

Data

**Data instances:** 1294  
**Features:** 69  
**Meta attributes:** 2  
**Condition:** Grain Diameter is defined

Matching data

**Data instances:** 204  
**Features:** 54  
**Meta attributes:** 2

Non-matching data

**Data instances:** 1090  
**Features:** 66  
**Meta attributes:** 2

Input data

**Features:** Total SiCAI, Total BP, Total Late Transition, Total Early Transition, Relative to Fe SiCAI, Relative to Fe BP, Relative to Fe Early, Relative to Fe Late, Relative to Late Early, Relative to Early SiCAI, Relative to Late SiCAI, 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, Au, V, Cr, Zr, Nb, Mo, W, Pr, Gd, Annealing temperature (K), Annealing Time (s), Primary Crystallization Onset (K), Primary Crystallization Peak (K), Secondary Crystallization Peak (K), Ribbon Thickness (um), Coercivity, Curie Temp, Core Loss, Electrical Resistivity, Permeability, Magnetostriction, Magnetic Saturation, Grain Diameter, LogCoercivity, LogPermeability (total: 56 features)  
**Meta attributes:** Composition ID, Reference DOI

Output data

**Features:** Fe, Si, B, Nb, Annealing temperature (K), Ribbon Thickness (um), Relative to Late SiCAI, Relative to Early BP  
**Meta attributes:** Composition ID, Reference DOI  
**Target:** Grain Diameter

**Removed:** 47 (W, Relative to Late Early, Cu, Magnetostriction, Coercivity, P, LogPermeability, Cr, Primary Crystallization Peak (K), Electrical Resistivity, Late Weighted Volume, Delta T1, Total Early Transition, Relative to Early SiCAI, Relative to Fe BP, Delta T0, Total Late Transition, Early Weighted Area, Relative to Fe Early, Ag, Gd, Permeability, Relative to Fe SiCAI, Early Mean Electrons, Secondary Crystallization Peak (K), Relative to Fe Late, V, LogCoercivity, Late Mean Electrons, Late Weighted Mass, Delta T2, Annealing Time (s), Relative to Late BP, Al, Pr, Magnetic Saturation, Early Weighted Mass, Curie Temp, Zr, Mo, Core Loss, Early Weighted Volume, Total BP, Au, Total SiCAI, Primary Crystallization Onset (K), 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	49.587	7.042	3.766	0.560
Tree	50.721	7.122	3.826	0.550
SVM	73.781	8.590	4.964	0.346
Random Forest	31.158	5.582	3.148	0.724
Neural Network	62.235	7.889	4.335	0.448
Linear Regression	73.987	8.602	5.450	0.344

