



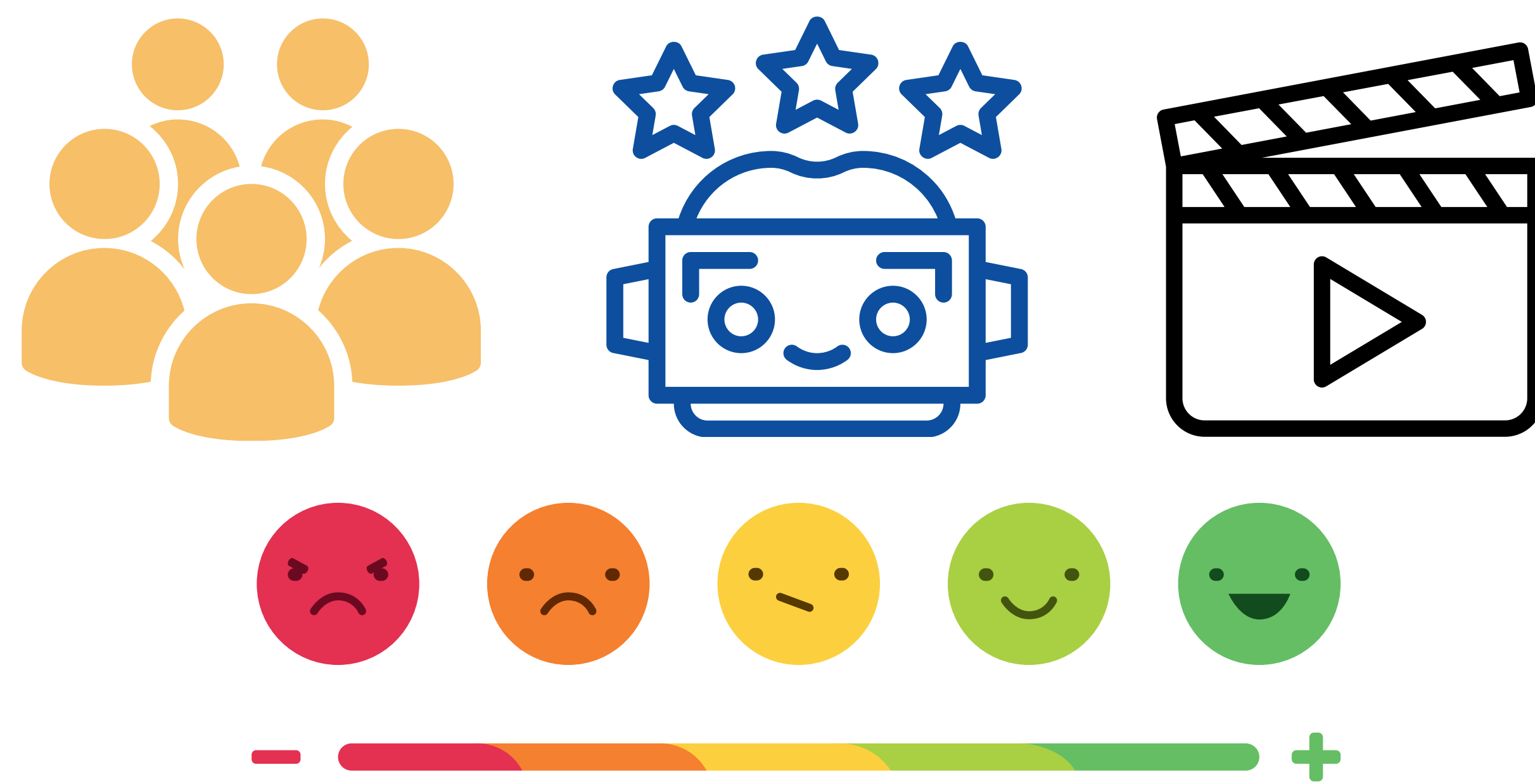
URL4MC: Unsupervised Representation Learning for Matrix Completion



