Artificial Intelligence

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Contents

Statistics

1.1 Basic Concepts

1.1.1 Mean

The mean, also known as the **average**, is obtained by dividing the sum of observed values, data values x_i, by the number of observations, n.

$$\bar{X} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Equation xxx can be used when the error associated with each measurement is the same or unknown.

1.1.2 Weighted Average

The weighted average is related to the mean, but incorporates the standard deviation.

$$X_{\text{wav}} = \frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i}$$

where

$$w_i = \frac{1}{{\sigma_i}^2}$$

and x_i is the data value.

1.1.3 Median

1.1.4 Mode

1.1.5 Standard Deviation

1.1.6 Gaussian Distribution

1.2 Metrics

1.2.1 Accuracy

Proportion of correct predictions and total predictions.

$$\text{Accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{TN} + \text{FP} + \text{FN}}$$

1.2.2 Recall

Proportion of true positives and total positives.

$$\text{Recall} = \frac{\text{TP}}{\text{TP} + \text{FN}}$$

1.2.3 Precision

Proportion of true positives and positive predictions.

$$\text{Precision} = \frac{\text{TP}}{\text{TP} + \text{FP}}$$

1.2.4 F1-Score

Mean of precision and recall.

$$\text{F1-Score} = 2 * \frac{\text{Precision} * \text{Recall}}{\text{Precision} + \text{Recall}}$$

Mathematics

2.1 Some Section

2.1.1 Sigmoid

Algorithms

AI algorithms can be classified by their learning approach, task type, domain, domain, and others.

Learning approach

- Supervised learning.
- Unsupervised learning.
- Reinforcement learning.
- Semi-supervised learning.

Task type

- Classification: used to sort data into categories.
  - Binary classification: separates data into two classes.
  - Multi-class classification: assigns an item to three or more classes.
- Regression: used to predict a continuous value.

Domain

- Natural Language Procesing (NLP).
- Computer vision.

3.1 Supervised Learning

3.1.1 Linear Regression

3.1.2 Logistic Regression

3.1.3 K-Nearest Neighbor

3.1.4 Decision Tree

3.1.5 Support Vector Machine

3.1.6 Naive Bayes

3.2 Unsupervised Learning

3.3 Optimization