
Introduction to Deep Learning
Video 6: Scalars and Vectors
Analytics Vidhya

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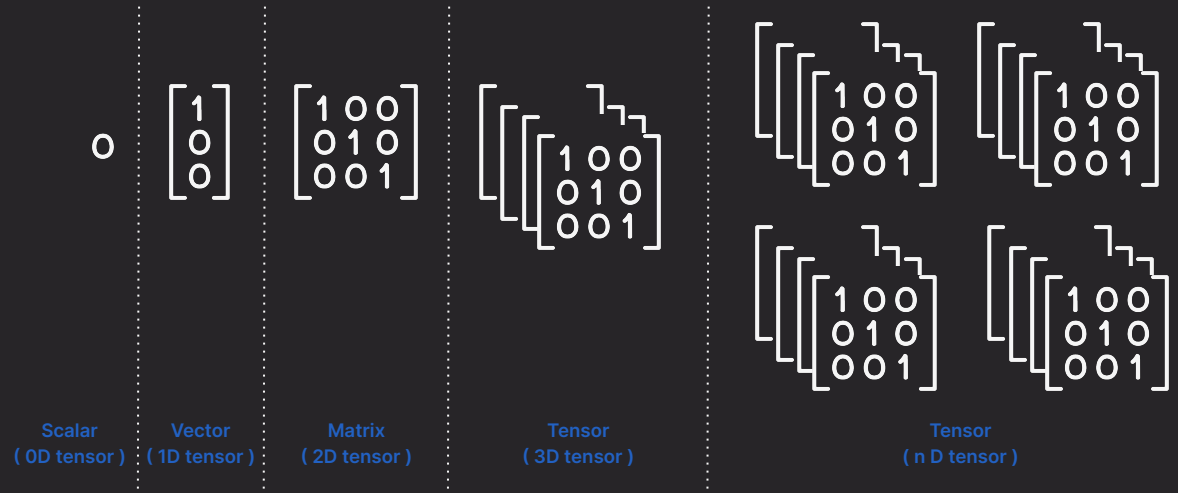
Tensors

Tensors are mathematical objects that generalize scalars, vectors, and matrices to higher dimensions.



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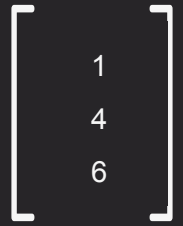
Scalars

Scalars : Single digit matrix.

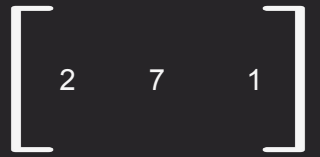
1

Scalar

Vectors : Either one row or one column.



1 Row Vector



1 Column Vector

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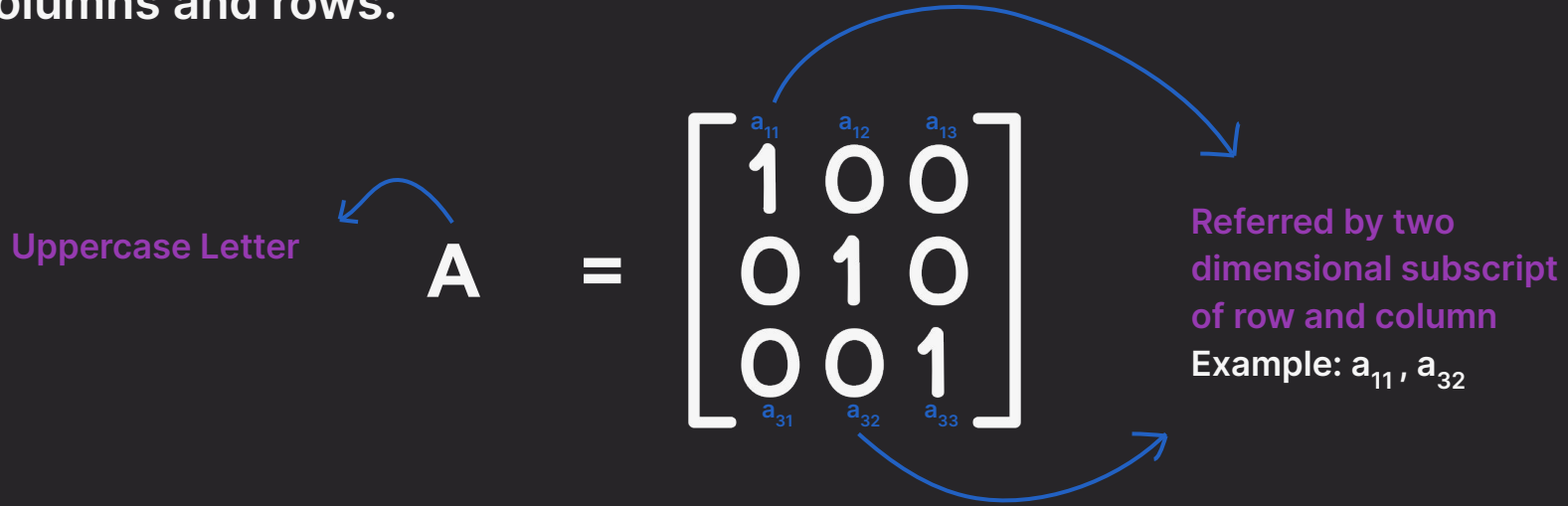
Matrices

A matrix is a two dimensional array of scalars with one or more columns and rows.