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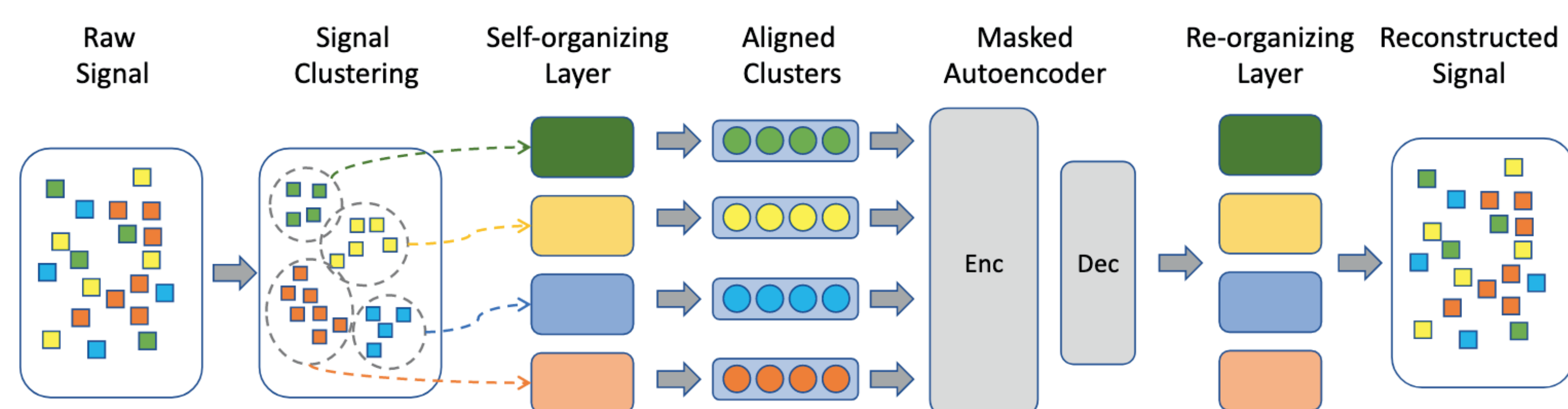
Background

Matrix Completion is a simple mathematical problem that has various applications in the real world. The famous Netflix Challenge can be viewed as a matrix completion problem. This technique, which learns to predict the missing values in the user-movie rating matrix, is called a recommendation system.

