**Matrix-Vector Multiplication**

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

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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.

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

A =

1 2 3

4 5 6

7 8 9

v =

1

1

1

Av =

6

15

24