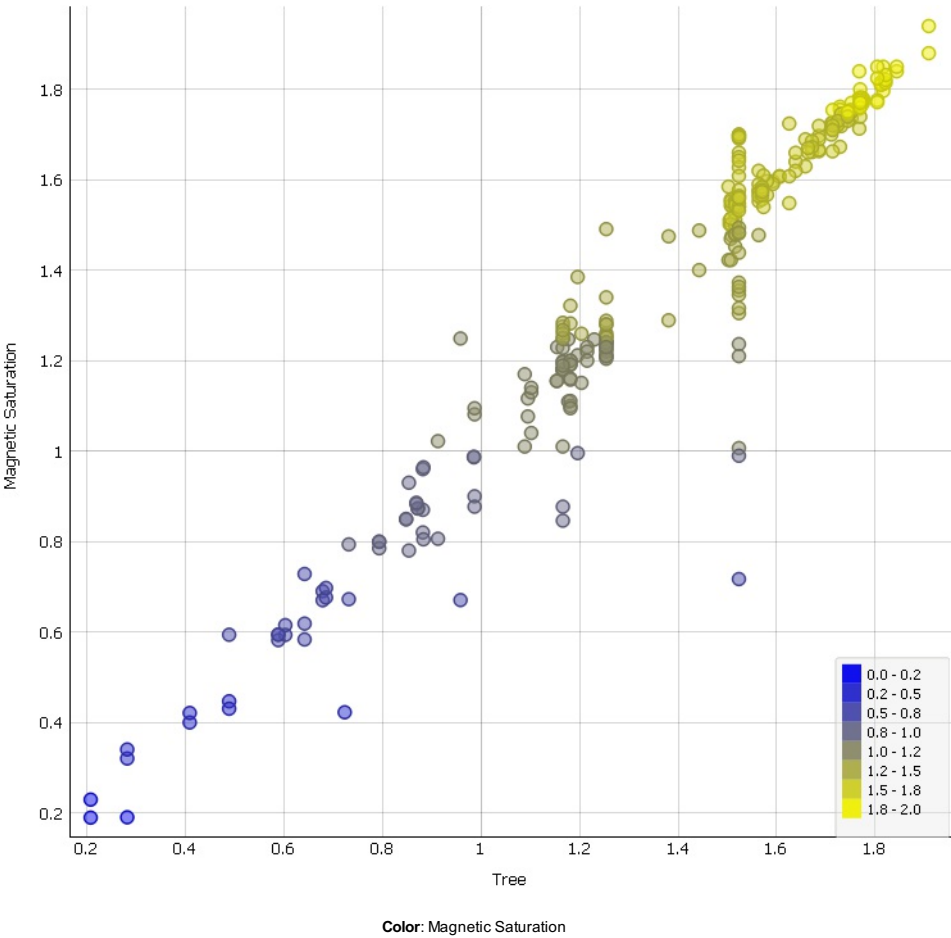**Binary trees:** Yes

Data

Data instances: 294
Features: Fe, Si, B, P, Zr, Nb, Annealing temperature (K), Annealing Time (s), Secondary Crystallization Peak (K), Ribbon Thickness (um), Total BP (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetic Saturation