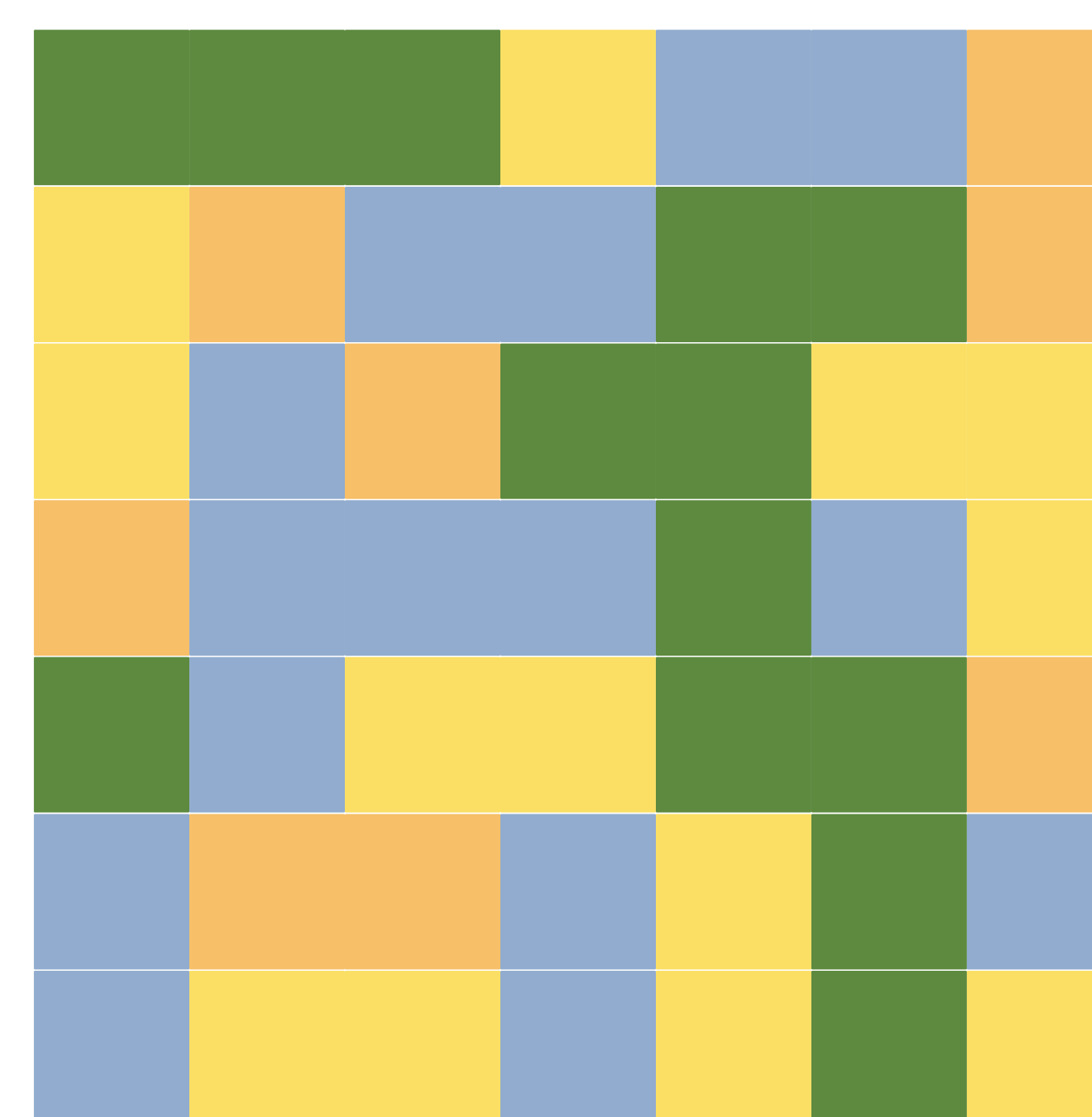
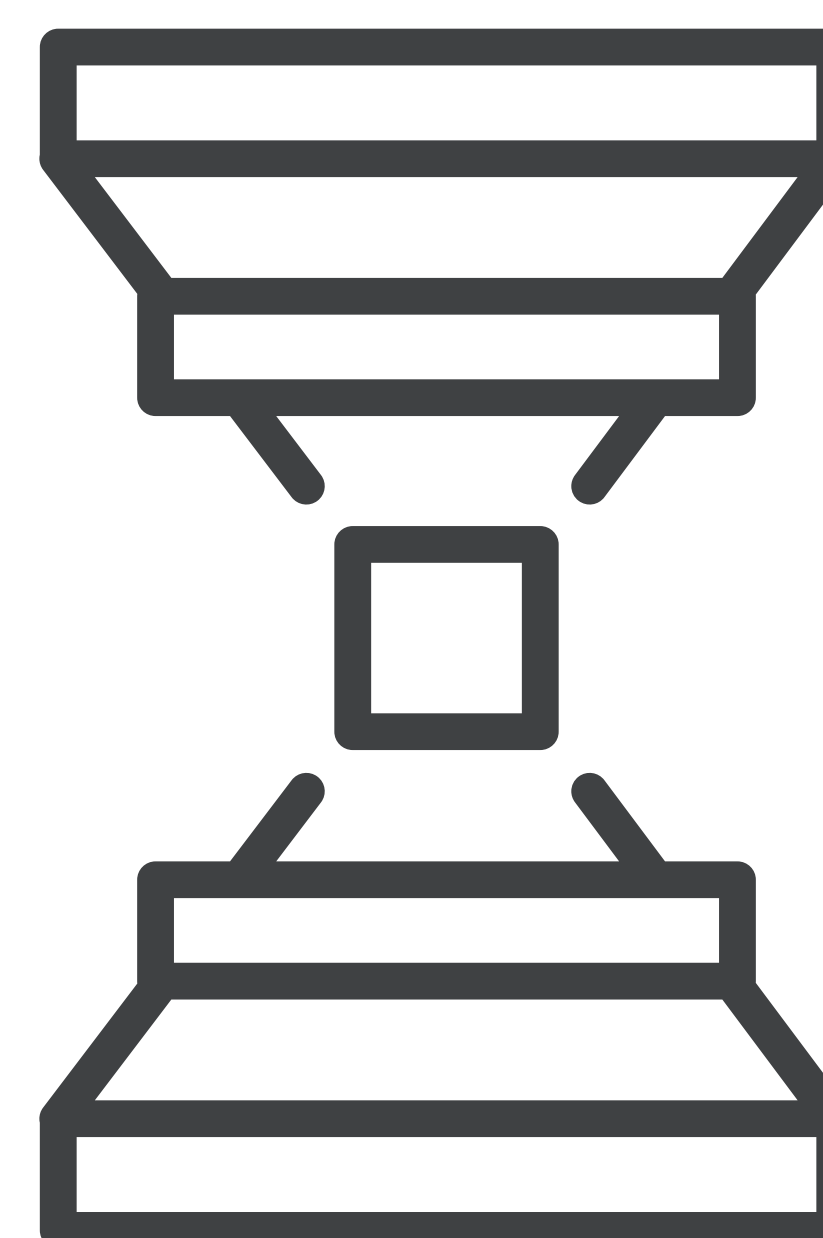
