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Supervised Machine Learning Techniques Overview

Neural Networks:

- Primarily used for deep learning algorithms, mimicking human brain interconnectivity through layers of nodes.
- Learned through supervised learning, adjusts based on loss function through gradient descent.
- Accurate model yields when cost function is near zero.

Naive Bayes:

- Classification approach adopting the principle of class conditional independence from the Bayes Theorem.
- Used in text classification, spam identification, and recommendation systems.

Linear Regression:

- Used to identify the relationship between a dependent variable and one or more independent variables.
- Used to make predictions about future outcomes.
- Plots a line of best fit, calculated through the method of least squares.

Logistic Regression:

- Used when dependent variable is categorical, mainly used to solve binary classification problems.
- Used for binary classification problems, such as spam identification.

Support Vector Machines (SVM):

- Used for both data classification and regression.
- Constructs a hyperplane where the distance between two classes of data points is at its maximum.

K-Nearest Neighbor (KNN):

- Classifies data points based on their proximity and association to other available data.
- Used for recommendation engines and image recognition.

Random Forest:

- Flexible supervised machine learning algorithm used for both classification and regression purposes.

Supervised Learning Challenges

- Requires specific expertise for accurate structure.
- Training models can be time-consuming.
- High likelihood of human error in datasets.
- Cannot cluster or classify data independently.