Color: Magnetic Saturation

Name: Random Forest

Model parameters

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

Data

Data instances: 294
Features: Fe, Si, B, P, Zr, Nb, Annealing temperature (K), Annealing Time (s), Secondary Crystallization Peak (K), Ribbon Thickness (um), Total BP (total: 11 features)
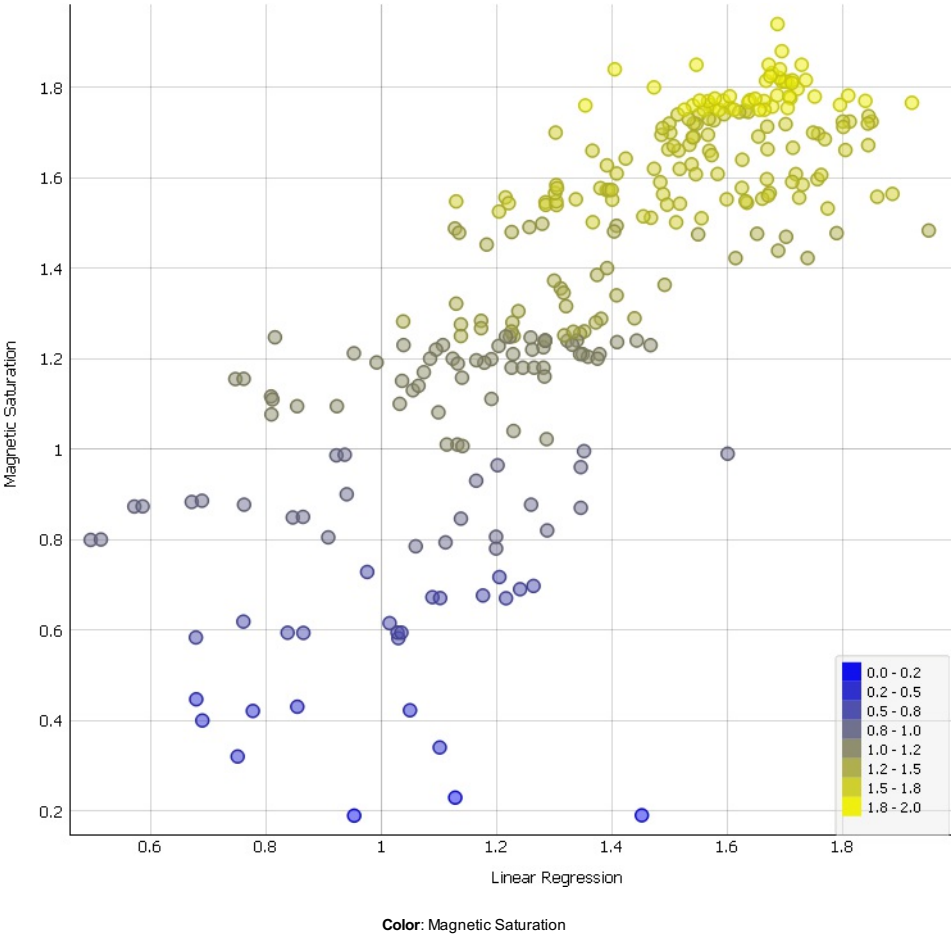**Meta attributes:** Composition ID, Reference DOI
Target: Magnetic Saturation

Color: Magnetic Saturation
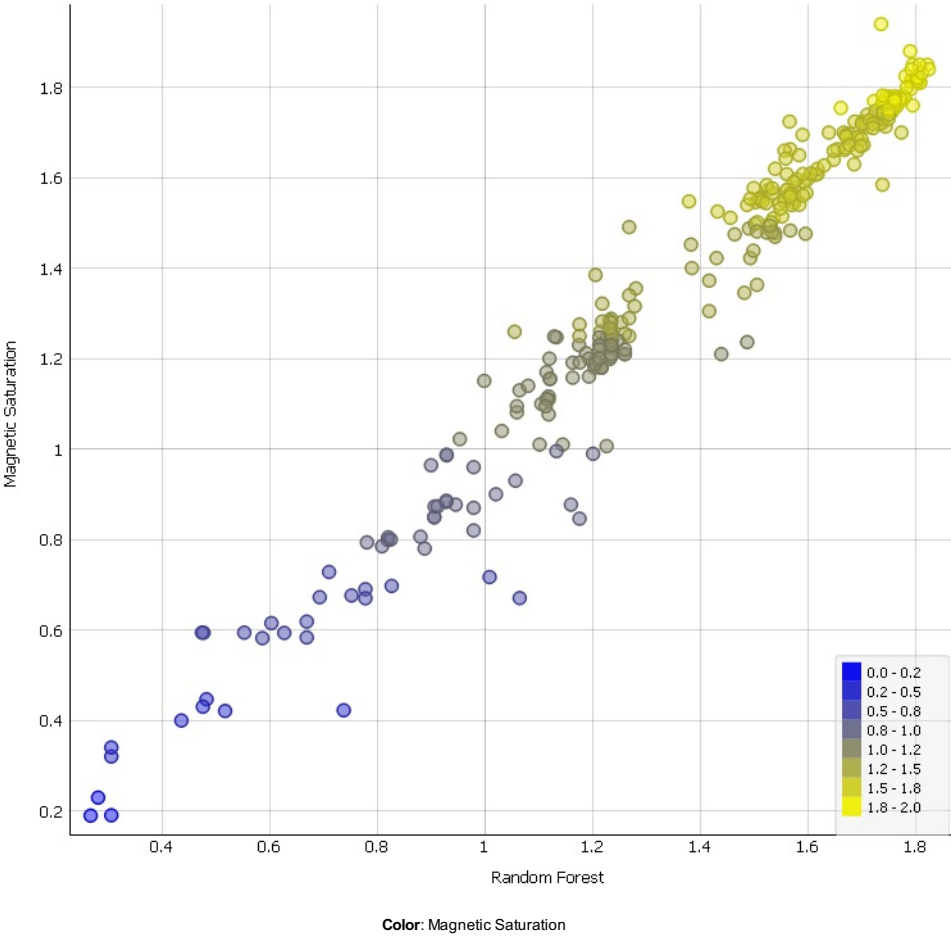
Name: Linear Regression

