Performance Evaluation Metrics

Applied Machine Learning for Educational Data Science

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Contents

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In the next few weeks, we will talk about different approaches to build predictive models. We need some performance metrics to evaluate how useful a model is by itself, or how well it performs compared to alternative models. We will consider the performance metrics in two main categories: 1) metrics for predicting a continuous outcome, 2) metrics for predicting a binary outcome.

We will use two hypothetical small datasets (N = 30) for introducing these concepts. The first hypothetical dataset will have a continuous outcome and predictions. The second hypothetical dataset will have a binary outcome and predictions.

You can load these two hypothetical datasets using the code below:

```
readability <- read.csv('https://raw.githubusercontent.com/uo-datasci-specialization/c4-ml-fall-2021/ma
                        header=TRUE)
```

1. Evaluation Metrics for Continuous Outcomes

Explained Variance (R^2)

Error related indices

Mean Absolute Error

Median Absolute Error

Mean Squared Error

Root Mean Squared Error

Squared Log Error

Mean Absolute Percentage Error

Baseline performance considerations

2. Evaluation Metrics for Binary Outcomes

Brier Score

Confusion Matrix

Accuracy

True Positive Rate

False Positive Rate

Precision

Recall

F1 score

AUC

Log loss

Custome metrics for profit/cost optimization

Baseline performance considerations

Baseline performance