Supplementary Materials for a Review of R Neural Network Packages (with NNbenchmark): Accuracy and Ease of Use

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Figures below provides some insights where a package performs reasonably well with respect to one explanatory variable and where the fit misses the correct behavior of an explanatory variable. It displays the average response per rounded explanatory variable for the predicted, the empirical and the theoretical values. That is, the empirical value and the predicted value for the jth explanatory variable are respectively computed at x-value x as

$$\bar{y}_j^{emp}(x) = \frac{1}{n_x}\sum_{i=1}^{n} y_i 1_{r(x_{i,j})=x},\ \bar{y}_j^{pred}(x) = \frac{1}{n_x}\sum_{i=1}^{n} \hat{y}_i 1_{r(x_{i,j})=x},\quad n_x = \sum_{i=1}^{n} 1_{r(x_{i,j})=x},$$

where $r()$ denotes the round function with two decimal places and $y_i, \hat{y}_i$ stand respectively for the ith observed response and the ith predicted response. For instance, **MachineShop**, **nnet**, **nlsr** do not correctly capture the sinusoidal aspect of explanatory variable x_5 on the expected response, whereas **rminer**, **validann** miss the increasing non-linear trend of explanatory variable x_1 on the expected response.

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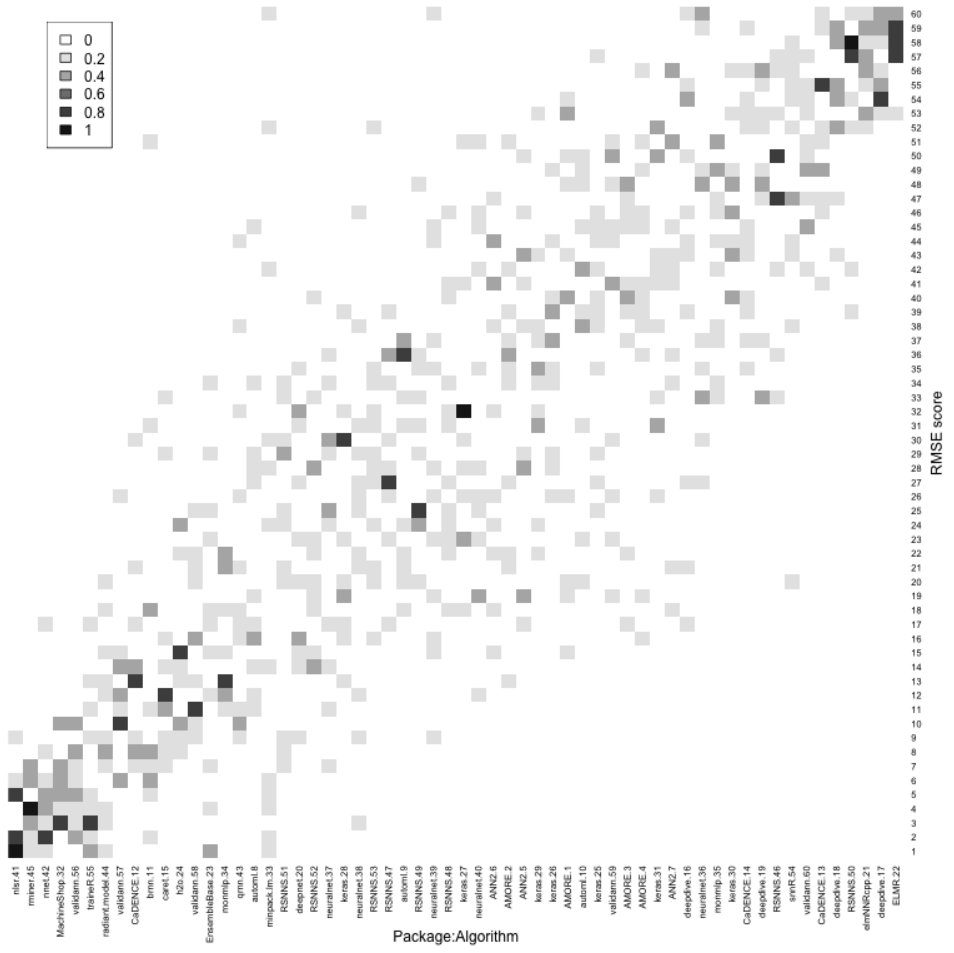

