OneModel Academy

One AI

Global Settings

Machine Learning

Hayley Bresina
One AI Client Enablement

10 Jun 2024

Adjusting Global Settings is Optional

- Configuring global settings can be advanced
  - Ensure you are comfortable with the basics of model building & interpretation first
  - One AI automatically selects default settings based on best practices that perform well on most models in One Model
- Informed configuration enhances model performance & improves insight visualization on storyboards

Topics Covered

- Continuous strategy & null indicators
- Correlation type & general correlation threshold
- Leakage & suspicious performance threshold
- Category size threshold
- Null drop threshold
- Random state
- Global settings overview

Global Settings Overview

Overview & Purpose

- **Global settings** refer to overarching parameters that impact the entire model's behavior and performance
  - Dictate the rules for automatically dropping columns from the model dataset
  - Influences preprocessing
  - Impacts how the model insights & results can be visualized in storyboards
- Unique to each model & do not apply across all models on your site
- Purpose
  - Give the user control over model configuration
  - Improve performance, feature selection, & data handling

Navigation in One Model

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Continuous Strategy & Null Indicators

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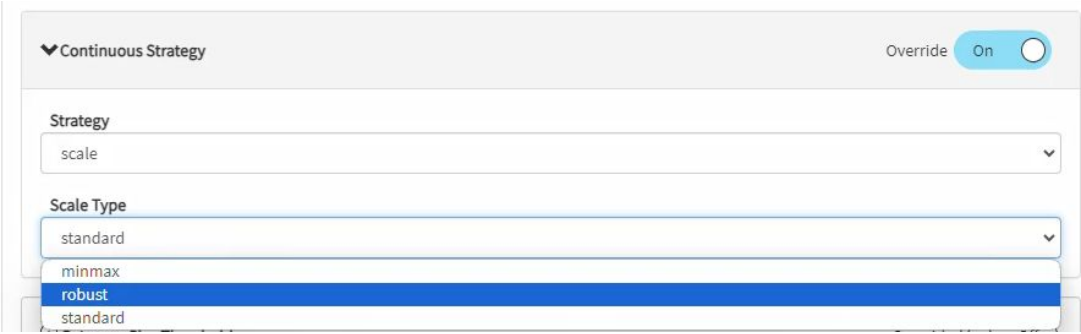
Continuous Strategy: Scaling

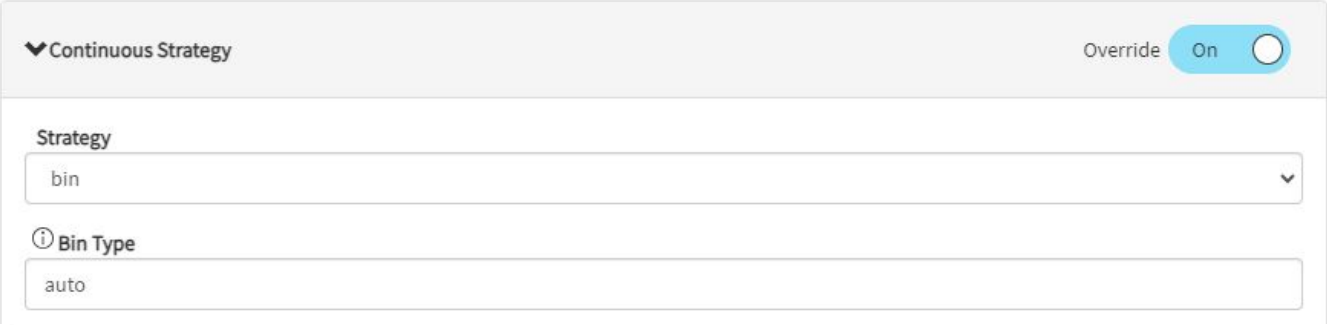
How One AI handles numerical & date input variables during preprocessing

- **Default strategy:** linear scaling
  - Puts all features on the same scale, preventing incorrect weighting & bias
- **Default scale type:** standard
  - Other scale type options: MinMax; Robust