Model parameters

Regularization: No Regularization

Data

Data instances: 294
Features: Fe, Si, B, P, Zr, Nb, Annealing temperature (K), Annealing Time (s), Secondary Crystallization Peak (K), Ribbon Thickness (um), Total BP (total: 11 features)
**Meta attributes:** Composition ID, Reference DOI
Target: Magnetic Saturation

Color: Magnetic Saturation

Name: kNN

Model parameters

Number of neighbours: 3
Metric: Euclidean
Weight: Uniform

Data

Data instances: 294
Features: Fe, Si, B, P, Zr, Nb, Annealing temperature (K), Annealing Time (s), Secondary Crystallization Peak (K), Ribbon Thickness (um), Total BP (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetic Saturation

Color: Magnetic Saturation
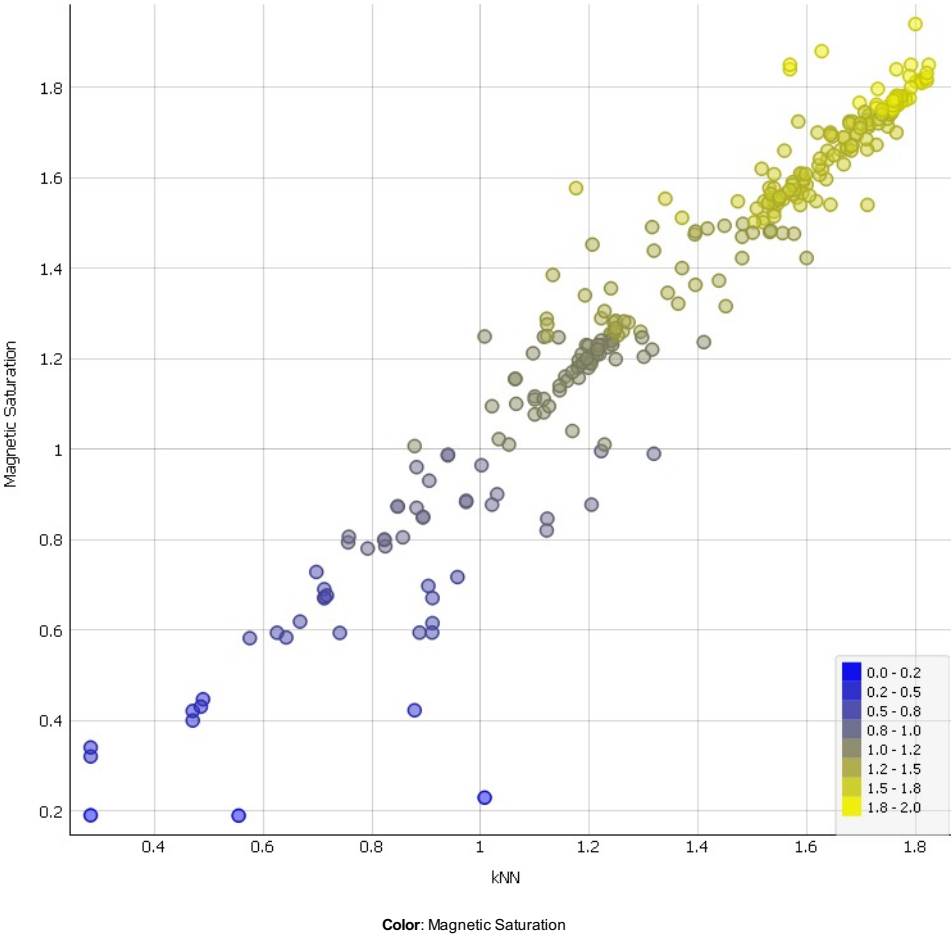
Name: Neural Network

