Deep Learning Primitives

Most deep architectures are built by combining and recombining a limited set of architectural primitives. Such primitives, typically called neural network layers, are the foundational building blocks of deep networks. In the rest of this book, we will provide in-depth introductions to such layers. However, in this section, we will provide a brief overview of the common modules that are found in many deep networks. This section is not meant to provide a thorough introduction to these modules. Rather, we aim to provide a rapid overview of the building blocks of sophisticated deep architectures to whet your appetite. The art of deep learning consists of combining and recombining such modules and we want to show you the alphabet of the language to start you on the path to deep learning expertise.

Fully Connected Layer

A fully connected network transforms a list of inputs into a list of outputs. The transformation is called fully connected since any input value can affect any output value. These layers will have many learnable parameters, even for relatively small inputs, but they have the large advantage of assuming no structure in the inputs. This concept is illustrated in Figure 1-1.

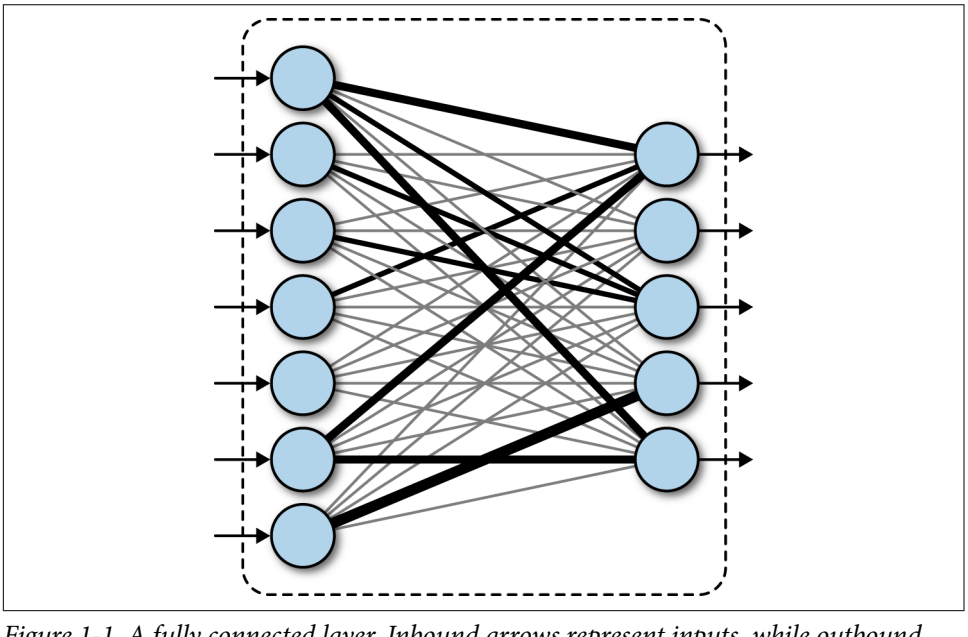

Figure 1-1. A fully connected layer. Inbound arrows represent inputs, while outbound arrows represent outputs. The thickness of interconnecting lines represents the magnitude of learned weights. The fully connected layer transforms inputs into outputs via the learned rule.