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Classification:

\*Predicts a categorical label or class (e.g., spam/not spam, dog/cat, etc.)

\*Output variable is discrete

Algorithms:

Logistic Regression, Decision Trees, Random Forest, Support Vector Machines (SVM), K-Nearest Neighbors (KNN)

Definition:

Classification is a type of supervised learning where the algorithm predicts a categorical label or class that an instance belongs to, based on its features.

Types:

\* Binary Classification: Predicts one of two classes (e.g., spam/not spam, 0/1, yes/no)

\*Multi-Class Classification: Predicts one of multiple classes (e.g., dog/cat/bird, 1/2/3)

\* Multi-Label Classification: Predicts multiple labels for each instance (e.g., tagging a photo with multiple objects)

\*Imbalanced Classification: Deals with unequal class distributions (e.g., fraud detection, rare disease diagnosis)

Uses:

- Image classification (e.g., object detection, facial recognition)

- Sentiment analysis (e.g., positive/negative review)

- Customer churn prediction

- Medical diagnosis (e.g., disease classification)

- Text classification (e.g., spam filtering, topic modeling)

Regression:

\*Predicts a continuous value or range (e.g., house prices, temperature, etc.)

\*Output variable is numerical

\*Algorithms: Linear Regression, Ridge Regression, Lasso Regression, Elastic Net Regression, Decision Trees, Random Forest

Definition: Regression is a type of supervised learning where the algorithm predicts a continuous or numerical value, based on its features.

Types:

\* Simple Linear Regression: Predicts a continuous value using a single feature and a straight-line relationship

\*Multiple Linear Regression: Predicts a continuous value using multiple features and a linear relationship

\*Non-Linear Regression: Predicts a continuous value using non-linear relationships between features and target

\*Logistic Regression: Predicts a binary target variable using a logistic function (often used for binary classification)

\*Polynomial Regression: Predicts a continuous value using polynomial relationships between features and target

Uses:

- Predicting house prices

- Stock market prediction

- Energy consumption forecasting

- Medical prediction (e.g., blood pressure, disease progression)

- Time series forecasting (e.g., weather, sales)