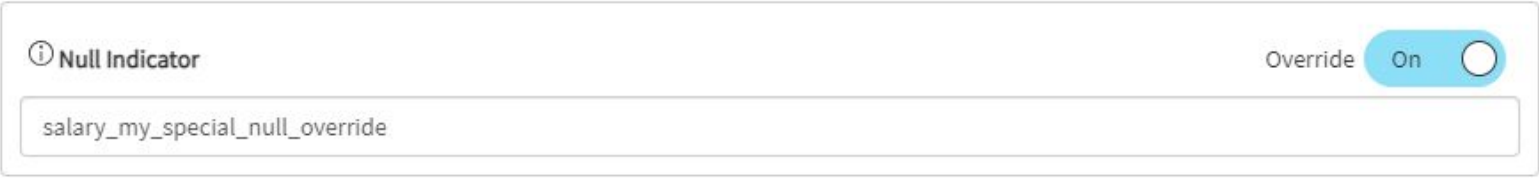
Continuous Strategy: Binning

- **Alternative strategy option:** binning
  - Grouping numerical data into discrete intervals or bins
  - **Bin type default:** auto
    - Alternative bin types: manually specified numerically



Null Indicator

- Only applicable if the continuous strategy is set to **binning**
  - Binning results in numerical values being one hot encoded, creating categories or intervals (bins)
  - By default, binning sets aside null rows & doesn't create bins for nulls
  - To bin nulls, use the designated field & input free text value to label the null bin



Null Indicator

- No null indicator override:

id	salary_0	salary_1	salary_2	salary_null
0	0	0	1	0
1	0	1	0	0
2	0	0	0	1
3	1	0	0	0

- Null indicator override:

id	salary_0	salary_1	salary_2	salary_my_special_null_override
0	0	0	1	0
1	0	1	0	0
2	0	0	0	1
3	1	0	0	0

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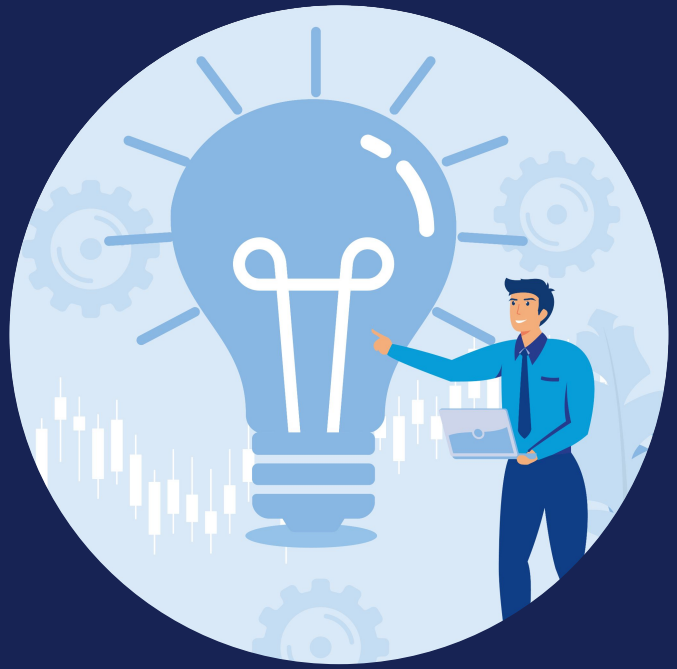
Correlation Type & General Correlation Threshold

Global Settings



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Correlation Type

During a One AI model run, a correlation check is performed to determine how correlated each input feature column is with the target column

- Checking for **data leakage**
- **Default behavior**: Cramér's correlation test for categorical variables & Pearson's correlation test for continuous variables
  - **Cramér's V**: correlation coefficient ranging 0 to 1 that assesses the association between a pair of categorical variables
  - **Pearson's** correlation coefficient: "r", quantifies the strength & direction of a linear relationship between two continuous variables ranging -1 to 1

General Correlation Threshold

One AI also runs a correlation test to check the correlation between each input variable

- **General correlation threshold**: how correlated 2+ predictor variables must be for the less performant variable(s) to be automatically dropped
  - Model datasets should not have multiple variables that are effectively the same thing
  - Avoid multicollinearity
  - **Default threshold: +/- 0.65**, which indicates a moderately strong linear relationship between 2 variables

