Tours

A tour is a movie of low-dimensional projections of high-dimensional space.

Let

$$\mathbf{A} = [\mathbf{a}_1 \ \mathbf{a}_2] = \begin{bmatrix} a_{11} & a_{12} \\ \vdots & \\ a_{p1} & a_{p2} \end{bmatrix}$$

be a 2-dimensional projection matrix, where $\mathbf{a}_1$ and $\mathbf{a}_2$ are both of length 1, and orthogonal to each other, then for data matrix $\mathbf{X}_{n\times p}$

$$\mathbf{XA} = \begin{bmatrix} a_{11}X_{11} + a_{21}X_{12} + \ldots + a_{p1}X_{1p} & a_{12}X_{11} + a_{22}X_{12} + \ldots + a_{p2}X_{1p} \\ \vdots & \vdots \\ a_{11}X_{n1} + a_{21}X_{n2} + \ldots + a_{p1}X_{np} & a_{12}X_{n1} + a_{22}X_{n2} + \ldots + a_{p2}X_{np} \end{bmatrix}_{n\times 2}$$

is a 2-dimensional projection of the data.

The values (call them coefficients) in the projection matrix are varied producing the views in the movie.