Figure 1: Score probabilities of `package:algorithm`

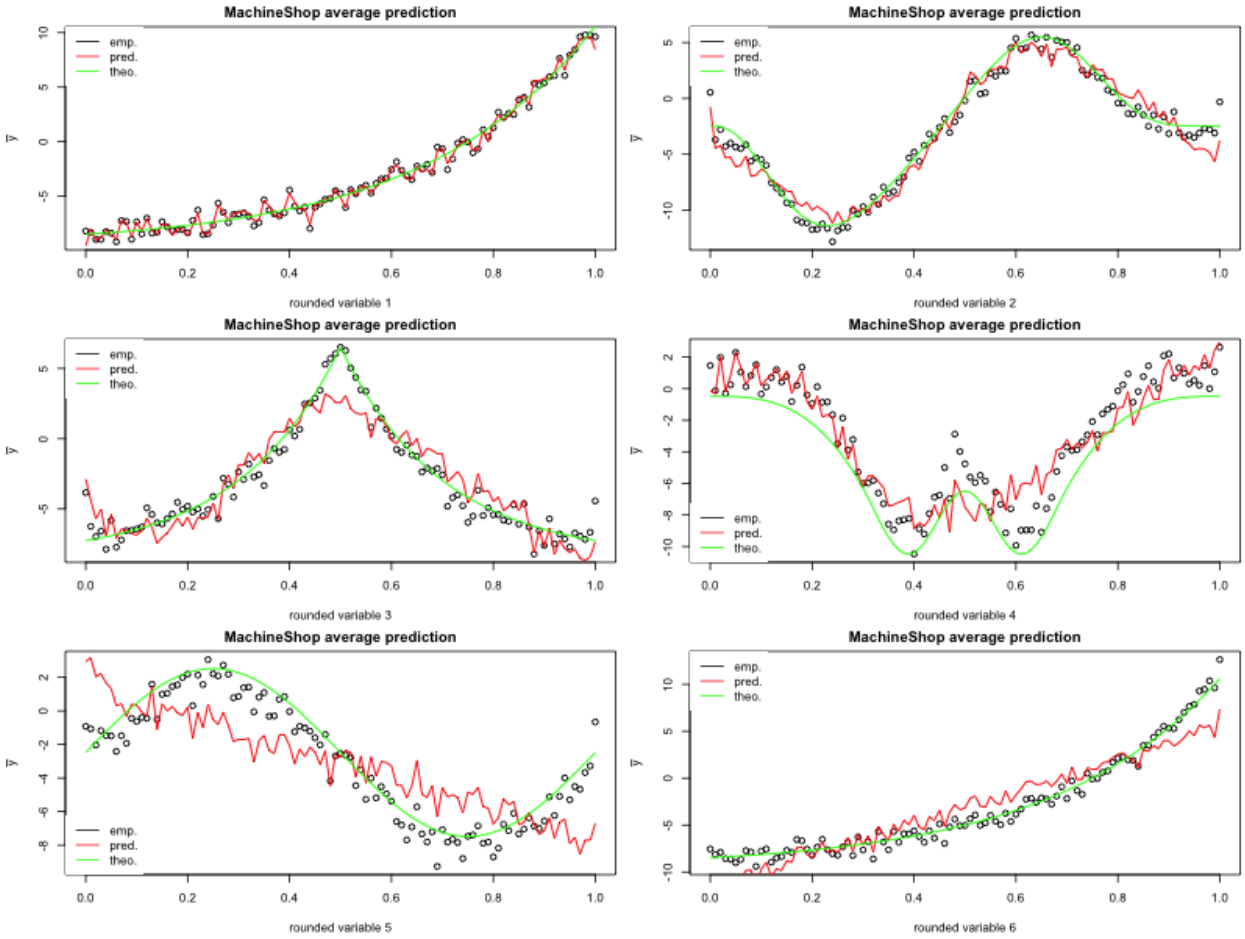

Figure 2: Average predicted