

# The application of unsupervised learning to the AC susceptibility data of High-Temperature Superconductors

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This work gives an insight if clustering technique applied to the dataset consisting of about 1000 measurements of High-Temperature Superconductors using the AC susceptibility method, will allow to recover known and unknown relationships (features) between different types of high-temperature superconductors and their superconducting properties, which depend on type of superconductor, sample preparation method and sample preparation conditions like sintering and annealing. The dataset was simplified by using a Convolutional Autoencoder and the Bag of Words (BOW) representation. The k-means and DBSCAN (Density-based spatial clustering of applications with noise) methods were used for clustering. The obtained results were visualised by the t-SNE algorithm (t-Distributed Stochastic Neighbor Embedding). As a result, a single AC vs temperature measurement is represented by only five numeric values.

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