

# Model Report: DeepNN

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## Introduction

*This is an automated report for the Neural networks on real estate dataset; the DeepNN 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 neural networks on real estate dataset

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## Model setup

The model has been used for the following forecast purposes:

- one\_step

The model has been optimized using the following hyperparameters:

- optimizer: ['adam', 'sgd']
- epochs: [100, 200]
- batch\_size: [32, 64]
- scaler: [None, StandardScaler(), MinMaxScaler(), RobustScaler(), PowerTransformer()]

And with the following search algorithms:

- grid
- random

The used performance measure is the neg\_mean\_absolute\_error 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']

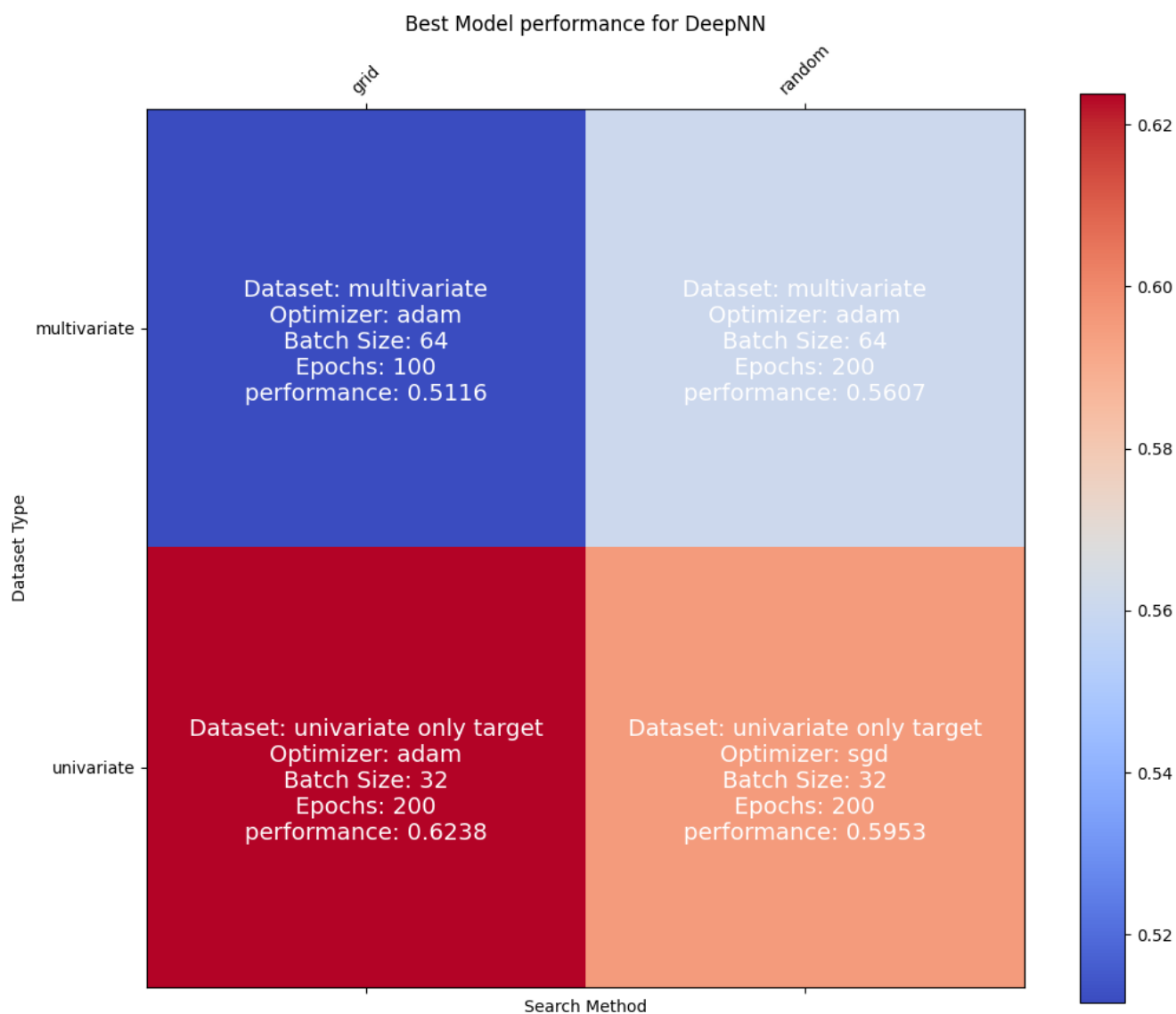
## Results: DeepNN

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.