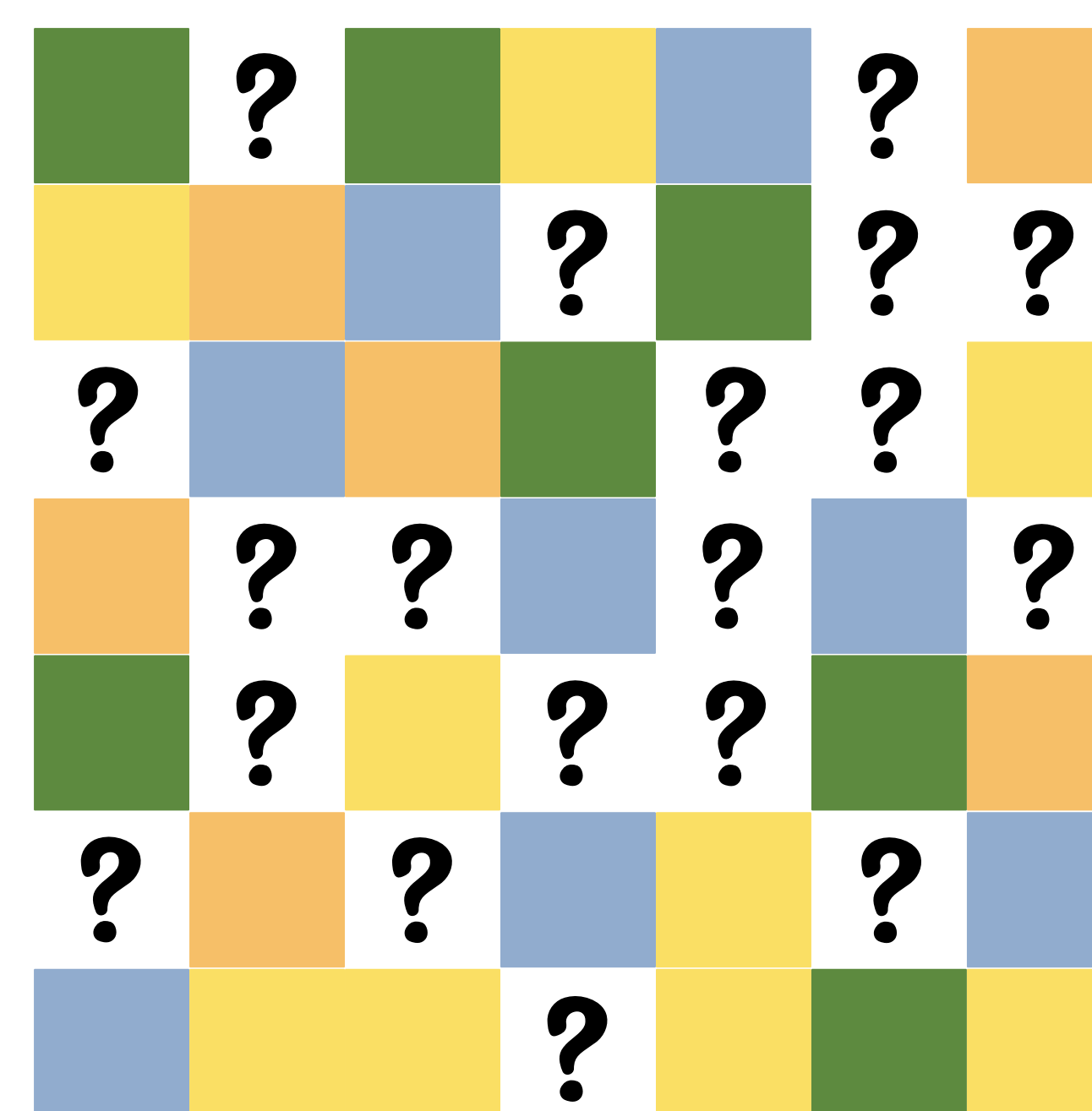