Name: Tree

Model parameters

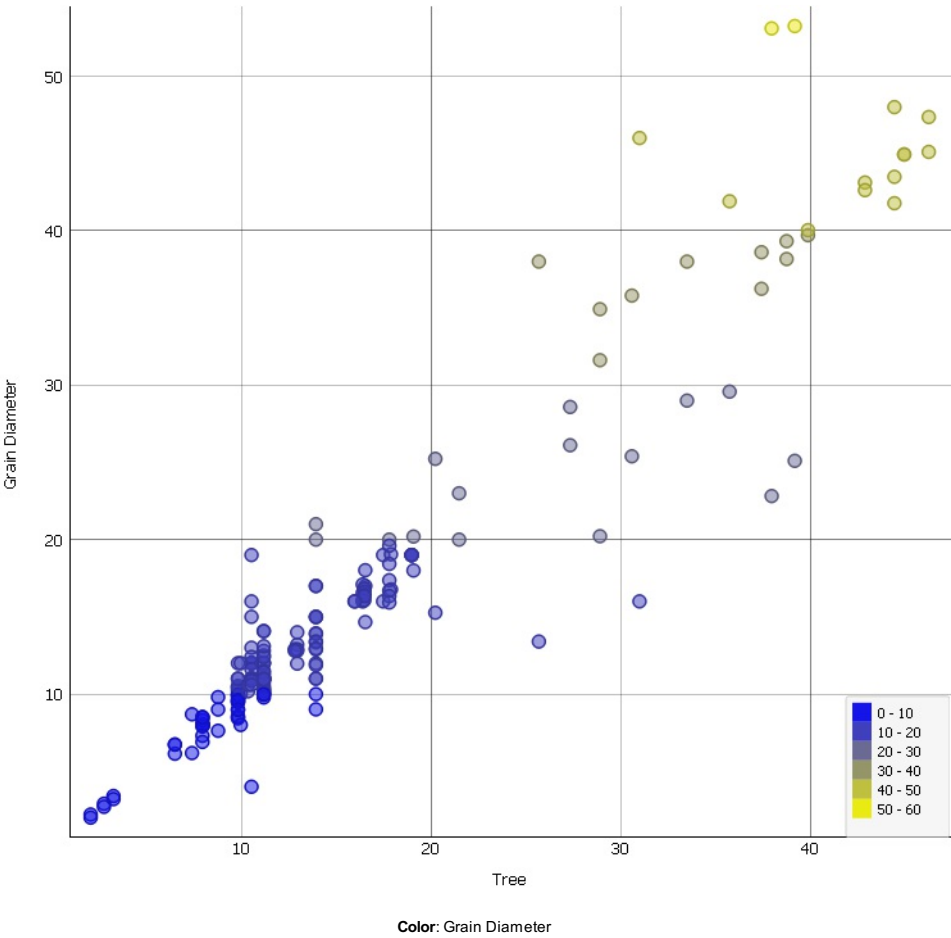
**Pruning:** at least two instances in leaves, at least four instances in internal nodes, maximum depth 7  
**Splitting:** Stop splitting when majority reaches 95% (classification only)  
**Binary trees:** Yes

Data

**Data instances:** 204  
**Features:** Fe, Si, B, Nb, Annealing temperature (K), Ribbon Thickness (um), Relative to Late SiCAI, Relative to Early BP  
**Meta attributes:** Composition ID, Reference DOI  
**Target:** Grain Diameter

Scatter Plot

Thu Jul 26 18, 13:39:15



Random Forest

Thu Jul 26 18, 13:39:18

Name: Random Forest

Model parameters

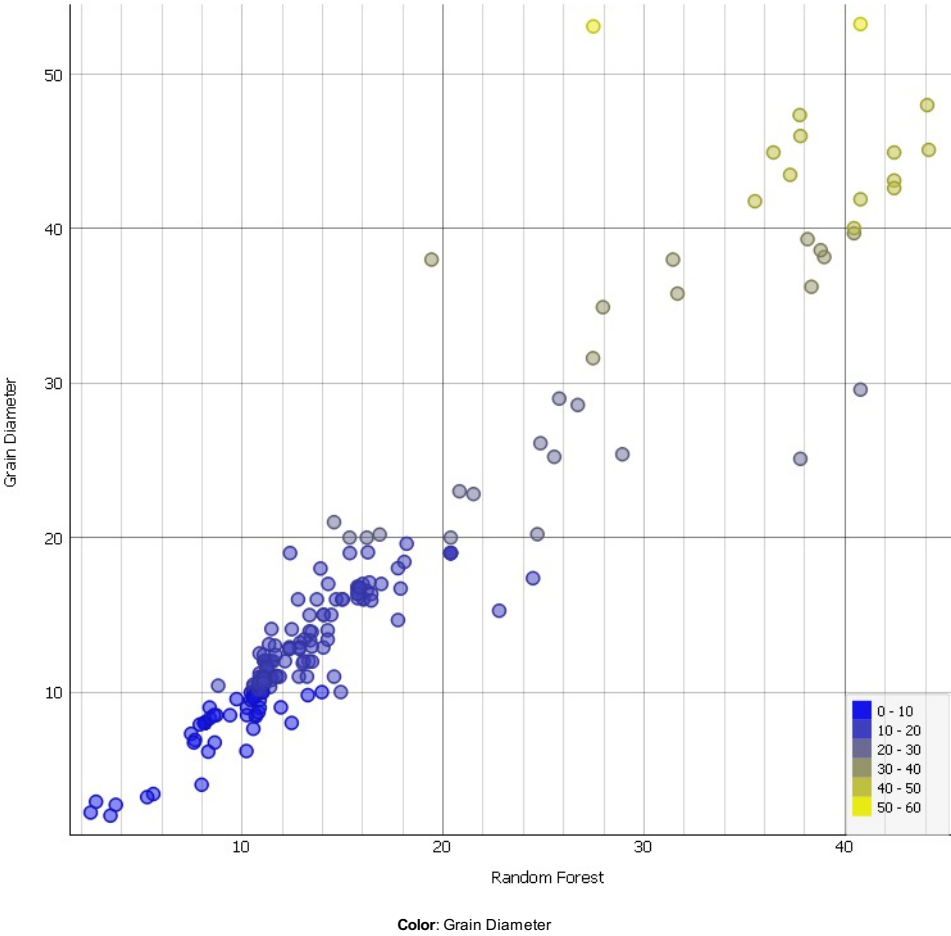
**Number of trees:** 8  
**Maximal number of considered features:** unlimited  
**Fixed random seed:** 4  
**Maximal tree depth:** 7  
**Stop splitting nodes with maximum instances:** 4

