Linear Algebra review (optional)

Matrices and vectors

Machine Learning

Matrix: Rectangular array of numbers:

$$\begin{bmatrix} 1402 & 191 \\ 1371 & 821 \\ 949 & 1437 \\ 147 & 1448 \end{bmatrix}$$

4×2 matrix

$$\mathbb{R}^{4 \times 2}$$

$$2 \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

3
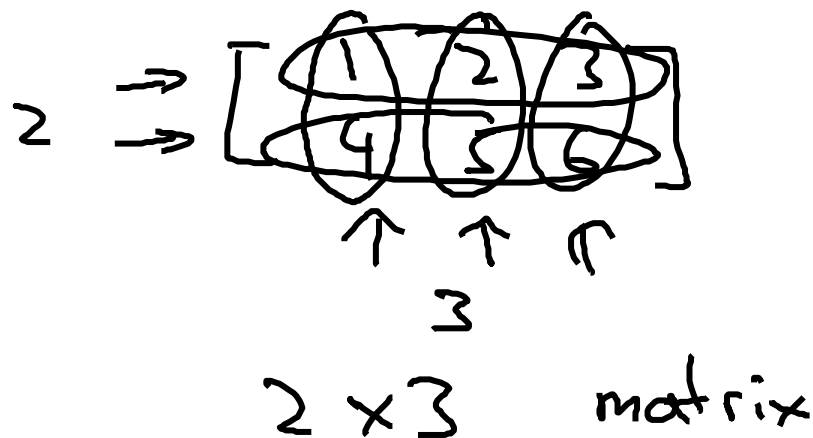
2×3 matrix

$$\mathbb{R}^{2 \times 3}$$

Dimension of matrix: number of rows x number of columns

Matrix Elements (entries of matrix)

$$A = \begin{bmatrix} 1402 & 191 \\ 1371 & 821 \\ 949 & 1437 \\ 147 & 1448 \end{bmatrix}$$

Ayx

$A_{ij} =$ "i,j entry" in the ith row, j^{th} column.

$A_{11} = 1402$

$A_{12} = 191$

$A_{32} = 1437$

$A_{41} = 147$

$A_{43} = $ undefined (error)

Vector: An n x 1 matrix.

$\mathbb{R}^{3 \times 2}$

$$y = \begin{bmatrix} 460 \\ 232 \\ 315 \\ 178 \end{bmatrix}$$

$n = 4$

$\leftarrow$ 4-dimensional vector. $\mathbb{R}^4$

$y_i = i^{th}$ element

$y_1 = 460$

$y_2 = 232$

$y_3 = 315$

$\boxed{A, B, C, X}$
matriz

$\boxed{a, b, x, y}$
vectores

1-indexed vs 0-indexed:

$y[1]$
$$y = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix}$$
1-indexed

$$y = \begin{bmatrix} y_0 \\ y_1 \\ y_2 \\ y_3 \end{bmatrix}$$
$y[0]$
0-indexed