矩阵乘法

矩阵和向量相乘:

Example

$$\begin{vmatrix} 1 & 3 \\ 4 & 0 \\ 2 & 1 \end{vmatrix} = \begin{bmatrix} 16 \\ 4 \\ 7 \end{bmatrix}$$

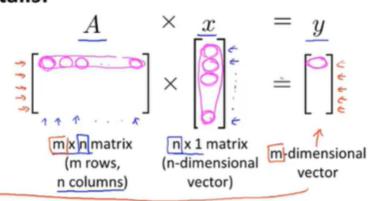
$$\begin{vmatrix} 1 & 1 \\ 4 & 3 \end{vmatrix} + 3 \times 5 = 16$$

$$4 \times 4 + 0 \times 5 = 4$$

$$2 \times 1 + 1 \times 5 = 7$$

3X2矩阵和2X1的向量相乘 得到 3X1的向量

Details:



To get y_i , multiply \underline{A} 's i^{th} row with elements of vector x, and add them up.

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矩阵和矩阵相乘:

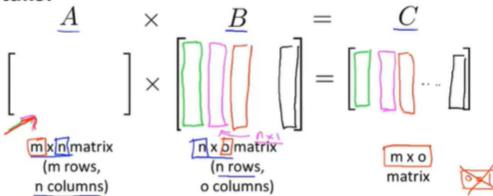
Example

$$\begin{bmatrix} 1 & 3 & 2 \\ 4 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 5 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 11 & 10 \\ 9 & 14 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 3 & 2 \\ 4 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 3 \\ 0 \\ 5 \end{bmatrix} = \begin{bmatrix} 11 \\ 9 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 3 & 2 \\ 4 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 10 \\ 14 \end{bmatrix}$$

Details:



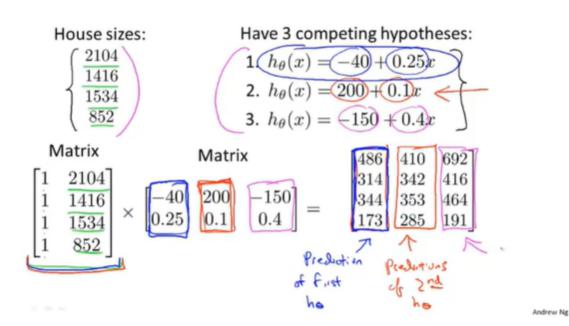
The $\underline{i^{th}}$ column of the $\underline{\text{matrix }C}$ is obtained by multiplying A with the i^{th} column of B. (for i = 1,2,...,0)

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Example

$$\begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix} \begin{bmatrix} 0 \\ 3 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 1 & 4 \\ 1 & 5 \end{bmatrix} \begin{bmatrix} 0 \\ 3 \end{bmatrix} \begin{bmatrix} 0 \\ 3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & + 3 \times 3 \\ 2 & 0 & + 5 \times 3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & + 3 \times 3 \\ 2 & 5 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 1 \times 1 & + 3 \times 2 \\ 2 \times 1 & + 5 \times 2 \end{bmatrix} = \begin{bmatrix} 7 \\ 12 \end{bmatrix}$$

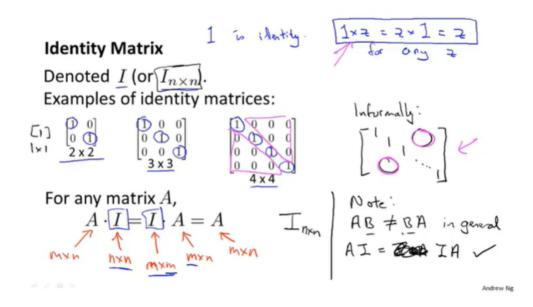
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矩阵乘法特征:

- 1.矩阵乘法不服从交换律,不可交换
- 2.矩阵乘法服从结合律 mxn nxi ixj = mxj

单位矩阵:



单位矩阵和其他矩阵的乘法符合交换律