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Leakage & Suspicious Performance Threshold

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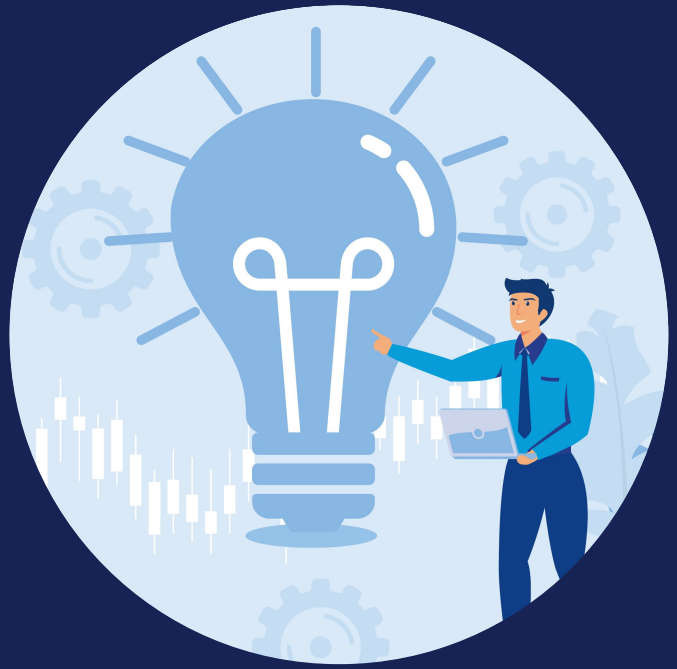

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Leakage Performance Threshold

- Data leakage check is performed during preprocessing
  - **Data leakage**: when the training dataset contains information about the target variable that won't be available when making predictions on new, unseen data
    - Cheat column
  - Identified by generating a random forest model against the target using only the input feature in question & measuring the performance with an ROC-AUC score
  - Default threshold: 0.85;
    - Variables exceeding this threshold will be automatically dropped by One AI

Suspicious Performance Threshold

Less stringent version of the data leakage performance threshold

- Informs users of possible leakage
- Default threshold: 0.7
  - Variables exceeding this threshold will **not** be automatically dropped by One AI & instead will be flagged in the EDA report for the user to investigate

Suspicious Selected! Processed Scaled `one.employee.date_of_birth` has been processed as a date feature and numerically scaled. This column may be leaking target data. A random forest using only this column achieved a ROC-AUC score of 0.76 against the target.

- If leakage is present, column should be manually dropped
- If leakage is not present, no action is needed

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Category Size Threshold

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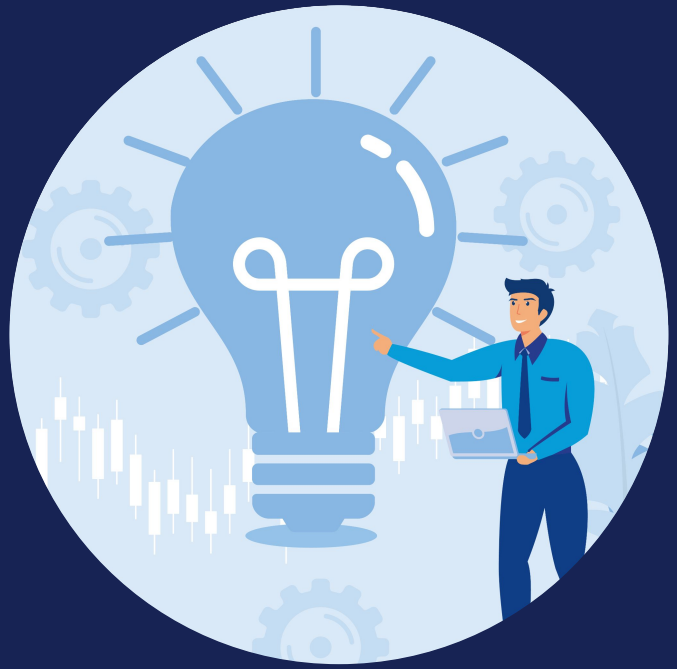