Model parameters

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

Data

Data instances: 294
Features: Fe, Si, B, P, Zr, Nb, Annealing temperature (K), Annealing Time (s), Secondary Crystallization Peak (K), Ribbon Thickness (um), Total BP (total: 11 features)
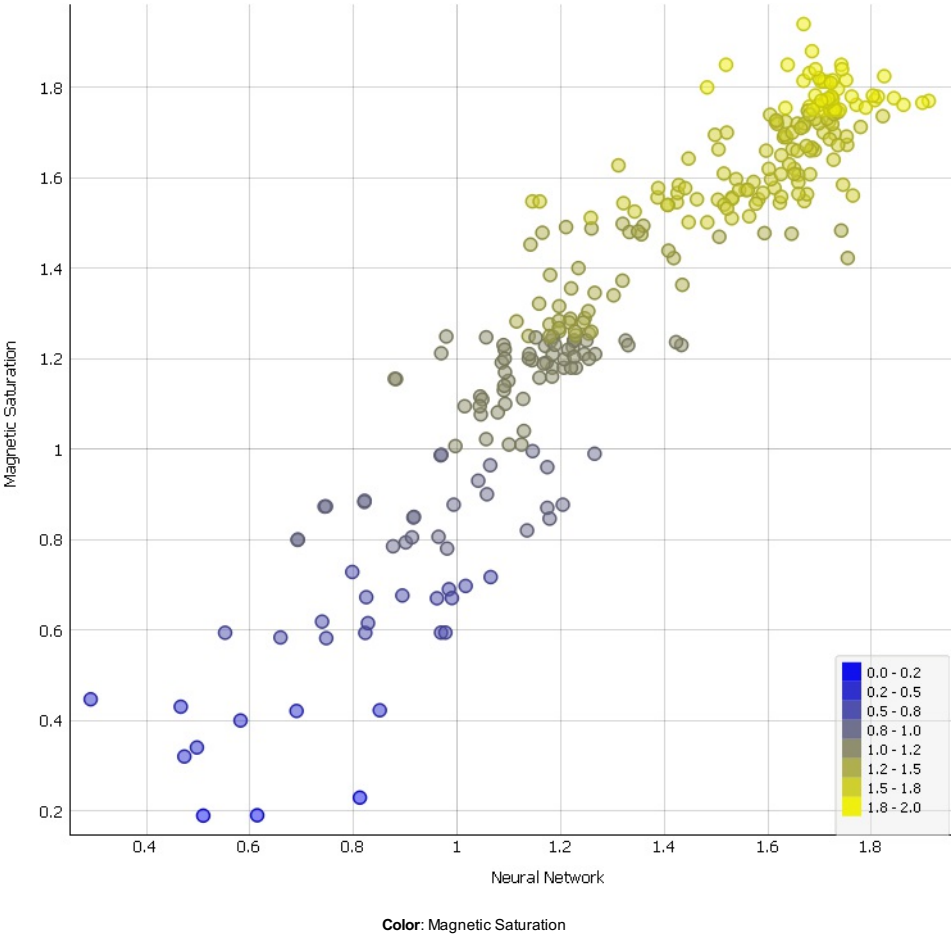**Meta attributes:** Composition ID, Reference DOI
Target: Magnetic Saturation

Color: Magnetic Saturation

Name: SVM

Model parameters

SVM type: ν-SVM, ν=0.35, C=0.8999999999999997
Kernel: Linear
Numerical tolerance: 0.001
Iteration limt: 5000

Data

Data instances: 294
Features: Fe, Si, B, P, Zr, Nb, Annealing temperature (K), Annealing Time (s), Secondary Crystallization Peak (K), Ribbon Thickness (um), Total BP (total: 11 features)
Meta attributes: Composition ID, Reference DOI
Target: Magnetic Saturation

Color: Magnetic Saturation