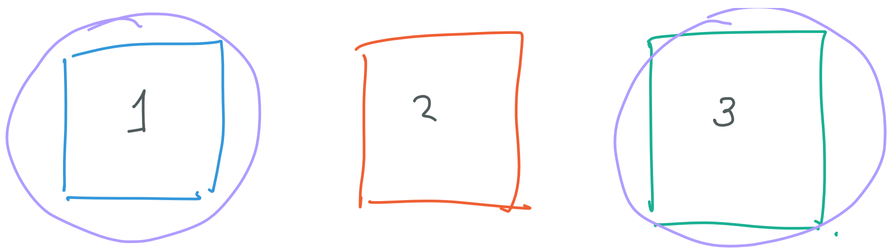


$P(CAR = 1)$ $\qquad\qquad$ $P(HOST = 3)$

PRIOR

$$\begin{matrix} P(CAR=1) \\ P(CAR=2) \\ P(CAR=3) \end{matrix} = \begin{bmatrix} 0.33 \\ 0.33 \\ 0.33 \end{bmatrix}$$

POSTERIOR

$$P(CAR=1 \mid HOST=3) = \overset{\frac{1}{3}}{P(CAR=1)} \cdot \overset{\frac{1}{2}}{P(HOST=3 \mid CAR=1)}$$

$$P(CAR=2 \mid HOST=3) = \overset{\frac{1}{3}}{P(CAR=2)} \cdot \overset{1}{P(HOST=3 \mid CAR=2)}$$

$$P(CAR=3 \mid HOST=3) = \overset{\frac{1}{3}}{P(CAR=3)} \cdot \overset{0}{P(HOST=3 \mid CAR=3)}$$

$$\begin{bmatrix} \frac{1}{3} \\ \frac{1}{3} \\ \frac{1}{3} \end{bmatrix} \cdot \begin{bmatrix} \frac{1}{2} \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} \frac{1}{6} \\ \frac{1}{3} \\ 0 \end{bmatrix} = \text{NORMALIZE}$$

$$= \begin{bmatrix} \frac{1}{3} \\ \frac{2}{3} \\ 0 \end{bmatrix}$$

MARTICES AS LINEAR TRANSFORMATIONS

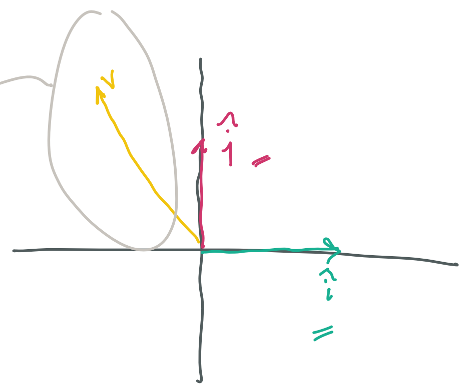
$$A^{2\times 2} \quad V^{2\times 1}$$

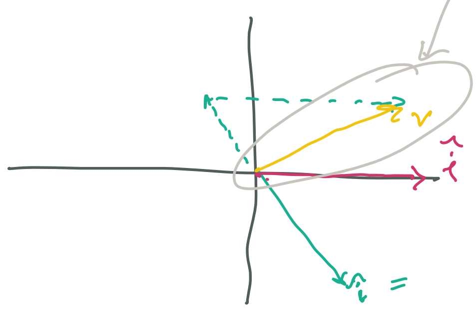
$$\begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} -1 \\ 2 \end{bmatrix}$$

v

where $\hat{i}$ lands

where $\hat{j}$ lands

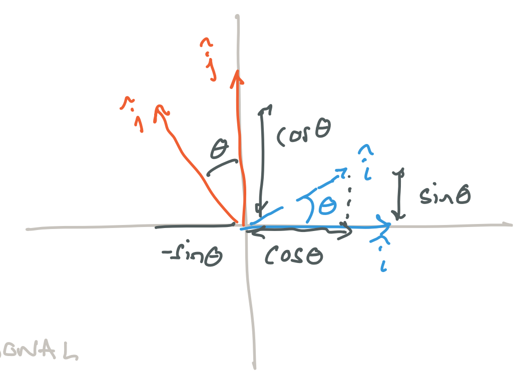




ROTATION

$$\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$$

ORTHOGONAL MATRIX



* Columns are length 1.
* Columns are perpendicular to each other

} Orthonormal

$$R^T R =$$

$$= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I$$

$$R^T R = I.$$

$$R^T R R^{-1} = R^{-1}$$

$$\boxed{R^T = R^{-1}}$$

$$\begin{bmatrix} & R & \end{bmatrix} \underbrace{\begin{bmatrix} x_1 & x_2 & x_3 & x_4 \\ y_1 & y_2 & y_3 & y_4 \end{bmatrix}}_{X} = \underbrace{\begin{bmatrix} x_1' & x_2' & x_3' & x_4' \\ y_1' & y_2' & y_3' & y_4' \end{bmatrix}}_{Y}$$

$$\min_{R} \underbrace{\| RX - Y \|}_{\text{Error Matrix } E}{}_F^{2}$$

where R is orthogonal

SUM OVER ALL 8 ELEMENTS^2

$e_{11}^2 + e_{12}^2 + \ldots$

FEED THIS TO PYTORCH

$$R = \begin{bmatrix} 1.1 & 2.1 \\ 1.3 & 2.5 \end{bmatrix}$$

SVD

(SINGULAR VALUE DECOMPOSITION)

ANY MATRIX A

as

a SERIES OF

ROTATION STRETCHING ROTATION

$A^{m \times n}$

$$A = U \Sigma V^T$$

$$\underbrace{\begin{bmatrix} | & | & | & & | \\ u_1 & u_2 & u_3 & \cdots & u_m \\ | & | & | & & | \end{bmatrix}}_{\text{ORTHOGONAL}}^{m \times m} \begin{bmatrix} \sigma_1 & 0 & 0 & 0 \\ 0 & \sigma_2 & 0 & \cdots \\ 0 & 0 & \sigma_3 & \cdots \\ \hline 0 \; 0 & 0 \; 0 & 0 \; 0 & 0 \\ 0 \; 0 & 0 \; 0 & 0 \; 0 & 0 \end{bmatrix}^{m \times n} \underbrace{\begin{bmatrix} | & | & | & & | \\ v_1 & v_2 & v_3 & \cdots & v_n \\ | & | & | & & | \end{bmatrix}}_{\text{ORTHOGONAL}}^{n \times n}$$