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Multiple Features

Note: [7:25 - θ^T is a 1 by (n+1) matrix and not an (n+1) by 1 matrix]

Linear regression with multiple variables is also known as "multivariate linear regression".

We now introduce notation for equations where we can have any number of input variables.

 $x_j^{(i)}$ = value of feature j in the i^{th} training example

 $x^{(i)}$ = the input (features) of the i^{th} training example

m =the number of training examples

n = the number of features

The multivariable form of the hypothesis function accommodating these multiple features is as follows:

$$h_{ heta}(x) = heta_0 + heta_1 x_1 + heta_2 x_2 + heta_3 x_3 + \dots + heta_n x_n$$

In order to develop intuition about this function, we can think about θ_0 as the basic price of a house, θ_1 as the price per square meter, θ_2 as the price per floor, etc. x_1 will be the number of square meters in the house, x_2 the number of floors, etc.

Using the definition of matrix multiplication, our multivariable hypothesis function can be concisely represented as:

$$h_{\theta}(x) = \theta_0 \qquad \theta_1 \qquad \dots \qquad \theta_n \overset{x_0}{\vdots} = \theta^T x$$
 \vdots

This is a vectorization of our hypothesis function for one training example; see the lessons on vectorization to learn more.

Remark: Note that for convenience reasons in this course we assume $x_0^{(i)}=1$ for $(i\in 1,\ldots,m)$. This allows us to do matrix operations with theta and x. Hence making the two vectors ' θ ' and $x^{(i)}$ match each other element-wise (that is, have the same number of elements: n+1).]

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Completed





