

# Manual Computation

Wednesday, October 25, 2023

4:25 PM

Row 1: A B C } 3x3

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} \leftarrow \text{CTOR}$$

$$\alpha = .85$$

$$M = \begin{pmatrix} 1/3 & 1/3 & 1/3 \\ 1/3 & 1/3 & 1/3 \\ 1/3 & 1/3 & 1/3 \end{pmatrix} \quad \text{compute ToMarkov()}$$

$$(.85)M + (.15) \frac{1}{3} \cdot \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix} \quad \text{compute PageRank()}$$

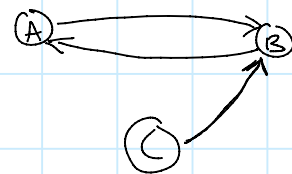
$$\uparrow \rightarrow \lim_{k \rightarrow \infty} M^k \vec{1} \leftarrow \text{rankedList: } \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \quad \text{get PageRank()}$$

$$\vec{R} = \begin{pmatrix} 1/3 \\ 1/3 \\ 1/3 \end{pmatrix} \begin{matrix} \leftarrow \text{RANK A} \\ \leftarrow \text{RANK B} \\ \leftarrow \text{RANK C} \end{matrix}$$

Row 2: AB BA CB

$$A = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 0 \end{pmatrix} \leftarrow \text{CTOR.}$$

$$M = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 0 \end{pmatrix} \leftarrow \text{compute ToMarkov()}$$



$$P = .85 M + 0.15 \left( \frac{1}{3} \right) \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix} \leftarrow \text{compute PageRank()}$$

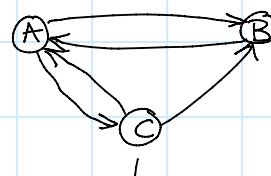
$$P = \begin{pmatrix} 0.05 & 0.9 & 0.05 \\ 0.9 & 0.05 & 0.9 \\ 0.05 & 0.05 & 0.05 \end{pmatrix}$$

$$\vec{R} = \begin{pmatrix} 0.464 \\ 0.4865 \\ 0.05 \end{pmatrix} \begin{matrix} 1^{st} B, 2^{nd} A, 3^{rd} C \end{matrix}$$

Row 3: ABC BA CAB

$$A = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 0 & 0 \end{pmatrix} \leftarrow \text{CTOR}$$

$$M = \begin{pmatrix} 0 & 1 & \frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ \frac{1}{2} & 0 & 0 \end{pmatrix} \leftarrow \text{compute ToMarkov()}$$



$$P = 0.85 M + 0.15 \left( \frac{1}{3} \right) \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} .05 & .9 & .475 \\ .475 & .05 & .475 \\ .475 & .05 & .05 \end{pmatrix} \leftarrow \text{compute PageRank()}$$

$$\vec{R} = \begin{pmatrix} 0.433 \\ 0.333 \\ 0.234 \end{pmatrix} \begin{matrix} 1^{st} A \\ 2^{nd} B \\ 3^{rd} C \end{matrix}$$