Matrix Vector Multiplication

Matrix-Vector Multiplication

We map the column of the vector onto each row of the matrix, multiplying each element and summing the result.

$$\begin{bmatrix} a & bc & de & f \end{bmatrix} * \begin{bmatrix} xy \end{bmatrix} = \begin{bmatrix} a*x + b*yc*x + d*ye*x + f*y \end{bmatrix}$$

The result is a **vector**. The number of **columns** of the matrix must equal the number of **rows** of the vector.

An **m x n matrix** multiplied by an **n x 1 vector** results in an **m x 1 vector**.

Below is an example of a matrix-vector multiplication. Make sure you understand how the multiplication works. Feel free to try different matrix-vector multiplications.

```
1    % Initialize matrix A
2    A = [1, 2, 3; 4, 5, 6;7, 8, 9]
3
4    % Initialize vector v
5    v = [1; 1; 1]
6
7    % Multiply A * v
8    Av = A * v
9
10
```

[Run]

Reset

```
A =

   1   2   3
   4   5   6
   7   8   9

v =

   1
   1
   1

Av =

    6
   15
   24
```

[Go to next item]   ✓ **Completed**

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