Matrix Completion can also be applied to many other realistic problems, such as Social Network Information Completion and Distance Estimation.

How our method works



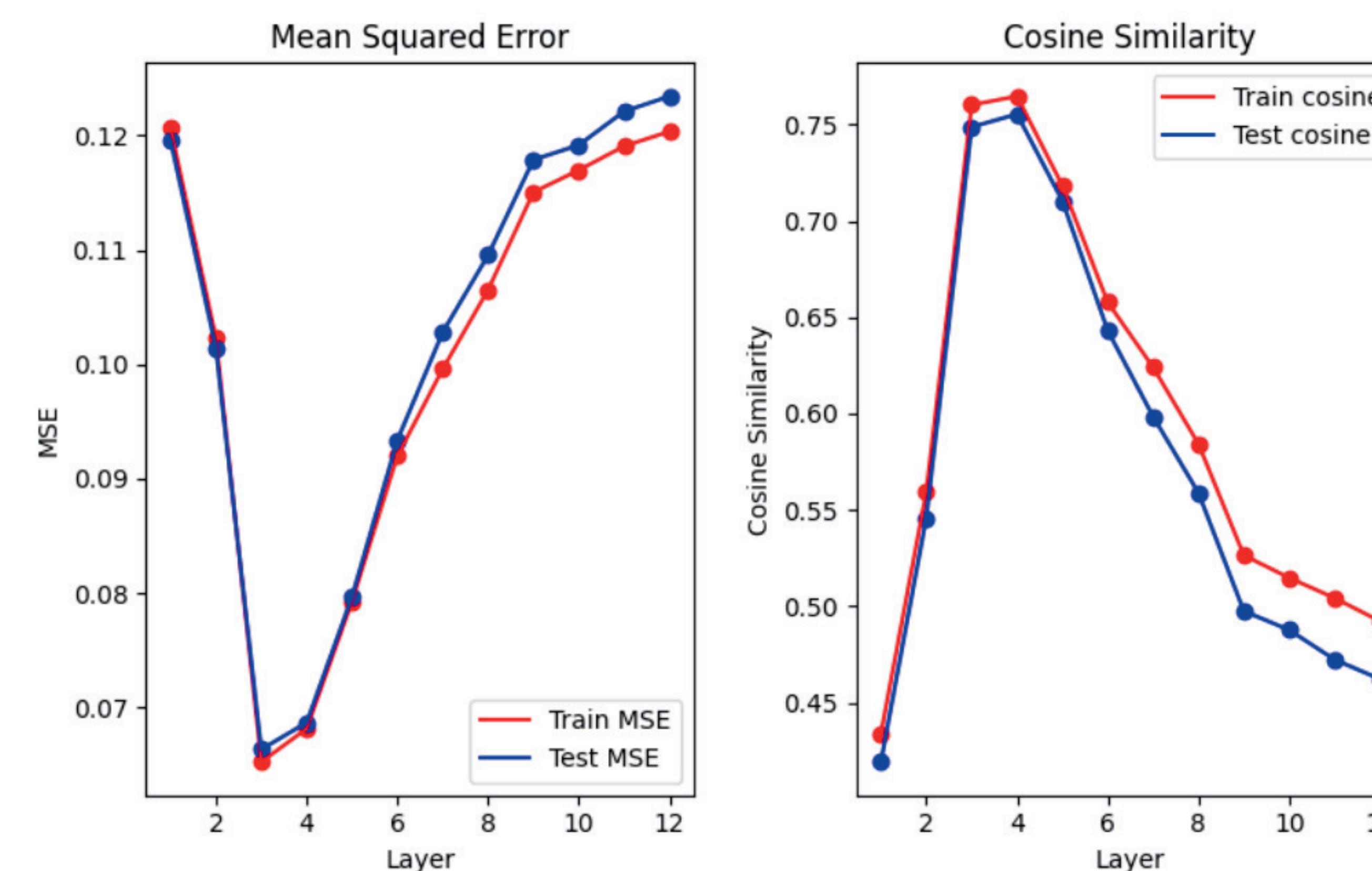
- Cluster the features with high correlation
- Self-organize the clusters into a sequence
- Process through a masked autoencoder architecture



