ACTIVIDAD #1

Tipo actividad: Reading comprehension "Machine Learning Model Evaluation", antonym activity and multiple choice activity

2) Key vocabulary reading activity.

- Machine Learning Model Evaluation: The process of analyzing the performance of machine learning models using various metrics to determine their predictive power and generalization capabilities.
- Metrics: Quantitative measures used to evaluate the performance of machine learning models, including accuracy, precision, recall, F1 score, area under the curve (AUC), confusion matrix, and mean square error (MSE).
- Cross Validation: A technique where the dataset is divided into k subsets, with one subset used for testing and the remaining k-1 subsets used for training the model, repeated k times to ensure each subset serves as both a test and training subject.
- Holdout: A simple approach where the dataset is divided into training and test datasets, typically in ratios like 70:30 or 80:20, with a large portion used for training and a small portion for testing the model.

- Evaluation Metrics for Classification Task: Specific metrics used to evaluate the performance of classification tasks, such as accuracy score, precision, recall, and F1 score, often accompanied by the visualization of a confusion matrix.
- Python Libraries: Essential libraries like Pandas, Numpy, Matplotlib/Seaborn, and Scikit-learn used for handling data, performing analysis, visualization, and implementing machine learning algorithms efficiently.
- Decision Trees: A type of machine learning algorithm used for classification and regression tasks, known for its intuitive decision-making process resembling a tree structure.

3) Reading comprehension activity: "Machine Learning Model Evaluation"

Reading: "Machine Learning Model Evaluation"

Machine Learning Model does not require hard-coded algorithms. We feed a large amount of data to the model and the model tries to figure out the features on its own to make future predictions. So we must also use some techniques to determine the predictive power of the model.

Machine Learning Model Evaluation

Model evaluation is the process that uses some metrics which help us to analyze the performance of the model. As we all know that model development is a multi-step process and a check should be kept on how well the model generalizes future predictions. Therefore evaluating a model plays a vital role so that we can judge the performance of our model. The evaluation also helps to analyze a model's key weaknesses. There are many metrics like Accuracy, Precision, Recall, F1 score, Area under Curve, Confusion Matrix, and Mean Square Error. Cross Validation is one technique that is followed during the training phase and it is a model evaluation technique as well.

Cross Validation and Holdout

Cross Validation is a method in which we do not use the whole dataset for training. In this technique, some part of the dataset is reserved for testing the model. There are many types of Cross-Validation out of which K Fold Cross Validation is mostly used. In K Fold Cross Validation the original dataset is divided into k subsets. The subsets are known as folds. This is repeated k times where 1 fold is used for testing purposes. Rest k-1 folds are used for training the model. So each data point acts as a test subject for the model as well as acts as the training subject. It is seen that this technique generalizes the model well and reduces the error rate

Holdout is the simplest approach. It is used in neural networks as well as in many classifiers. In this technique, the dataset is divided into train and test datasets. The dataset is usually divided into ratios like 70:30 or 80:20. Normally a large percentage of data is used for training the model and a small portion of the dataset is used for testing the model.

Evaluation Metrics for Classification Task

In this Python code, we have imported the iris dataset which has features like the length and width of sepals and petals. The target values are Iris setosa, Iris virginica, and Iris versicolor. After importing the dataset we divided the dataset into train and test datasets in the ratio 80:20. Then we called Decision Trees and trained our model. After that, we performed the prediction and calculated the accuracy score, precision, recall, and f1 score. We also plotted the confusion matrix.

Importing Libraries and Dataset

Python libraries make it very easy for us to handle the data and perform typical and complex tasks with a single line of code.

- Pandas – This library helMachine Learning Modelps to load the data frame in a 2D array format and has multiple functions to perform analysis tasks in one go.
- Numpy – Numpy arrays are very fast and can perform large computations in a very short time.
- Matplotlib/Seaborn – This library is used to draw visualizations.

- Sklearn – This module contains multiple libraries having pre-implemented functions to perform tasks from data preprocessing to model development and evaluation.

Adapted from: *https://www.geeksforgeeks.org/machine-learning-model-evaluation/*

4) Antonym activity.

Match each term with its corresponding antonym to reinforce understanding of the concepts discussed in the text.

Terms: Model learning model

1. Model Evaluation
2. Metrics
3. Cross Validation
4. Holdout
5. Evaluation Metrics
6. Python Libraries
7. Decision Trees

Antonyms:

1. Model Creation ( )
2. Subjective Measures ( )
3. Manual Data Analysis ( )
4. Single Validation ( )
5. Manual Processing ( )
6. Validation Standards ( )
7. Inclusion ( )
8. Random Guessing ( )

5) Multiple choice activity.

According to the text, select the correct answer:

1.What is the purpose of model evaluation in machine learning?

a) To hard-code algorithms into the model
b) To determine the predictive power of the model
c) To reduce the size of the dataset
d) To increase the complexity of the model

2.Which technique involves reserving a portion of the dataset for testing the model?

a) Cross Validation
b) Holdout
c) Decision Trees
d) Precision-Recall Curve

3.What is the purpose of K Fold Cross Validation?

a) To use the entire dataset for training
b) To divide the dataset into train and test datasets
c) To generalize the model well and reduce the error rate
d) To increase the bias of the model

4.Which metric is NOT typically used for evaluating classification tasks?

a) Accuracy score
b) Mean Square Error
c) Precision
d) Recall

5.Which Python library is commonly used for drawing visualizations?

a) Numpy
b) Matplotlib/Seaborn
c) Pandas
d) Sklearn