Matrices

A matrix is a two dimensional array of scalars with one or more columns and rows.

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

m = number of rows

n = number of columns

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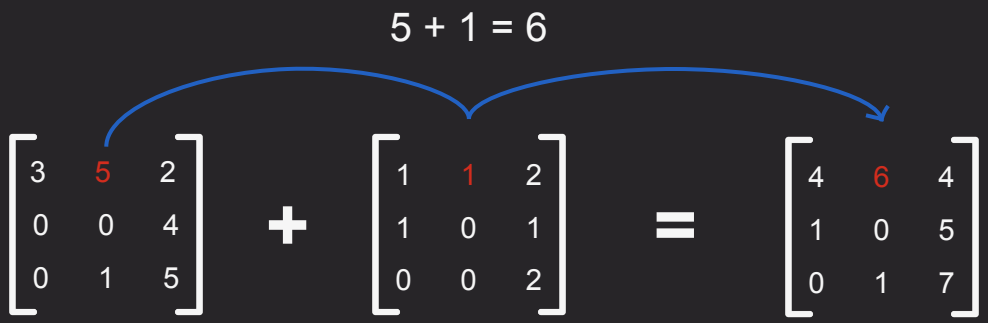
Matrix Addition

Two matrices with same dimensions can be added together to create a new third matrix.



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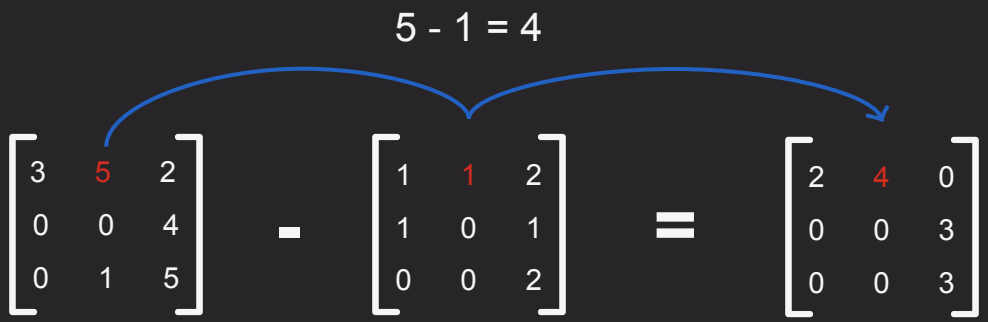
Matrix Subtraction

Two matrices with same dimensions can be subtracted together to create a new third matrix.



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Matrix Multiplication

Multiplication of a scalar with *mxn* matrix.

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}_{3 \times 2} \times 2 = \begin{bmatrix} 2*1 & 2*2 \\ 2*3 & 2*4 \\ 2*5 & 2*6 \end{bmatrix}_{3 \times 2}$$

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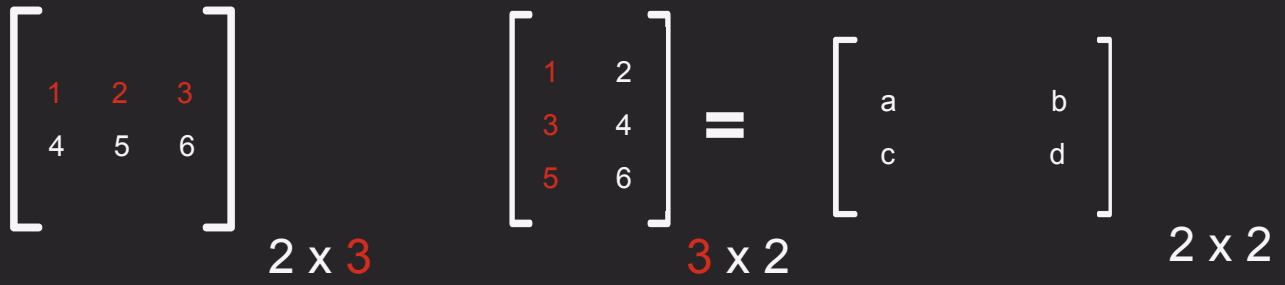
Matrix Multiplication

The number of columns in the 1st matrix should be same the number of rows of the 2nd matrix.



