1. A feature is a measurable property or characteristic of a phenomenon that is used as input to a machine learning algorithm. For example, in an image classification task, features could be the intensity of the pixels, color histograms, or texture descriptors.

2. Feature construction is required when the available features are not sufficient to solve a particular machine learning problem, or when the existing features are not informative enough. For example, in natural language processing, features may need to be constructed from raw text by using techniques such as tokenization, stemming, and n-grams.

3. Nominal variables are categorical variables with no inherent ordering, such as colors or names. They can be encoded using one-hot encoding, where each possible value of the variable is represented by a binary variable.

4. Numeric features can be converted to categorical features by binning or discretization. Binning involves dividing the range of the feature into a fixed number of intervals, while discretization involves grouping the values into a smaller number of categories based on some criteria.

5. The feature selection wrapper approach involves training a machine learning algorithm multiple times, each time using a different subset of features, and selecting the subset of features that yields the best performance. The advantages of this approach are that it considers the interactions between features and can lead to better performance. The disadvantages are that it can be computationally expensive and may overfit the model to the training data.

6. A feature is considered irrelevant if it does not contain any information that is useful for predicting the target variable. One way to quantify the relevance of a feature is to measure its correlation with the target variable.

7. A feature is considered redundant if it provides the same information as another feature or can be derived from other features. Criteria for identifying redundant features include measuring their correlation with each other or performing a principal component analysis.

8. Distance measurements used to determine feature similarity include Euclidean distance, Manhattan distance, cosine similarity, and Jaccard similarity.

9. Euclidean distance is the straight-line distance between two points in a Euclidean space, while Manhattan distance is the sum of the absolute differences between the coordinates of the points along each dimension.

10. Feature transformation involves transforming the original features into a new representation, such as by scaling or normalizing them, while feature selection involves selecting a subset of the original features that are most relevant for the task at hand.

11.

- SVD (Singular Value Decomposition) is a matrix factorization technique that is used for dimensionality reduction and feature extraction. It decomposes a matrix into three matrices that represent its row space, column space, and diagonal matrix of singular values.

- Collection of features using a hybrid approach involves combining multiple types of features, such as handcrafted and deep learning-based features, to improve the performance of a machine learning model.

- The width of the silhouette is a measure of cluster quality that quantifies the distance between clusters and the compactness of the data points within each cluster.

- Receiver operating characteristic (ROC) curve is a graphical representation of the performance of a binary classification model at different classification thresholds. It plots the true positive rate against the false positive rate at various thresholds.