Data Science

- SCSA 3016

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Assignment - 11

Fill in the blanks:

1. Artifical Intelligence
2. Machine Learning
3. Supervised Learning
4. two components (structural and numerical parameters)
5. to estimate level of fit of a model to a data set that is independent of the data that were used to train the model

Short Answers

1. There are three types of Machine learning
   a) Supervised learning
   b) Unsupervised Learning
   c) Reinforcement learning

2. Approaches of dimensionality reduction
   a) Filters method
   b) Wrappers Methods
   c) Embedded Methods

3. Principal component analysis (PCA) is the process of computing the principal components and using them to perform a change of bars on the data, sometimes using only the first few principal components and ignoring the rest.

4. Neural Network

A neural network is a series of algorithm that endeavors to to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates.

There are three components:

-> input layer

-> a processing layer

-> output layer

5. A confusion matrix is a table that is often used to describe the performance of a classification model on a set of test data for which the true values are unknown.

Long Answer

1. There are three types of machine learning:

a) Supervised Learning

It is based on the results of a previous operations that is related to the existing business operations. Based on previous patterns, supervised learning aids in the prediction of an out come. Some of the supervised Algorithms are:

→ Linear Regression: Regression models a target prediction value based on independent variables.

→ Random Forest: Random Forest is an ensemble learning method for classification, regression and other tasks that operates by constructing a multitude of decision trees at training time.

→ Support vector machine: SVM is a supervised machine learning algorithm that can be used for both classifications or regression challenges.

b) Unsupervised Learning

This form of learning has no pre-existing consequence or patterns. Instead, it concentrates on examining the interaction and connections between the presently available Data points.

Some of the Unsupervised Learning Algorithm are:

→ KNN (k-Nearest Neighbors): K-nearest neighbors algorithms is a non-parametric supervised learning method. ~~fast~~

→ Hierarchical clustering: It is an algorithm that groups similar objects into groups.

→ Anomaly detection: It is the identification of unexpected events, observations, or items that differ significantly from the norm.

c) Reinforcement learning

It is a fascinating Machine learning technique that uses a dynamic Dataset that interacts with the real world. In simple terms, it is a mechanism by which a system learns from its mistakes and improves over time. Some of the Reinforcement learning Algorithm are:

→ Q-learning: It is an off policy reinforcement learning algorithm that seeks to find the best action to take given the current state.

→ SARSA (State-action-reward-state-action): It is an algorithm for learning a Markov decision process policy, used in the reinforcement learning area of machine learning.

→ Deep Q Network- Replaces the regular Q-table with neural network. Rather than mapping a state-action pair to a q-value,