



## Search Commands for Machine Learning

The Machine Learning Toolkit provides custom search commands for applying machine learning to your data.

Command	Description	Syntax
<b>fit</b>	Fit and apply a machine learning model to search results.	...   fit <b>algorithm</b> <b>y</b> from <b>x</b> params into <b>model_name</b> as <b>output_field</b>
<b>apply</b>	Apply a machine learning model to search results using the fit command.	...   apply <b>model_name</b> as <b>output_field</b>
<b>summary</b>	Return a summary of a machine learning model created using the fit command.	summary <b>model_name</b>
<b>listmodels</b>	Return a list of machine learning models created using the fit command.	listmodels
<b>deletemodel</b>	Delete a machine learning model created using the fit command.	deletemodel <b>model_name</b>
<b>sample</b>	Randomly sample or partition data.	...   sample <b>options</b> by <b>split_by_field</b>



## Feature Extraction

Feature extraction algorithms transform fields for better prediction accuracy.

Algorithm	Examples
FieldSelector	...   fit FieldSelector type=categorical SLA_violation from *
PCA	...   fit PCA * k=3
KernelPCA	...   fit KernelPCA * k=3 gamma=0.01
TFIDF	...   fit TFIDF Reviews into user_feedback_model max_def=0.6 min_def=0.2

## Preprocessing

Preprocessing algorithms are used for preparing data and help with prediction accuracy.

Algorithm	Examples
StandardScaler	...   fit StandardScaler *

## Cluster Numeric

Partition events with multiple numeric fields into clusters.

Algorithm	Examples
KMeans	...   fit KMeans * k=3
DBSCAN	...   fit DBSCAN *
BIRCH	...   fit Birch * k=3
SpectralClustering	...   fit SpectralClustering * k=3

## Anomaly Detection

Find events that contain unusual combinations of values.

Algorithm	Examples
OneClassSVM	...   fit OneClassSVM * kernel="poly" nu=0.5coef0=0.5 gamma=0.5 tol=1 degree=3 shrinking=f into TESTMODEL_OneClassSVM

## Forecasting

Forecast future values given past values of a metric (numeric time series).

Algorithm	Examples
ARIMA	...   fit ARIMA Voltage order=4-0-1

## Predict Numeric

Predict the value of a numeric field using the values of other fields in that event.

Algorithm	Examples
LinearRegression	...   fit LinearRegression temperature from date_month date_hour into temperature_model
Lasso	...   fit Lasso temperature from date_month date_hour
Ridge	...   fit Ridge temperature from date_month date_hour normalize=true alpha=0.5
ElasticNet	...   fit ElasticNet temperature from date_month date_hour normalize=true alpha=0.5
KernelRidge	...   fit KernelRidge temperature from date_month date_hour into temperature_model
SGDRegressor	...   fit SGDRegressor temperature from date_month date_hour into temperature_model
DecisionTreeRegressor	...   fit DecisionTreeRegressor temperature from date_month date_hour into temperature_model
RandomForestRegressor	...   fit RandomForestRegressor temperature from date_month date_hour into temperature_model

## Predict Categorical

Predict the value of a categorical field using the values of other fields in that event.

Algorithm	Examples
LogisticRegression	...   fit LogisticRegression SLA_violation from IO_wait_time into sla_model
SVM	...   fit SVM SLA_violation from * into sla_model
BernoulliNB	...   fit BernoulliNB type from * into TESTMODEL_BernoulliNB alpha=0.5 binarize=0 fit_prior=f
GaussianNB	...   fit GaussianNB species from * into TESTMODEL_GaussianNB
SGDClassifier	...   fit SGDClassifier SLA_violation from * into sla_model
DecisionTreeClassifier	...   fit DecisionTreeClassifier SLA_violation from * into sla_model
RandomForestClassifier	...   fit RandomForestClassifier SLA_violation from * into sla_model

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