

Eigenvalues and Eigenvectors

Eigenvalues and Eigenvectors, are broad mathematical terms that play an important role in the field of artificial intelligence (AI) and machine learning (ML). They allow us to find patterns, reduce dimensional uncertainty, and understand complex data. Through the use of these terms, we can gain valuable insights, improve algorithm performance, and construct more precise models, all of which contribute to the advancement of AI and ML systems.

Feature Extraction

Feature extraction refers to the process of transforming raw data into numerical features that can be processed while preserving the information in the original data set. It yields better results than applying machine learning directly to the raw data.

Feature extraction can be accomplished manually or automatically:

- Manual feature extraction requires identifying and describing the features that are relevant for a given problem and implementing a way to extract those features. In many situations, having a good understanding of the background or domain can help make informed decisions as to which features could be useful. Over decades of research, engineers and scientists have developed feature extraction methods for images, signals, and text. An example of a simple feature is the mean of a window in a signal.
- Automated feature extraction uses specialized algorithms or deep networks to extract features automatically from signals or images without the need for human intervention. This technique can be very useful when you want to move quickly from raw data to developing machine learning algorithms. Wavelet scattering is an example of automated feature extraction.