
MA289: Mathematics of AI
Lesson 2 Outline — 13 January 2026
United States Military Academy, West Point
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1 General Data Science Process

1.1 1. Problem and Data Understanding (EDA)

This step focuses on understanding the question being asked and the data available to answer it. EDA includes basic summaries, visualizations, and checks for missing values or anomalies.

1.2 2. Model

A model describes how inputs are used to produce predictions or explanations. For example linear regression or classification rules.

1.3 3. Error Function

The error function measures how wrong a single prediction is. It compares a model's prediction to the observed value for one data point.

1.4 4. Loss Function

The loss function aggregates errors across the dataset. It is the quantity we typically minimize when fitting a model to data.

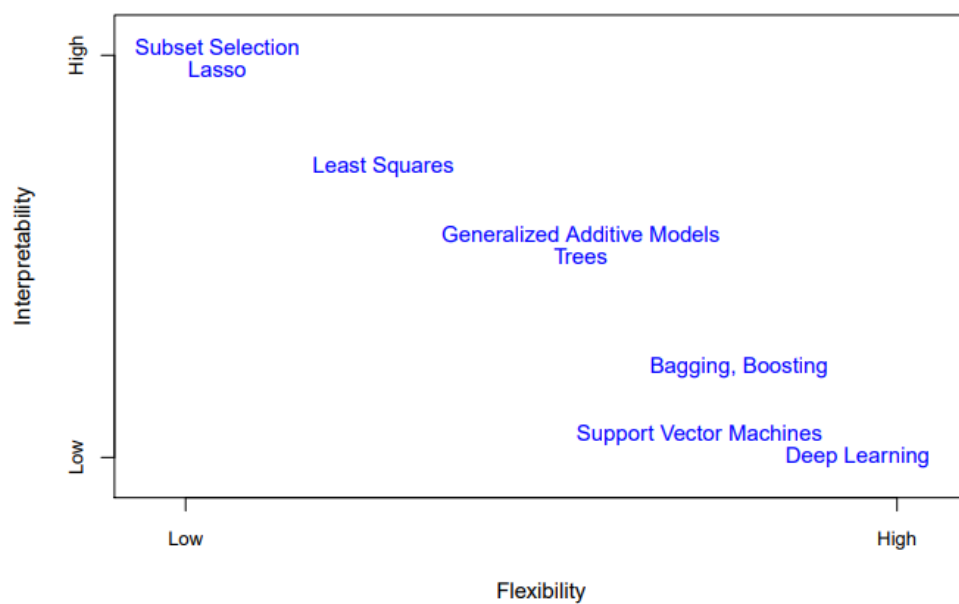


FIGURE 2.7. *A representation of the tradeoff between flexibility and interpretability, using different statistical learning methods. In general, as the flexibility of a method increases, its interpretability decreases.*

Figure 1: