Reinforcement Learning

Reinforcement learning presents an approach to learning that is quite different from what we have seen so far in supervised and unsupervised machine learning techniques. In reinforcement learning, an agent interacts with an environment in a feedback configuration and updates its strategy for choosing an action based on the responses it gets from the environment. An illustration of this scenario is shown in Figure 14-18.

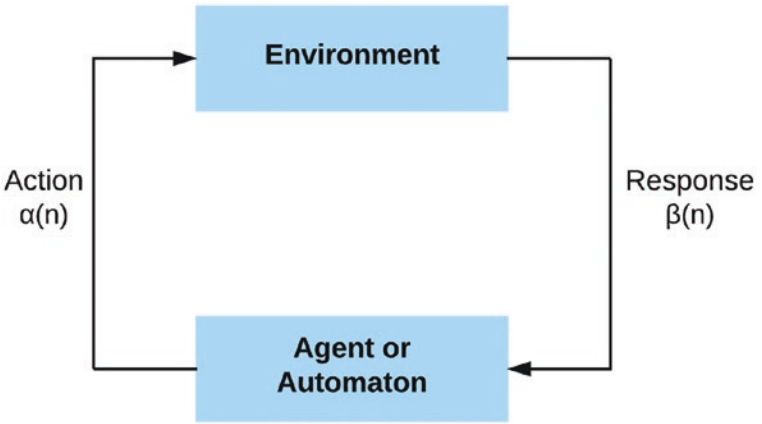

Figure 14-18. *Reinforcement learning model*

This book will not cover reinforcement learning techniques as it presents a different approach to the problem of learning from random environments that is distinct from the approach used in supervised and unsupervised learning problems.

In this chapter, we covered the three main components of machine learning, which are supervised, unsupervised, and reinforcement learning. The chapter largely focused on the principles for performing supervised machine learning such as framing a problem as a regression or classification task; splitting the dataset into training, test, and validation sets; understanding the bias/variance trade-off and consequently issues of overfitting and underfitting; and the evaluation metrics for assessing the performance of a learning model.

In the next chapter, we will briefly look at the differences between batch and online learning.

CHAPTER 15

Batch vs. Online Learning

Data is a vital component for building learning models. There are two design choices for how data is used in the modeling pipeline. The first is to build your learning model with data at rest (batch learning), and the other is when the data is flowing in streams into the learning algorithm (online learning). This flow can be as individual sample points in your dataset, or it can be in small batch sizes. Let's briefly discuss these concepts.

Batch Learning

In batch learning the machine learning model is trained using the entire dataset that is available at a certain point in time. Once we have a model that performs well on the test set, the model is shipped for production and thus learning ends. This process is also called *offline learning*. If in the process of time, new data becomes available, and there is need to update the model based on the new data, the model is trained from scratch all over again using both the previous data samples and the new data samples.

This pipeline is further illustrated in Figure 15-1.

E. Bisong, *Building Machine Learning and Deep Learning Models on Google Cloud Platform*,
https://doi.org/10.1007/978-1-4842-4470-8_15