Vectorization

① $h_\theta(x) = \sum_{j=0}^{n} \theta_j x_j = \theta^T x$

$\theta = \begin{bmatrix} \theta_0 \\ \theta_1 \\ \theta_2 \end{bmatrix}$ → theta(1), theta(2), theta(3)

$x = \begin{bmatrix} x_0 \\ x_1 \\ x_2 \end{bmatrix}$ → x(1), x(2), x(3)

Unvectorized implementation (MATLAB)

```
prediction = 0.0;
for j = 1:n+1
    prediction = prediction + theta(j) * x(j)
end;
```

Vectorized Implementation (MATLAB)

```
prediction = (theta)' * x;
```

Unvectorize Implementation (C++)

```
double prediction = 0.0;
for (int j = 0; j <= n; j++)
    prediction += theta[j] * x[j];
```

Vectorized Implementation (C++)

```
double prediction = theta.transpose() * x;
```