mean per explanatory variable for `MachineShop`

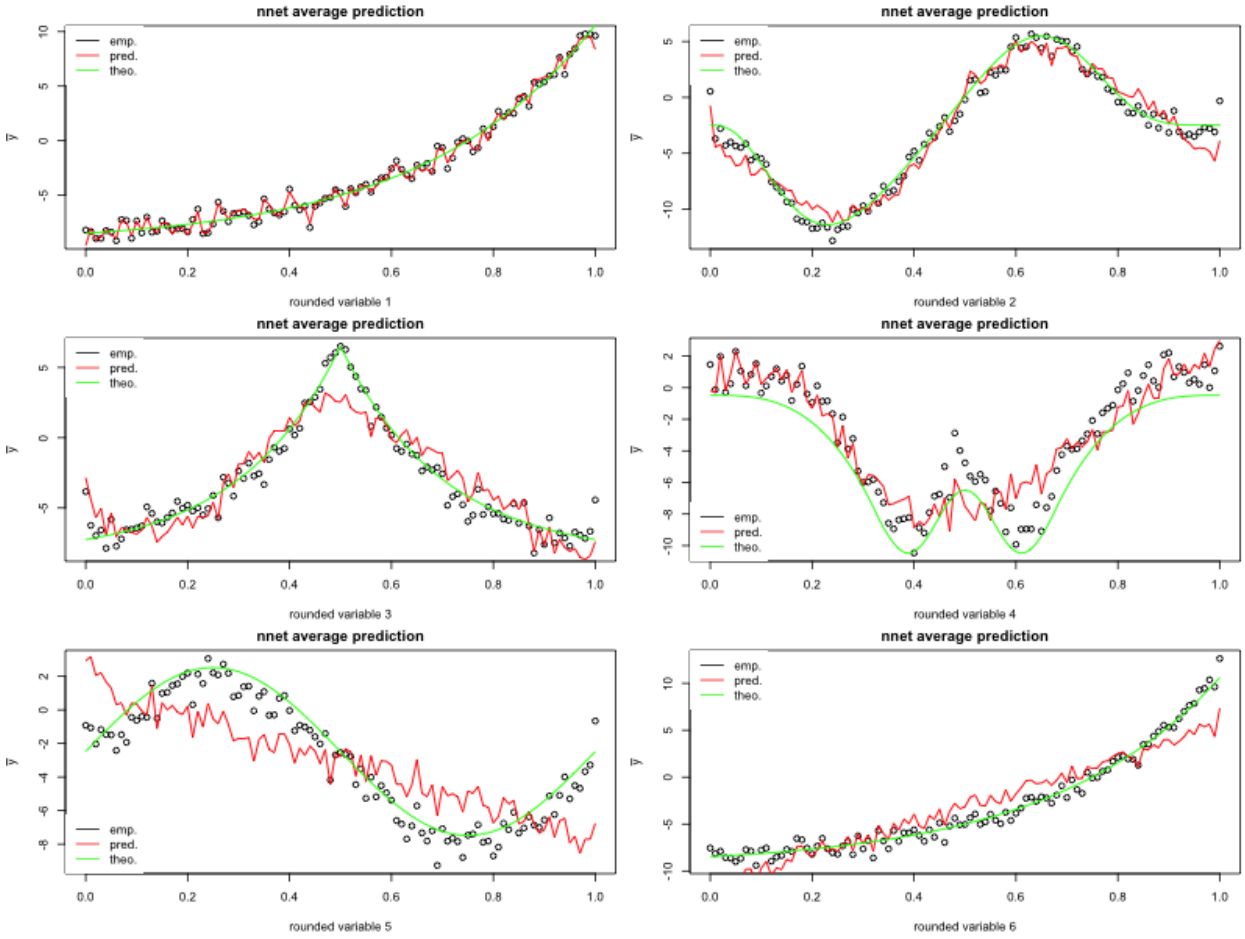

Figure 3: Average predicted mean