

deeplearning.ai

Basics of Neural Network Programming

Broadcasting in Python

Broadcasting example

Calories from Carbs, Proteins, Fats in 100g of different foods:

Apples Beef Eggs Potatoes

Carb
$$56.0$$
 0.0 4.4 68.0 1.2 104.0 52.0 8.0 1.8 135.0 99.0 0.9 13.4 135.0

Broadcasting example

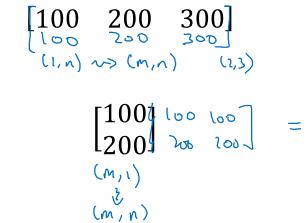
$$\begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix} + \begin{bmatrix} 100 \\ 100 \\ 100 \end{bmatrix} 100$$

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} + \begin{bmatrix} 100 & 200 & 300 \\ 100 & 200 & 300 \end{bmatrix}$$

$$(m,n) \xrightarrow{(2,3)} (m,n) \xrightarrow{(1,3)} (m,n) \xrightarrow{(1,3)}$$

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ (m, n) & (2,3) \end{bmatrix} + \begin{bmatrix} 100 & 200 \\ 100 & 200 \\ (1, n) & (2,3) \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} + \begin{bmatrix} 100t \\ 200t \\ (m,n) \end{bmatrix}$$











General Principle

[1 23]

$$(m, n) \qquad + \qquad (n, n) \qquad \longrightarrow \qquad (m, n)$$

$$modrix \qquad + \qquad (m, n) \qquad \longrightarrow \qquad (m, n)$$

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$$(M, I) + \mathbb{R}$$

$$\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + 100 = \begin{bmatrix} 101 \\ 102 \\ 103 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + 100 = \begin{bmatrix} 101 \\ 102 \\ 103 \end{bmatrix}$$

Mostlab/Octave: bsxfun