Assignment 7.2

1. **What are the three stages to build the hypotheses or model in machine learning?**

Ans: Three stages of Hypothesis:

1.Model Building

2.Model evaluation

3.Applying the model

1. **What is the standard approach to supervised learning?**

Ans: 1.To split the set of example into the training set and the test

2.Train the model using training dataset and validate it using test dataset.

1. **What is Training set and Test set?**

Ans: Training set: Data which is used to train/learn the model

Test set: Data which is used to test the performance/Accuracy of the model

Training set are distinct from Test set.

1. **What is the general principle of an ensemble method and what is bagging and**

**boosting in ensemble method?**

Ans : The general principle of an ensemble method is to combine the predictions of

several models built with a given learning algorithm in order to improve robustness

over a single model.

**Bagging**

Bagging attempts to reduce the chance overfitting complex models.

It trains a large number of "strong" learners in parallel.

A strong learner is a model that's relatively unconstrained.

Bagging then combines all the strong learners together in order to "smooth out" their predictions.

**Boosting**

While boosting method are used sequentially to reduce the bias of the combined model.

Weakness/error of previous model can be provide as input to th enext model.

Boosting attempts to improve the predictive flexibility of simple models.

It trains a large number of "weak" learners in sequence.

A weak learner is a constrained model (i.e. you could limit the max depth of each decision tree).

Each one in the sequence focuses on learning from the mistakes of the one before it.

Boosting then combines all the weak learners into a single strong learner.

1. **How can you avoid overfitting ?**

Ans: There are diffeerent ways you can Avoid Overfitting

1. Cross validation

In standard k-fold cross-validation, we partition the data into k subsets, called folds.

Then, we iteratively train the

algorithm on k-1 folds while using the remaining fold as the test set (called the “holdout fold”).

1. Train with more data

so that model can learn in better way.

1. Remove features

Some algorithms have built-in feature selection.

For those that don’t, you can manually improve their generalizability by removing irrelevant input features.

1. Regularization

The method will depend on the type of learner you’re using. For example, you could prune a decision tree, use dropout on a neural network, or add a penalty parameter to the cost function in regression.

Oftentimes, the regularization method is a hyperparameter as well, which means it can be tuned through cross-validation.

1. Ensembling.

Ensembles are machine learning methods for combining predictions from multiple separate models.

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