# Notes on machine learning

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## 1 Supervised machine learning

### 1.1 Univariate linear regression

The basic idea is as follows. We have a set $\{x_1, \ldots, x_m\}$ of "input variables," lying in some domain $D$, a set $\{y_1, \ldots, y_m\}$ "output" or "target" variables in some range $R$, i.e. a map $[1, \ldots, m] \to D \times R$. Given this, we want to select a "hypothesis function" $h\colon D \to R$, such that $h(x) = y$ is a good fit for the $(x_i, y_i)$.

Univariate linear regression concerns $D = \mathbf{R}$, $R = \mathbf{R}$, and $h_\theta(x) = \theta_0 + \theta_1 x$.