Homework #1 (60 points) AAI 695 Applied Machine Learning

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Due data: 2/2/2022, end of the day.

1) [18 points] Explain the following concepts:
1) supervised learning,
2) unsupervised learning, 3) online learning,
4) batch learning,
5) model-based learning, 6) instance-based learning.

1) **Supervised Learning**: G: X→ Y, Where X is input space and Y is targeted output Space. Supervised learning is an approach where an algorithm is trained on basis of input data that is labeled as a specific output.

2) **Unsupervised Learning**: G:X→Y, Where X is input space and Y is untargeted output Space. Unsupervised Learning Machine Learning draw inferences from the training data itself and the final label is unknown to us.

3) **Online Learning: -** online learning is a fundamentally different approach, one that embraces the fact that learning environments can (and do) change from second to second. It is usually used in situations where the training data is generated as a function of time. e.g., stock price prediction.

4) **Batch Learning:** Batch learning represents the training of machine learning models in a batch manner. In Batch learning we consider all the examples for every step of gradient descent.

5) **Model-based learning**:
Model-based learning is a type of training that aims to generate a custom solution for each new application. The agent in this technique seeks to comprehend the world and produce a representation of it. Instead, then trying to solve a problem using a predetermined set of techniques, this approach aims to construct a model specific to the challenge at hand.

6) **Instance Based Learning**:
Instance-based learning is a training method in which a class label/prediction is determined by the query similarity of the training set's nearest neighbor. Instance-based

learning approaches do not abstract specific instances; instead, they keep all of the data and extract the response by assessing the query's nearest neighbor at query time.