per explanatory variable for `nnet`

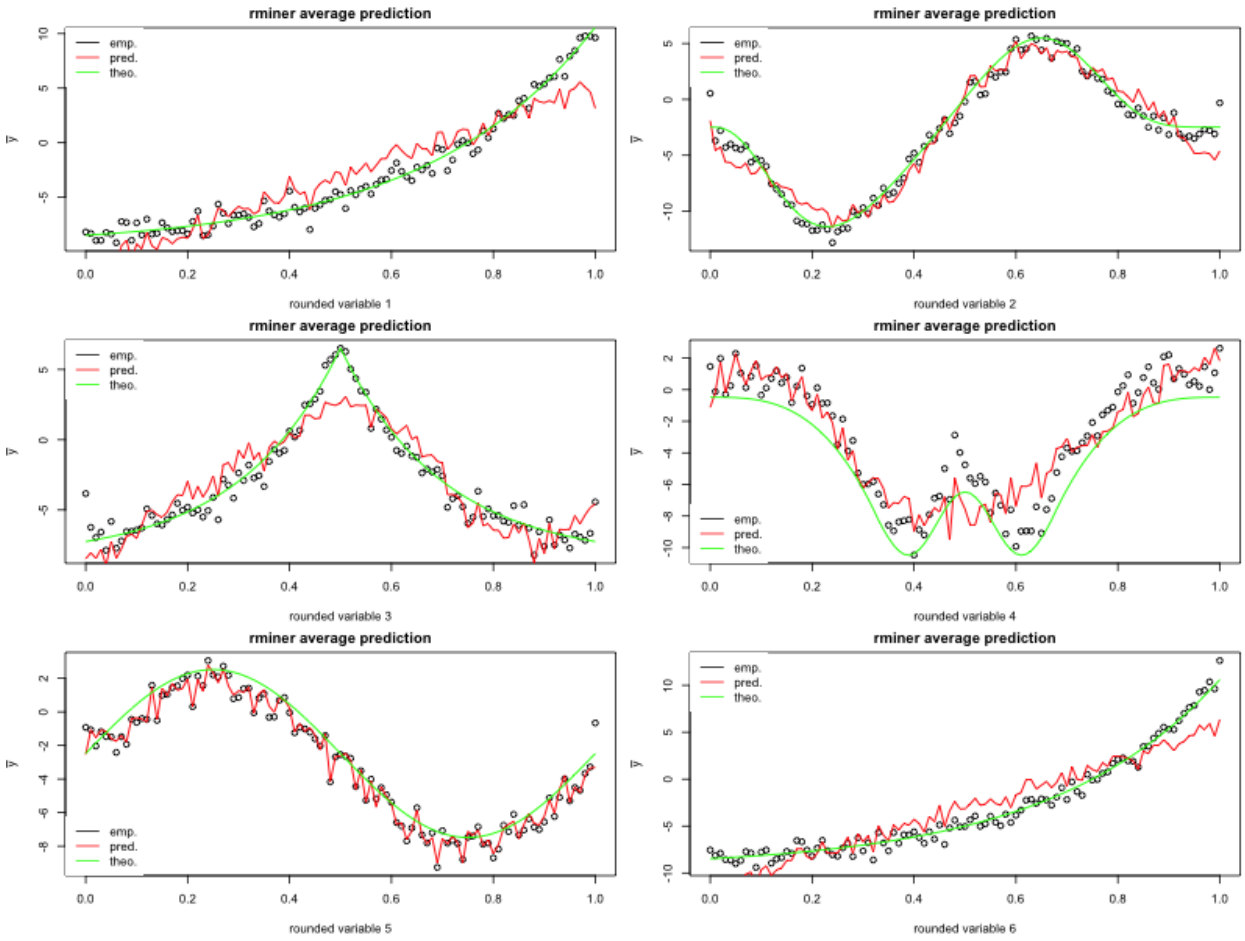

Figure 4: Average predicted mean per explanatory