Elements of Machine Learning
Assignment 1

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Problem 1 (T, 5 Points). **Principles of statistical learning**

Explain in short and concise words the concepts of these pairs of terms:

1. Unsupervised and Supervised Learning:

Supervised learning involves modeling the relationship between inputs and outputs in order to predict future output given previously unseen input. Unsupervised learning has to do with modeling relationships between inputs themselves, with no corresponding output variable for feedback.

2. Prediction and Inference:

Prediction has to do with constructing a model that accurately describes future observations, whereas inference is focused on the nature of the relationship between input and observations.

3. Classification and Regression:

Classification problems attempt to predict qualitative outputs, while regression models attempt to accurately predict quantitative output.

4. Training and Test Data:

Training data is the set of seen observations and/or inputs used to estimate the form of the underlying function, test data is previously unseen data used to quantify the accuracy of that estimation. Training data teaches the model, test data measures how closely the model predicts new data.

5. Parametric and Non-Parametric Methods:

Parametric methods assume an underlying function based on quantifiable relationships (parameters) between input variables and observations, whereas non-parametric methods make no assumptions about the underlying functional form, which cannot necessarily be easily defined in terms of some set of parameters.