Classification vs Clustering

- Classification is used for supervised learning whereas clustering is used for unsupervised learning.
- The process of classifying the input instances based on their corresponding class labels is known as classification whereas grouping the instances based on their similarity without the help of class labels is known as clustering.
- As Classification have labels so there is need of training and testing dataset for verifying the model created but there is no need for training and testing dataset in clustering.
- Classification is more complex as compared to clustering as there are many levels in the classification phase whereas only grouping is done in clustering.
- Classification examples are Logistic regression, Naive Bayes classifier, Support vector machines, etc. Whereas clustering examples are k-means clustering algorithm, Fuzzy c-means clustering algorithm, Gaussian (EM) clustering algorithm, etc.
- Uses Cases of Classification
    1. Recommendation System
    2. Social media text Classification
    3. Fault detection

  Use Cases of Clustering
    1. Customer Segmentation
    2. Image Segmentation
    3. Generalization

Classification vs Regression

- Classfication classifies the data into different classes, which are discrete in nature, whereas regression the target variable is continuous in nature.

- Classification Algorithm finds the best possible boundary to divide the classes of data whereas regression algorithm finds the best fit line to figure out the trends of the data
- Evaluation metrics like Precision,Recall and F1 score are used to evaluate the performance of the classification algorithm whereas in regression algorithm evaluation metrics like mean squared error and r2 squared are used.
- Output variables are categorical labels in classification, whereas in regression itis continuous numerical variable
- Use cases of Classification:
    1. Image Recognition -
    2. Object Detection in Autonomous vehicle
    3. Face Recognition
    4. Disease Diagnosis
    5. Language identification
    6. Email Spam filtering

  Use cases of Regression:
    1. Stock price prediction
    2. House Price Prediction
    3. Demand Forecating
    4. Weather Forecasting