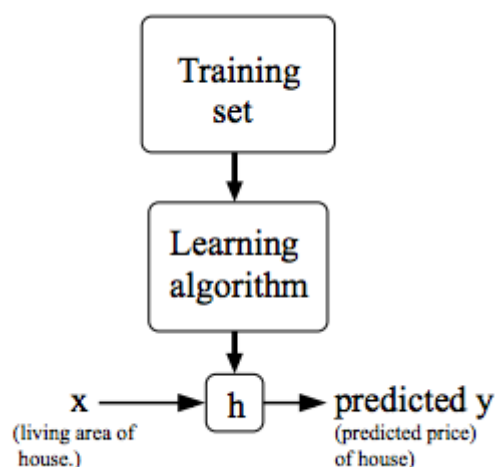


Model Representation

To establish notation for future use, we'll use $x(i)$ to denote the "input" variables (living area in this example), also called input features, and $y(i)$ to denote the "output" or target variable that we are trying to predict (price). A pair $(x(i), y(i))$ is called a training example, and the dataset that we'll be using to learn—a list of m training examples $(x(i), y(i)); i=1, \dots, m$ —is called a training set. Note that the superscript "(i)" in the notation is simply an index into the training set, and has nothing to do with exponentiation. We will also use X to denote the space of input values, and Y to denote the space of output values. In this example, $X = Y = \mathbb{R}$. To describe the supervised learning problem slightly more formally, our goal is, given a training set, to learn a function $h : X \rightarrow Y$ so that $h(x)$ is a "good" predictor for the corresponding value of y . For historical reasons, this function h is called a hypothesis. Seen pictorially, the process is therefore like this:



When the target variable that we're trying to predict is continuous, such as in our housing example, we call the learning problem a regression problem. When y can take on only a small number of discrete values (such as if, given the living area, we wanted to predict if a dwelling is a house or an apartment, say), we call it a classification problem.