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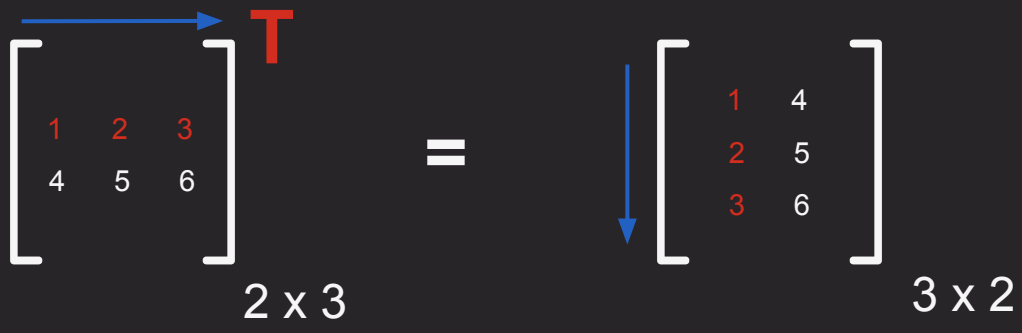
Transpose of a Matrix

Transposing a matrix means rows become columns and columns become rows.



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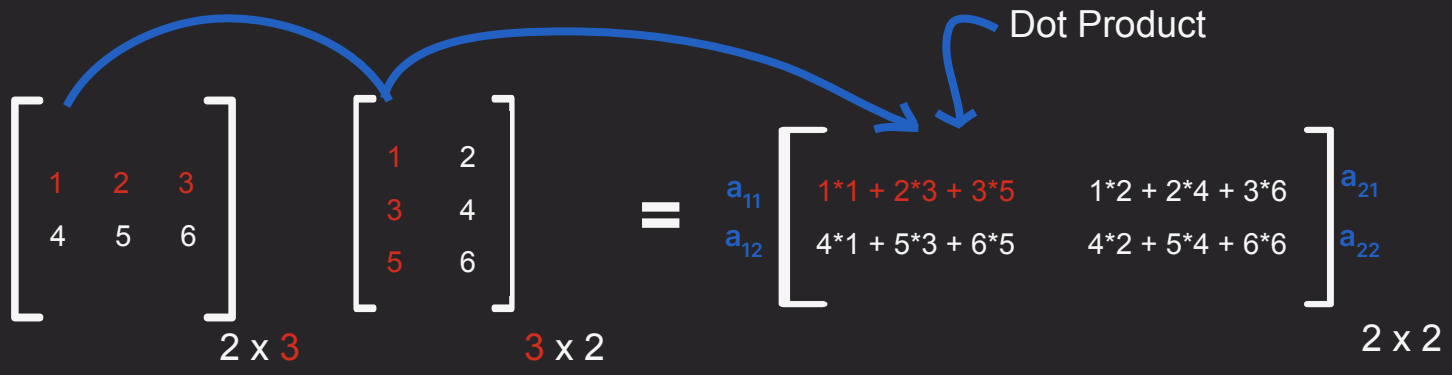
Matrix Multiplication

Multiplication of two matrices that have matching rows and columns.



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Matrices Operations

- ✓ Addition
- ✓ Subtraction
- ✓ Transpose
- ✓ Multiplication

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Tensors

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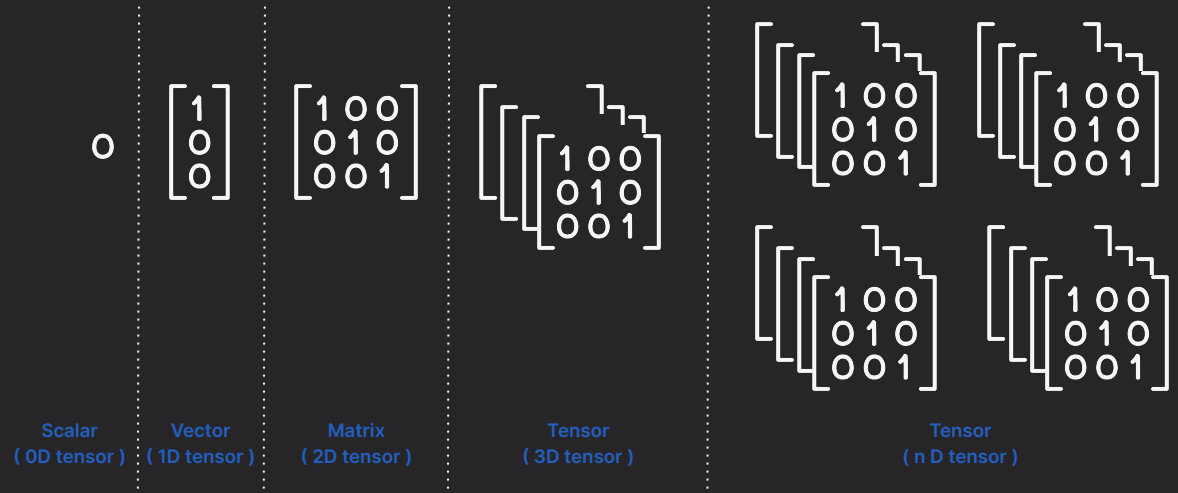


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Video 7: Building a neuron with PyTorch
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