**Introduction**

1. **Diffusion Maps**

Diffusion maps are a dimensionality reduction technique which is beneficial in data analysis due to its applicability to nonlinear data. Additionally, diffusion maps are commonly used to discover underlying properties of a data set that would not necessarily be revealed by other dimensionality reduction techniques [1]. More here?

The first step in implementing a diffusion map is to develop a kernel. The kernel acts as a measure of similarity between two data points and is often denoted as follows [2]:

The measure of “similarity” between two data points can be defined in a variety of ways. A common similarity measure is Euclidean distance in instances where data points can be described in terms of their coordinates in a Euclidean space. However, sometimes overall similarity should account for other data attributes such as color of pixels in an image [3].

1. **K-Means Clustering**
2. **Diffusion Maps**

**Methods**

The kernel developed for this model is the same as that developed by Farbman et. al. [3]:

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**Results**

Results here

**Analysis**

Analysis here

**Conclusion**

Conclusion here

**Bibliography**

[1] J. de la Porte, et. al. “An Introduction to Diffusion Maps.”

[2] Ronald R. Coifman and Stephane Lafon. “Diffusion Maps.”

[3] Zeev Farbman, et. al. “Diffusion Maps for Edge-Aware Image Editing.”

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