

AAI 695-Applies Machine Learning

HW 1

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1.[18 points] Explain the following concepts:

1) supervised learning: Supervised learning is a Model for Machine Learning, that might be able to produce classification regions, where an algorithm in which example set of labelled data and corresponding output is provided to train the system in recognizing output from example dataset. We know what kind of data we are dealing with, since it is labelled data.

There are two types of supervise learning,

1. Classification: classification problem deals with segregation of data into different labelled buckets. For Example, separation of sample colors: blue and red
2. Regression: Regression problem predicts a continuous outcome variable based on dependent parameters. It is the prediction of trends in labeled data to determine future outcomes.

2) unsupervised learning: Unsupervised learning is a machine learning task, that does not supervised the model, but it let the model work on its own to discover information that may not be visible. Unsupervised learning uses Machine Learning algorithm that draw conclusions on Unlabeled data. With Unsupervised learning algorithm, We can find thing such as groups/ clusters, perform density estimation and dimensionality reduction. The Method has fewer tests and fewer models that can be used in order to ensure the outcome of the model is accurate.

Unsupervised learning can be classified into,

1. Clustering: In clustering problem, The algorithm is aimed at finding groups with similar features within the data.
2. Association: This Problem is where the algorithm is aimed at trying to find relation that associate large portion of the data.

3) online learning: Online learning is a type of ML algorithm which is trained incrementally over data is available dynamically, in sequential order. This method is used for continuously updating predictions for the next set of data that is going to be available. This kind of algorithm is therefore used where data is dynamically generated and volatile like stock market, or in areas where data available is so massive that it computationally impractical to train over the entire dataset.

4) batch learning: In batch learning, the system must be trained using all the available data. Thus, it is not capable of learning incrementally, and for making the algorithm learn a new type of data it, needs to be retrained over the entire dataset. Since this requires a huge amount of computational power, It is mostly done offline and then launched into production, after which it doesn't learn anymore. Thus batch learning is also known as offline learning.

5) model-based learning: Model learning is an algorithm that task an environment and forms 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 aspect of the entire domain.

6) instance-based learning: Instance based learning is a method that is used to produce a class label or prediction based on similarities of new instances with previously observed training instances. Instances based learning therefore includes a family of algorithms that do not generalize the data to predict outcome, but rather compares instances of new data with those present in memory.