Malene Christiane Nielsen
mniel@mmmi.sdu.dk

Model Report: MLP

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Introduction

This is an automated report for the MLP regressor on real estate dataset; the MLP model.

This report will first introduce the model setup, including the hyperparameters and search algorithms used. Hereafter the base dataset will be described, and the differently created training datasets will be listed. After that, the results for the different forecast types will be presented, and the best results will be shown in plots.

Experiment description:

Experiment with MLP regressor on real estate dataset

Model setup

The model has been used for the following forecast purposes:

○ one_step

The model has been optimized using the following hyperparameters:

- hidden_layer_sizes: [[100], [100, 100], [100, 300, 100]]

- activation: ['relu', 'tanh', 'logistic']

- solver: ['adam']

- alpha: [0.0001, 0.001, 0.01]

- max_iter: [5000, 10000]

- scaler: [None, StandardScaler(), MinMaxScaler(), RobustScaler(), PowerTransformer()]

And with the following search algorithms:

○ grid

○ random

The used performance measure is the r2 measure.

Dataset setup

The baseline dataset used for these forecasts is
the 'Real Estate valuation from Sindian Dist., New Taipei City, Taiwan' dataset: *'Real estate valuation of houses in Taiwan, the price denotes the cost of unit area.'.*

The test size used for the forecasts is 0.2.

○ Dataset 1

- name: univariate_only_target

- dataset_type: univariate

- prediction_type: one_step

- components: ['one_step_target', 'temporal_features']

○ Dataset 2

- name: multivariate

- dataset_type: multivariate

- prediction_type: one_step

- components: ['one_step_target', 'feature_columns']

Results: MLP

The presentation of the results follows this system: For each prediction type, the best and worst results for each combination of search method and dataset type are presented in heat plots along with the corresponding model setup.
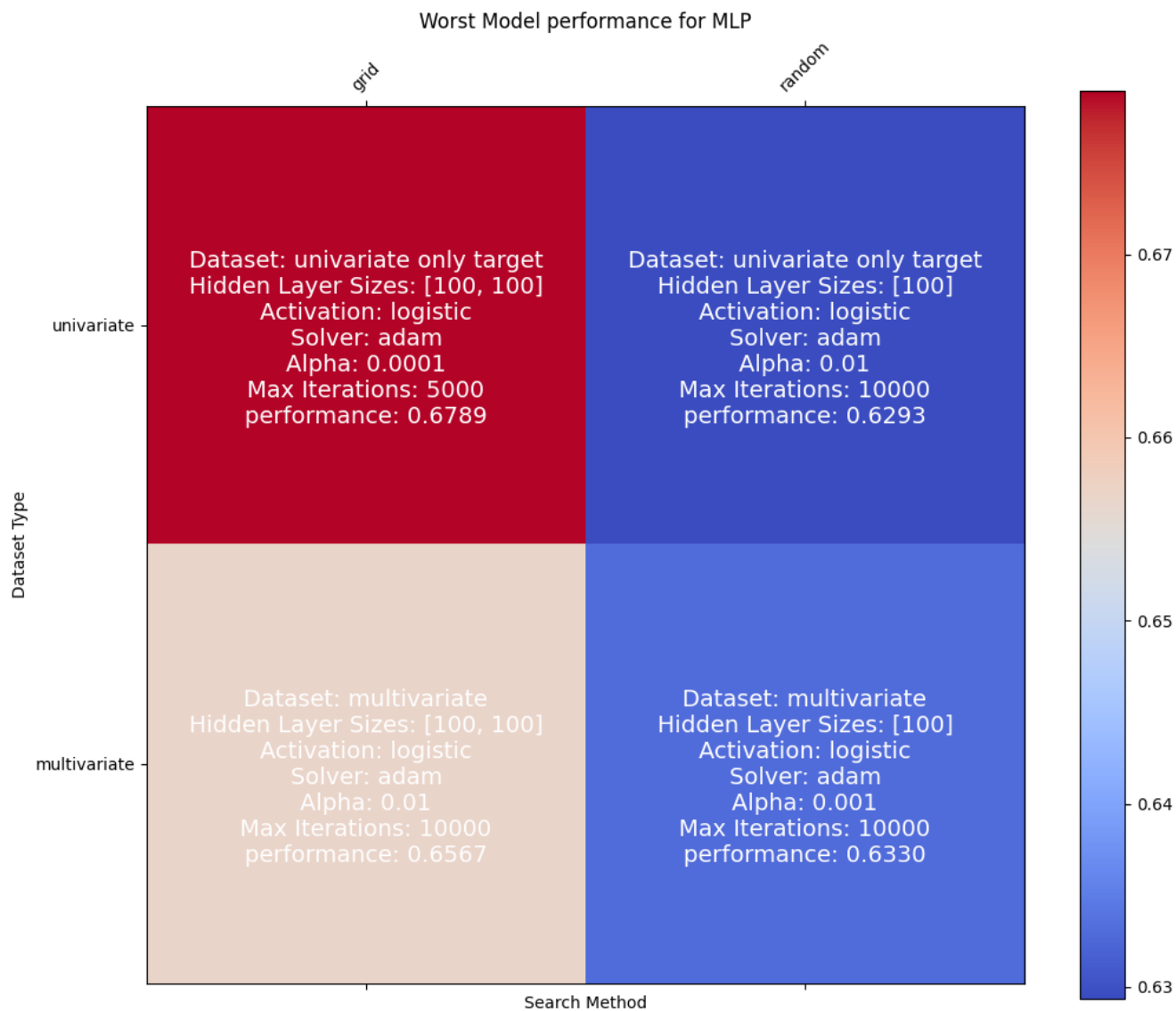
- Then, if the prediction type is one-step forecasts, the best prediction over time is visualized in a line plot.