Data

**Data instances:** 204  
**Features:** Fe, Si, B, Nb, Annealing temperature (K), Ribbon Thickness (um), Relative to Late SiCAI, Relative to Early BP  
**Meta attributes:** Composition ID, Reference DOI  
**Target:** Grain Diameter

Scatter Plot

Thu Jul 26 18, 13:39:23



Linear Regression

Thu Jul 26 18, 13:39:27

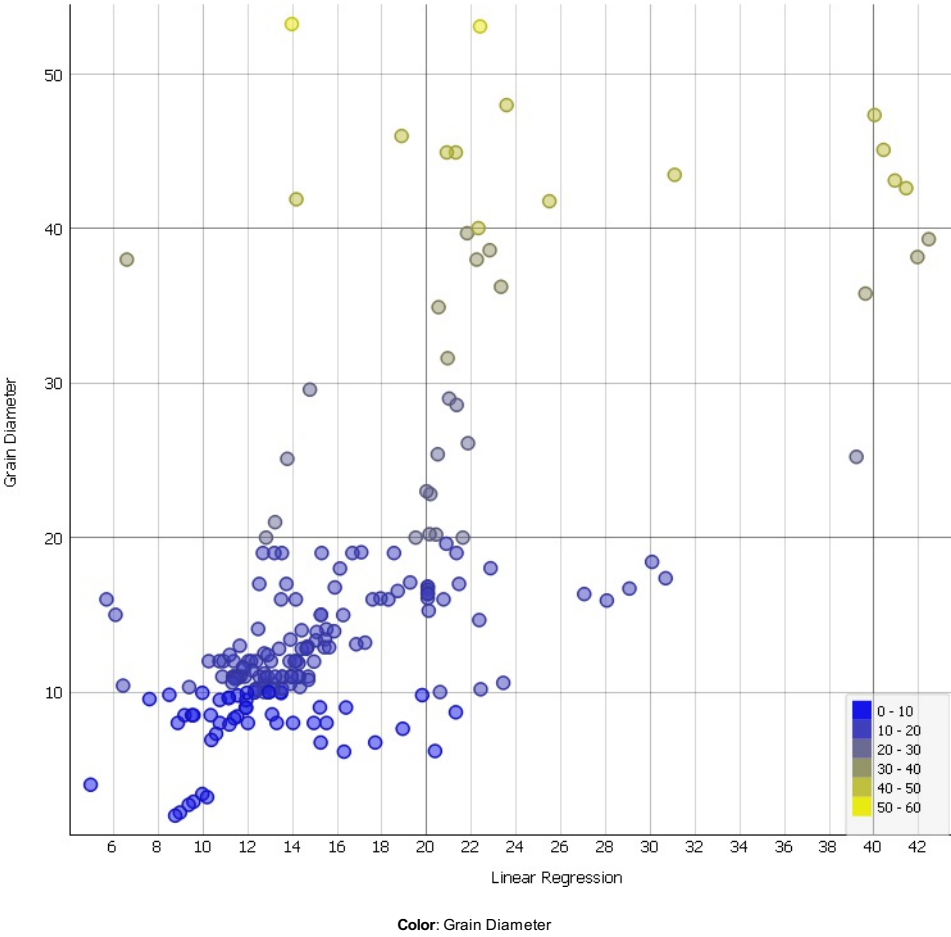
Name: Linear Regression

Model parameters

Regularization: No Regularization

Data

Data instances: 204  