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Category Size Threshold

Determines how categorical variables are handled

- In One AI, specifies the minimum size a categorical grouping must have before being grouped into an "Other" category
  - **Default threshold: 0.05**
    - Any categorical grouping representing less than 5% of the total will be placed in the "Other" grouping
- Reasonable category size thresholds are important for model performance interpretability, & efficiency

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Null Drop Threshold

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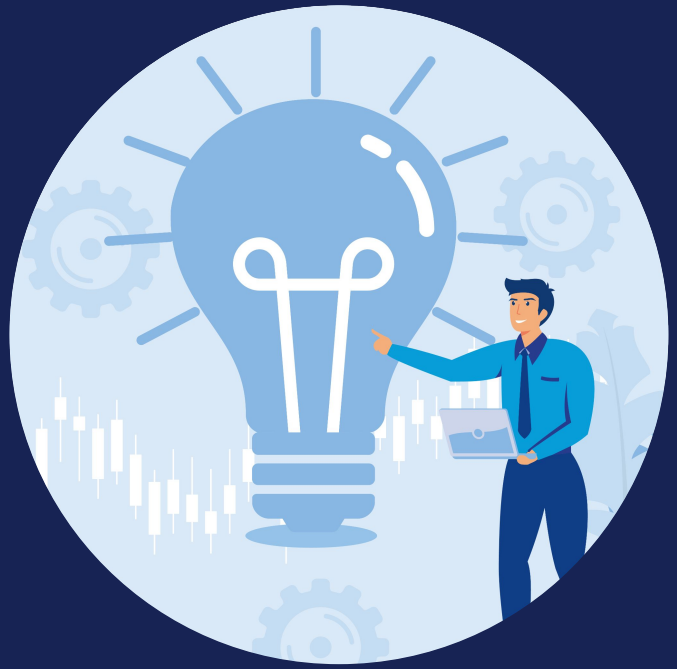

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Null Drop Threshold

Determines if input features in the model dataset should be dropped based on the proportion of missing values they contain

- In One AI, specifies the percentage of null data in an input feature before it is automatically dropped and excluded from the model
  - Zeroes are not nulls
  - **Default threshold: 0.05**
    - Input features with 5% or more null values will automatically be dropped during preprocessing
- Alternative options: droppability or null-filling **per column interventions**

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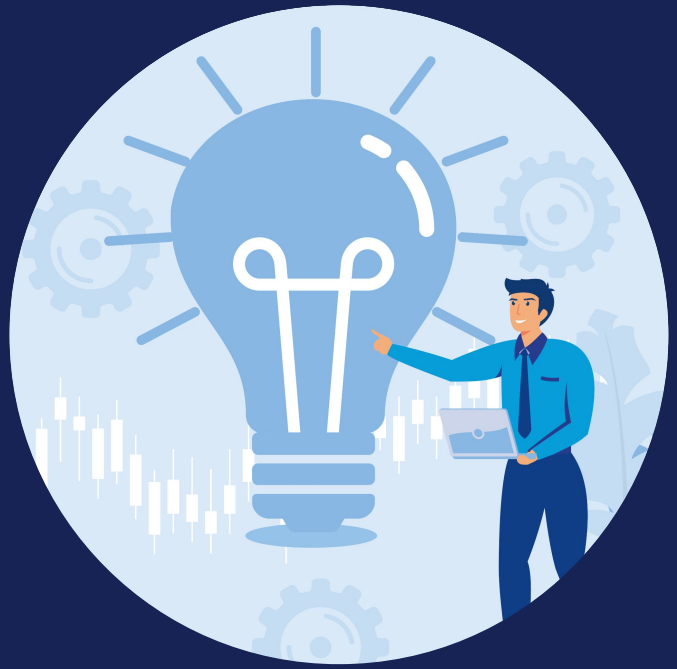
Random State

Global Settings



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Random State

Initializes the random number generator for tasks involving randomness:

- Splitting datasets into training & test sets, initializing model parameters, or conducting random sampling
- In One AI, a pseudo-random number parameter that allows you to reproduce the same train test split each time the model is run
  - Default value: **43**
  - Random state range: any value **ranging 0 to 4,294,967,295**
- Not a hyperparameter related to model performance
- **This setting should be left alone in most cases**

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