- If the prediction type is a multi-step forecast, either direct or recursive, the model with the average best r2 score is chosen, and the three best and worst predictions are visualized in a line plot. Furthermore, three steps of the forecasts are plotted.

Results for the one_step forecast.

The best results (one_step) for the different setup combinations are as follows:

Best Model performance for MLP

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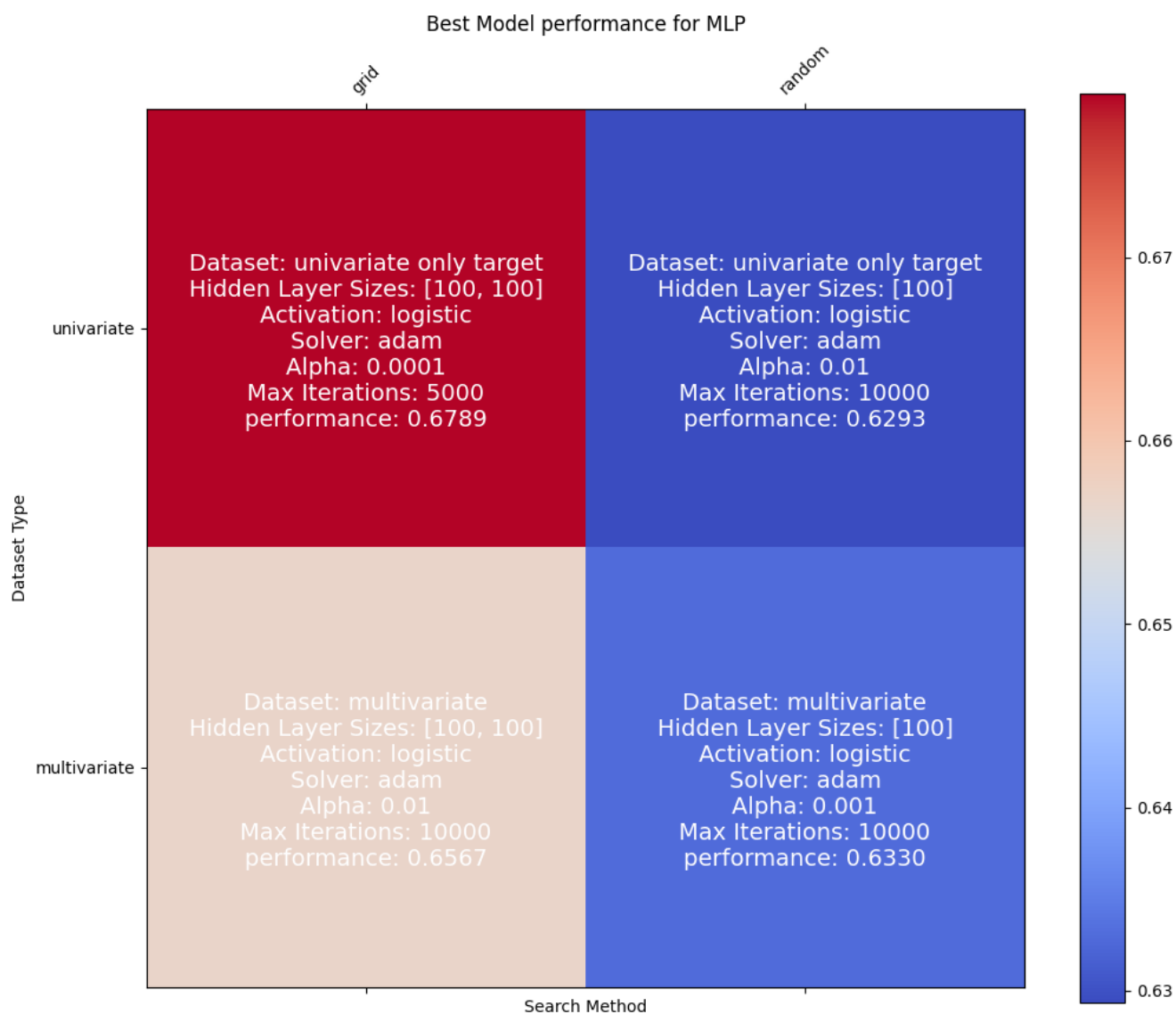
The worst results (one_step) for the different setup combinations are as follows:

Worst Model performance for MLP

Best one_step forecast over time

Actual vs Predicted House Price of Unit Area for MLP_univariate_only_target, Train Score: 0.6569805325385903, Test Score: 0.6789280691051244

Actual vs Predicted House Price of Unit Area for MLP_univariate_only_target, Train Score: 0.6569805325385903, Test Score: 0.6789280691051244