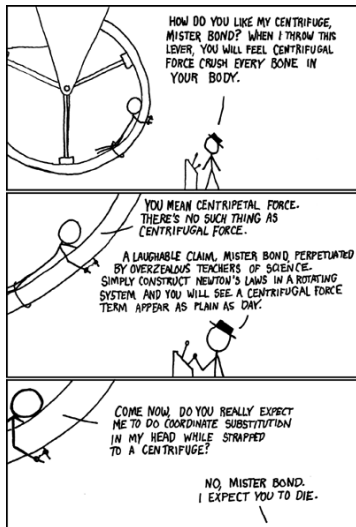


Practical Bioinformatics

Mark Voorhies

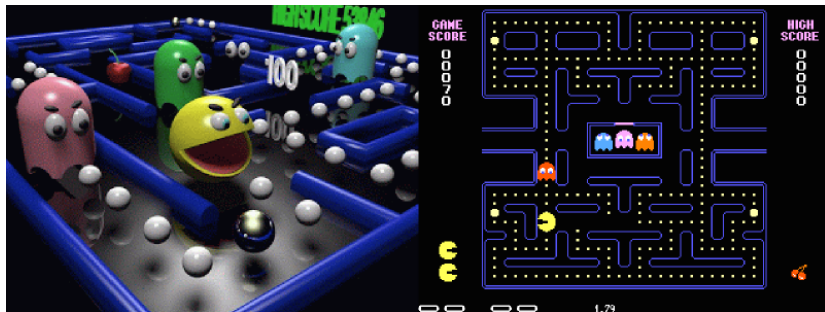
4/13/2018

Change of Coordinates



Principal Components Analysis (PCA)

Is there a point of view that makes our data easier to look at?



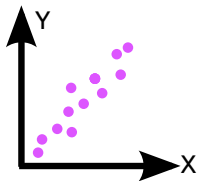
Principal Components Analysis (PCA)

Is there a point of view that makes our data easier to look at?

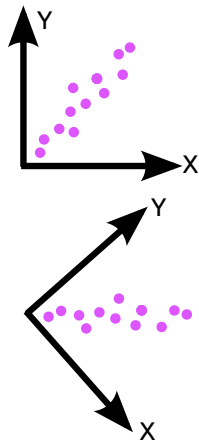


Implemented as Singular Value Decomposition (SVD) after centering (covariance PCA) and, possibly, scaling (correlation PCA)

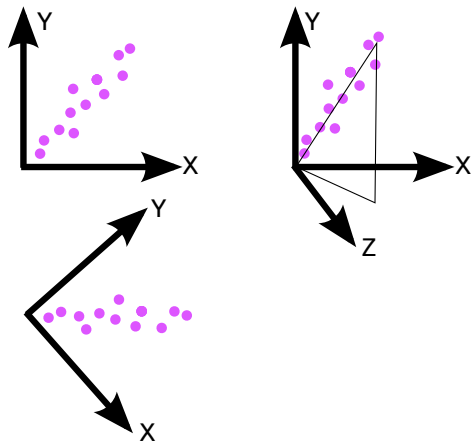
Correlations among more than two samples



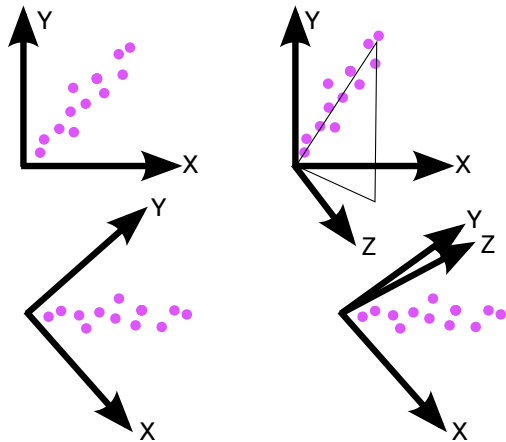
Correlations among more than two samples



Correlations among more than two samples



Correlations among more than two samples



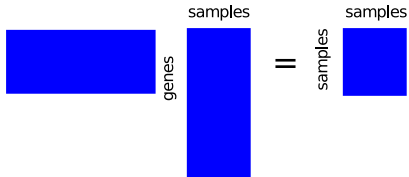
$$\begin{bmatrix} \cos 90^\circ & \sin 90^\circ \\ -\sin 90^\circ & \cos 90^\circ \end{bmatrix} \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

<http://xkcd.com/184/>

Matrix Multiply



Sample Correlation Matrix



Gene Correlation Matrix

