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Big Data Management and Analytics

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Tutorial 11: Text Processing & High Dimensionality Data

Assignment 11-1 *SVD Decomposition*

Given the matrix M:

$$M = \begin{pmatrix} 1 & 1 \\ 1 & 1 \\ 1 & -1 \end{pmatrix}$$

1. Find the eigenpairs for matrix M
2. Find the SVD for the original matrix $M = U\Sigma V^T$
3. Compute the one-dimensional approximation of the matrix M

Assignment 11-2 *CUR Decomposition*

Given the matrix

	Matrix	Alien	Star Wars	Casablanca	Titanic
Joe	1	1	1	0	0
Jim	3	3	3	0	0
John	4	4	4	0	0
Jack	5	5	5	0	0
Jill	0	0	0	4	4
Jenny	0	0	0	5	5
Jane	0	0	0	2	2

Find the CUR-decomposition of the matrix, when we pick **two** "random" rows and columns. The columns we pick are *Alien* and *Star Wars* and the rows are the ones of *Jack* and *Jill*.

Assignment 11-3 *PCA Power Iteration*

Given the matrix M:

$$M = \begin{pmatrix} \frac{14}{3} & 6 \\ 6 & 9 \end{pmatrix}$$

1. Determine the strongest eigenvector of M using the Power Iteration method.
2. After how many iterations can a convergence be observed?