

PART II

Neural Networks and Deep Learning

Up and Running with TensorFlow

TensorFlow is a powerful open source software library for numerical computation, particularly well suited and fine-tuned for large-scale Machine Learning. Its basic principle is simple: you first define in Python a graph of computations to perform (for example, the one in [Figure 9-1](#)), and then TensorFlow takes that graph and runs it efficiently using optimized C++ code.

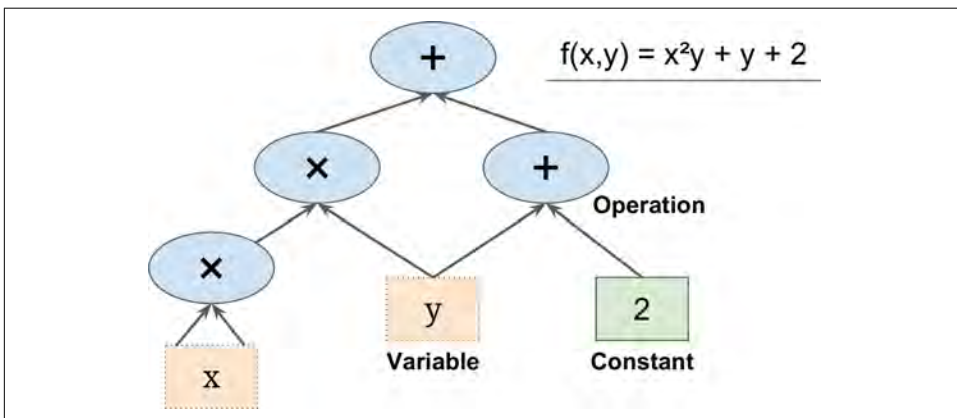


Figure 9-1. A simple computation graph

Most importantly, it is possible to break up the graph into several chunks and run them in parallel across multiple CPUs or GPUs (as shown in [Figure 9-2](#)). TensorFlow also supports distributed computing, so you can train colossal neural networks on humongous training sets in a reasonable amount of time by splitting the computations across hundreds of servers (see [Chapter 12](#)). TensorFlow can train a network with millions of parameters on a training set composed of billions of instances with millions of features each. This should come as no surprise, since TensorFlow was