Solutions

Ans1:

Supervised Learning: Supervised Learning is a machine learning technique which is defined by its use of label datasets. These datasets are intended to train algorithms into classifying data or predicting outcomes accurately. Using both labelled inputs and outputs, the model can determine its accuracy and learn over time.

Supervised learning can be further divided into two types:

Classification: It is a problem which uses an algorithm to accurately assign test data into specific categories such as identify spam. Each data sample is labeled as belonging to some class. There is no order among classes.

Regression: It is a type of Supervised learning method which uses an algorithm to understand the relationship between dependent and independent variables. Each data sample is provided with one or more feature variables, which are associated with a scalar continuous output variable.

Unsupervised Learning: Unsupervised learning uses machine learning algorithms to both analyse and cluster unlabelled datasets. With the help of these algorithms, we can determine hidden patterns in data without the human interfere. Therefore, it is called as unsupervised learning.

Unsupervised learning can be further divided into three types:

Clustering: It is a type of data mining method in which grouping the unlabelled data based on their differences or similarities. For example, In K-means clustering algorithm, it assigns the similar data points into groups, where the value of K displays the grouping size and its granularity.

Association: It is an another type of unsupervised learning technique which uses different rules in order to find the relationships between variables for given dataset.

Dimensionality reduction: It a learning method which is used when given dataset has too high number of features or dimensions. It helps in to reduce the number of data inputs to a desirable size while maintaining the data integrity.

Online Learning: Online learning is a training method in which the model is sequentially trained, and training dataset is updated during the training phase unlike training the model on whole dataset at once. It usually used in scenarios where the training data is generated as a function of time. For example: Stock price prediction.

Batch Learning: Batch learning is a training method in which the whole training dataset is considered into a single step. In this learning we include all the examples for every step of gradient descent.

Model Based Learning: Model based learning is an algorithm that takes an environment form models. All assumptions about the domain are made in the form of a model explicitly. This model is then used for creating a model specific to learn about the various aspects of the entire domain. Model-based learning can be either supervised or unsupervised, depending on whether the training data is labeled or not.

Instance Based Learning: Instance based learning is a training method in which a class label or prediction is based on the similarity of the query of its nearest neighbour in the training data. This type of learning method does not create an abstraction from specific instances rather it stores all the

data and at query extract the answer by examining the nearest query neighbour. Example of instance based learning algorithms include k-nearest neighbours (k-NN)