Features: Fe, Si, B, Nb, Annealing temperature (K), Ribbon Thickness (um), Relative to Late SiCAI, Relative to Early BP  
Meta attributes: Composition ID, Reference DOI  
Target: Grain Diameter



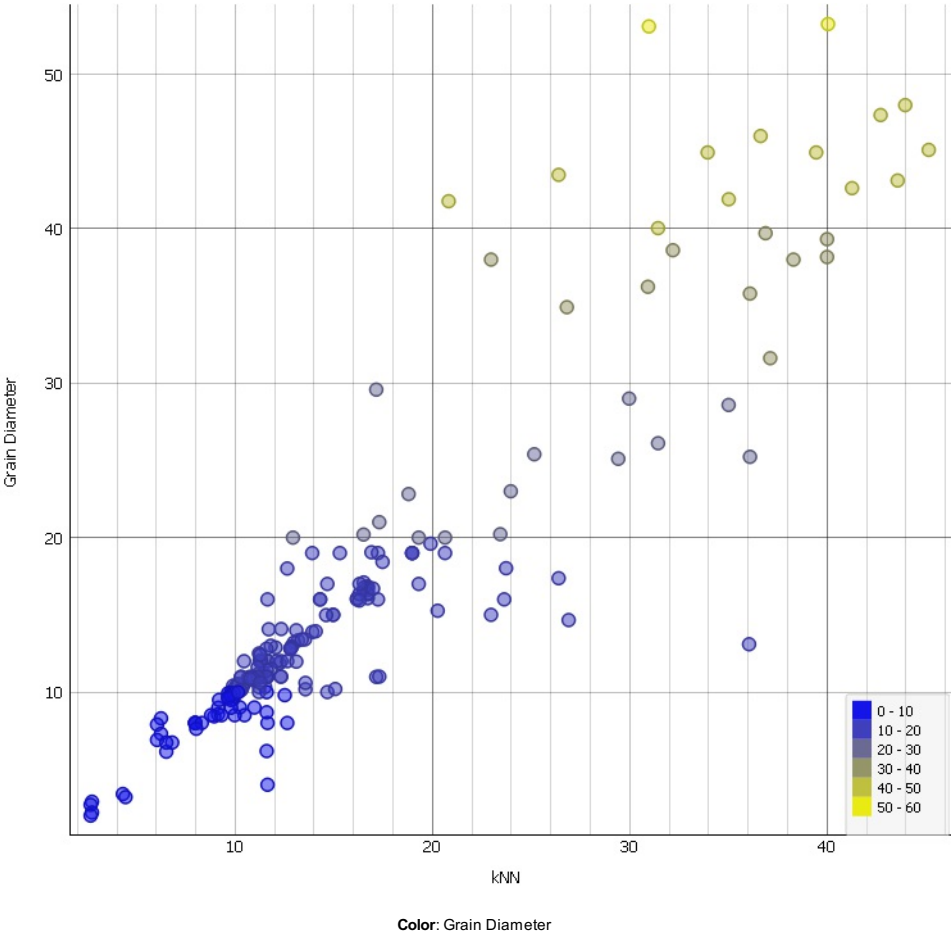
Name: kNN

Model parameters

Number of neighbours: 3  
Metric: Euclidean  
Weight: Uniform

Data

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Features: Fe, Si, B, Nb, Annealing temperature (K), Ribbon Thickness (um), Relative to Late SiCAI, Relative to Early BP  
Meta attributes: Composition ID, Reference DOI  
Target: Grain Diameter



