**HLT on Algorithms.**

Chosen algorithm: **Random Forest**

**What is a Random Forest?**

A random forest is a supervised machine learning algorithm that is constructed from decision tree algorithms.

It is a machine learning technique that’s used to solve regression and classification problems. It utilizes ensemble learning, which is a technique that combines many classifiers to provide solutions to complex problems.

**What does the algorithm do?**

The algorithm establishes the outcome based on the predictions of the decision trees. It predicts by taking the average or mean of the output from various trees. Increasing the number of trees increases the precision of the outcome.

A random forest algorithm consists of many decision trees. The ‘forest’ generated by the algorithm is trained through bagging or bootstrap aggregating. Bagging is an ensemble meta-algorithm that improves the accuracy of machine learning algorithms.

**In which situations will it be most useful?**

A random forest eradicates the limitations of a decision tree algorithm. It reduces the overfitting of datasets and increases precision. It generates predictions without requiring many configurations in packages like [scikit-learn](https://en.wikipedia.org/wiki/Scikit-learn).

As such, Random Forest is suitable for situations when we have a large dataset, and interpretability is not a major concern.  Decision trees are much easier to interpret and understand. Since a random forest combines multiple decision trees, it becomes more difficult to interpret.

**Can you find any examples of where this  
algorithm has been used?**

There are many domains where Random Forest Analysis has been used.

Some major Applications of Random Forest in different sectors:

* Banking Industry
  + Credit Card Fraud Detection
  + Customer Segmentation
  + Predicting Loan Defaults on LendingClub.com
* Healthcare and Medicine
  + Cardiovascular Disease Prediction
  + Diabetes Prediction
  + Breast Cancer Prediction
* Stock Market
  + Stock Market Prediction
  + Stock Market Sentiment Analysis
  + Bitcoin Price Detection
* E-Commerce
  + Product Recommendation
  + Price Optimization
  + Search Ranking

**References**

1. <https://iq.opengenus.org/applications-of-random-forest/>
2. <https://en.wikipedia.org/wiki/Random_forest#:~:text=Random%20forests%20or%20random%20decision,decision%20trees%20at%20training%20time.&text=Random%20forests%20generally%20outperform%20decision,lower%20than%20gradient%20boosted%20trees>.
3. <https://www.section.io/engineering-education/introduction-to-random-forest-in-machine-learning/>