What is the difference between Normalization and standardization?

**Normalization**

Normalization is a process in data management that involves organizing data to minimize redundancy and improve data integrity1. When you normalize a dataset, you reorganize it to remove any unstructured or redundant data, enabling a superior, more logical means of storing that data1. The main goal of normalization is to achieve a standardized data format across your entire system1. This allows the data to be queried and analyzed more easily, which can lead to better business decisions1.

**Standardization (or Z-score Normalization)**

Standardization, also known as Z-score normalization, is a technique often performed as a pre-processing step before many machine learning models2. It is used when features of the input dataset have large differences between their ranges or are measured in different units2. Standardization transforms features to comparable scales by subtracting the mean and dividing by the standard deviation for each value of each feature2. Once the standardization is done, all the features will have a mean of zero and a standard deviation of one2. This ensures that no single feature dominates others due to its scale, providing a balanced input to the model2.