Neural Network

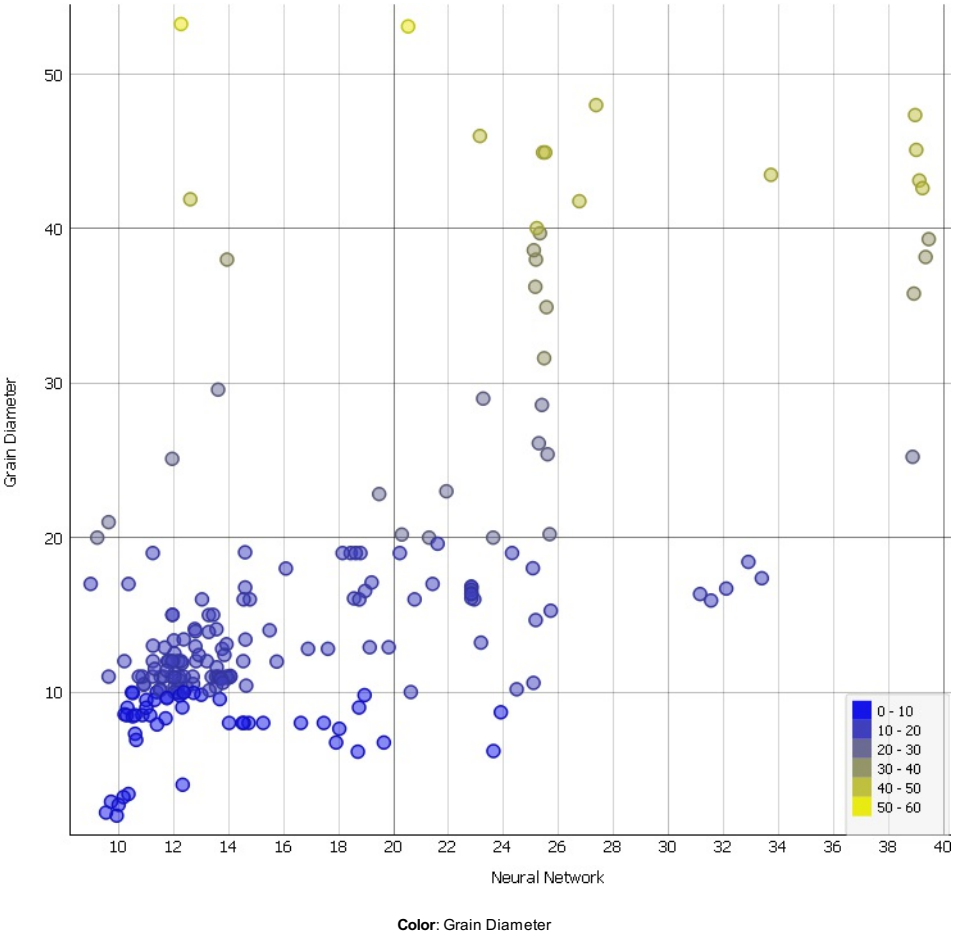
Name: Neural Network

Model parameters

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

Data

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Meta attributes: Composition ID, Reference DOI  
Target: Grain Diameter



SVM

Name: SVM

Model parameters

SVM type: v-SVM,  $\nu=0.5499999999999999$ ,  $C=1.8000000000000003$   
Kernel: Linear  
Numerical tolerance: 0.001  
Iteration limit: 5000

Data

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Target: Grain Diameter