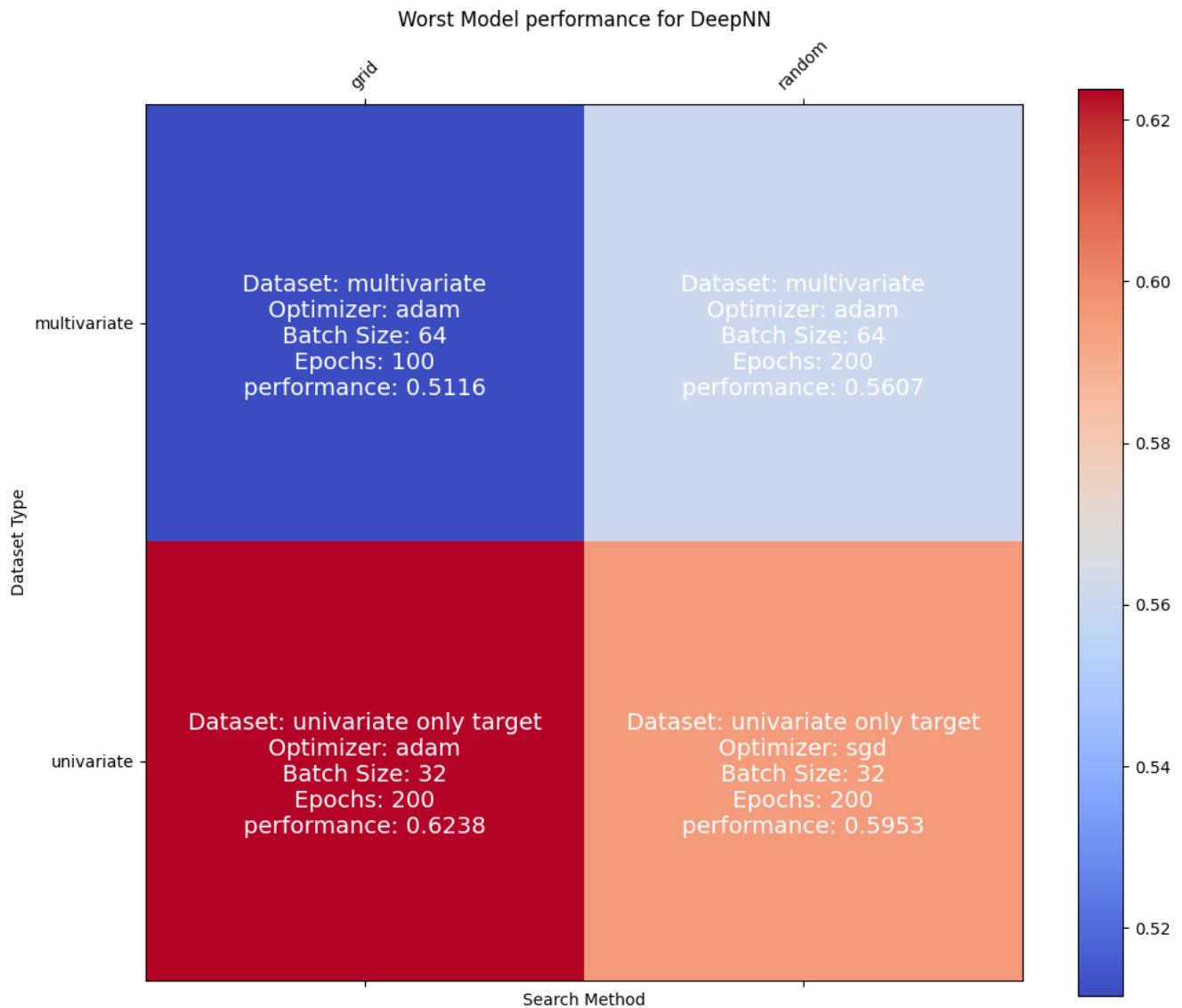
- Then, if the prediction type is one-step forecasts, the best prediction over time is visualized in a line plot.
- If the prediction type is a multi-step forecast, either direct or recursive, the model with the average best  $r^2$  score is chosen, and the three best and worst predictions are visualized 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:



The worst results (one\_step) for the different setup combinations are as follows:



### Best one\_step forecast over time