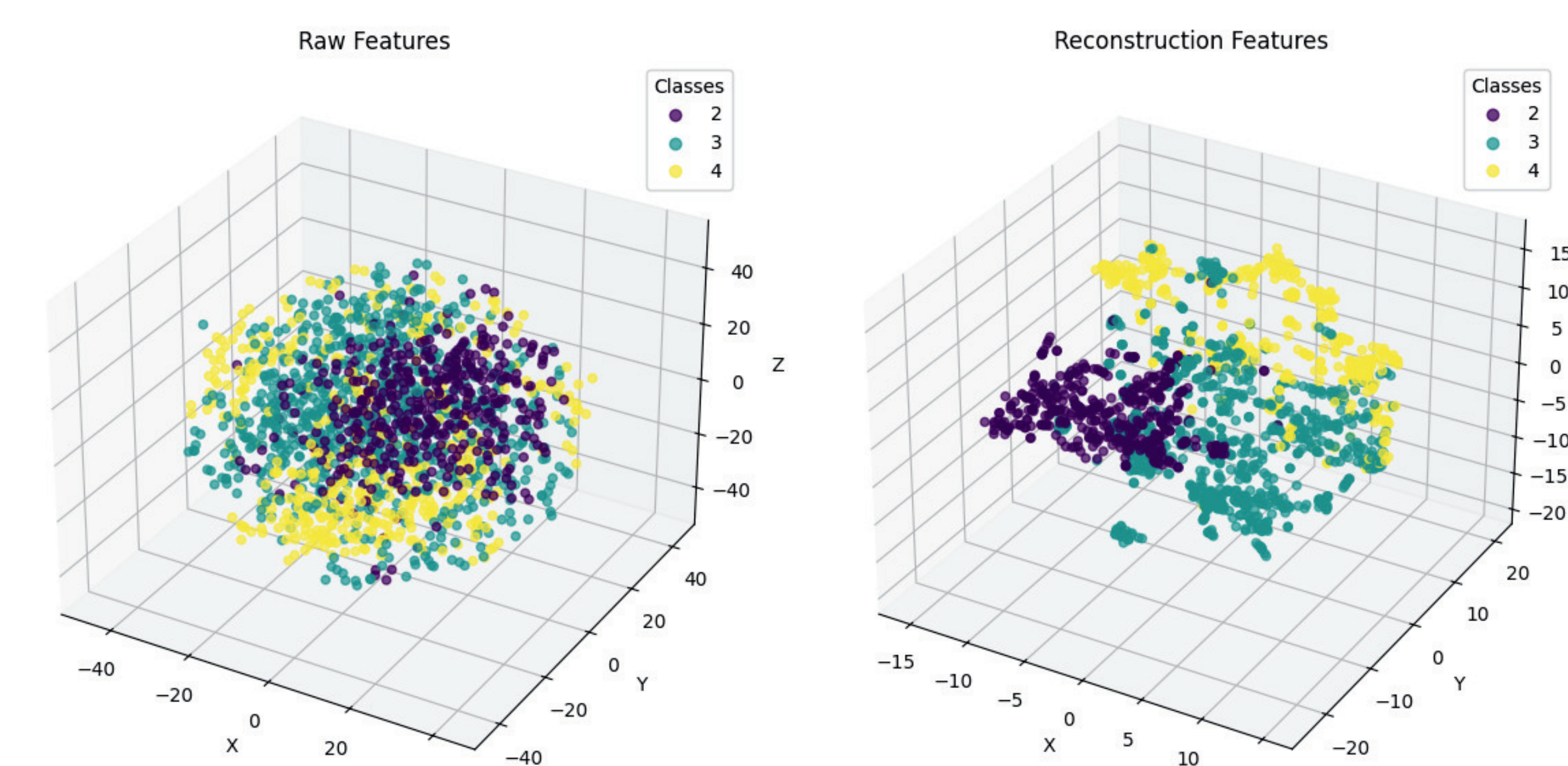
Settings

Given a matrix with some entries missing, utilize the known values to fill in the missing values.

Results



Visualization



Left: Matrix values with missing entries
Right: Matrix values after completion
Different classes shown in different colors

Future Work

- Develop more effective methods for matrix completion
- Apply unsupervised learning methods to other mathematical problems