variable for `rminer`

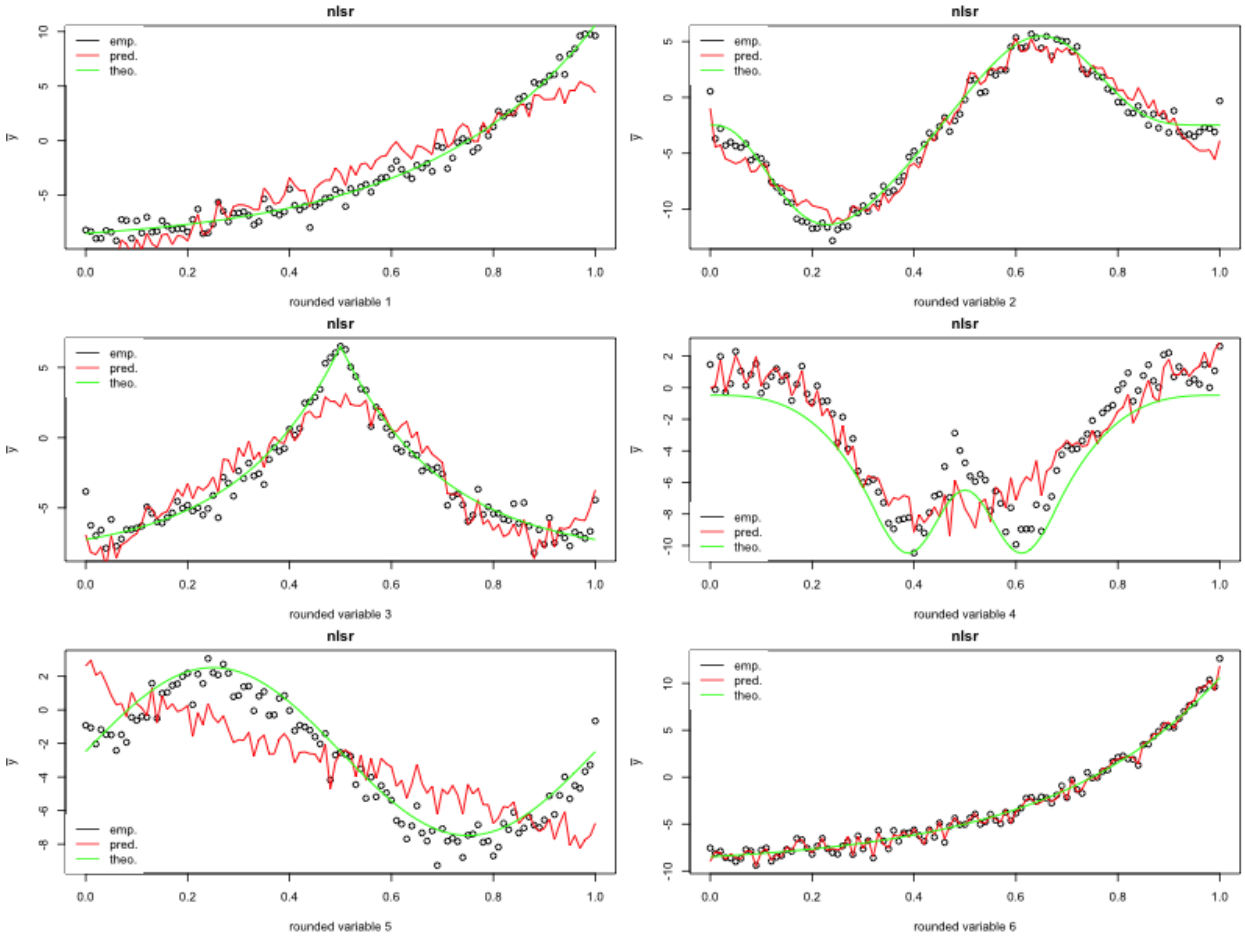

Figure 5: Average predicted mean per explanatory variable for `nlsr`

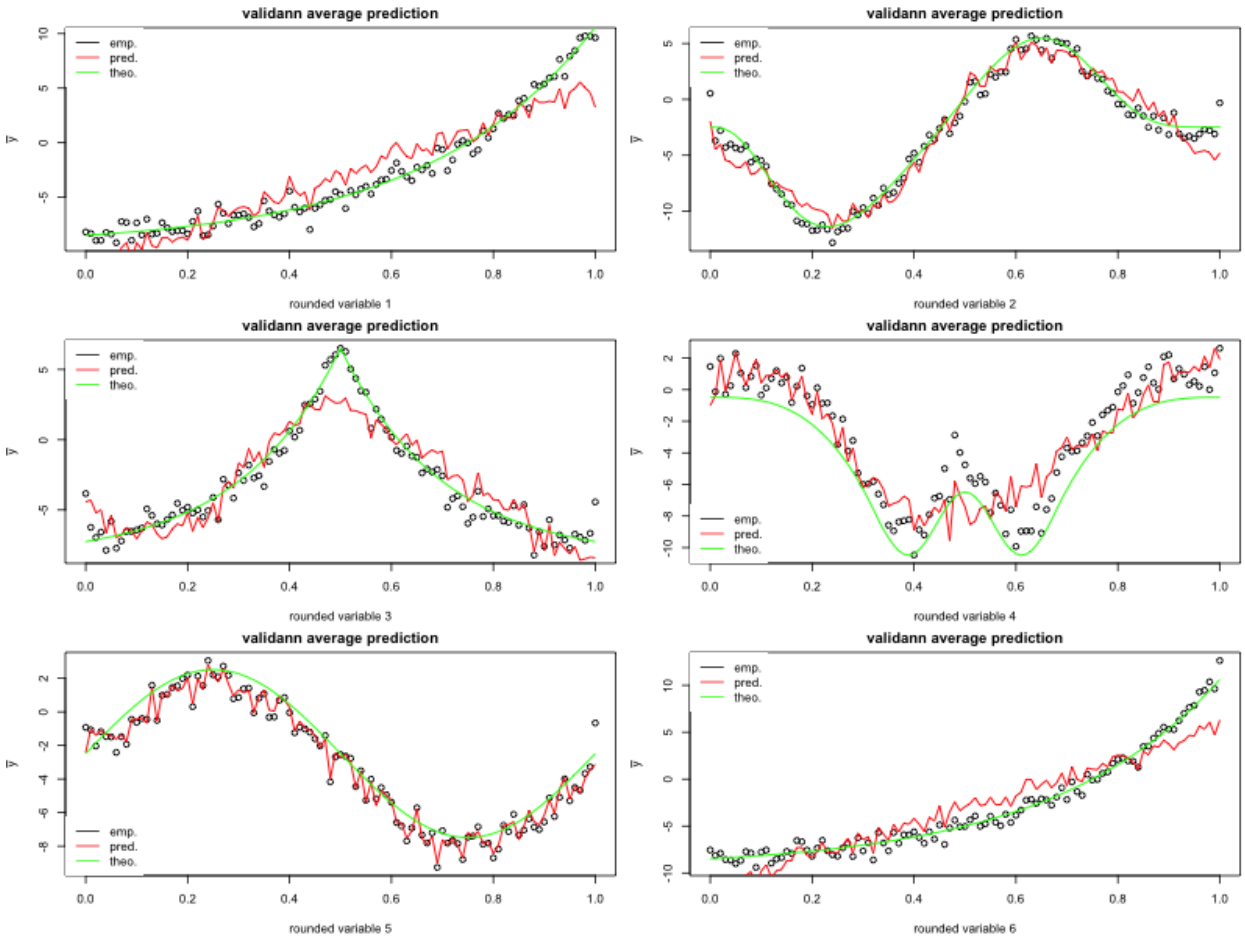

Figure 6: Average predicted mean per explanatory variable for `validann`