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Deep Neural Networks

In recent years, neural networks have emerged as, by far, the most important machine learning technology for practical applications, and we therefore devote a large fraction of this book to studying them. Previous chapters have already laid many of the foundations we will need. In particular, we have seen that linear regression models that comprise linear combinations of fixed nonlinear basis functions can be expressed as neural networks having a single layer of weight and bias parameters. Likewise, classification models based on linear combinations of basis functions can also be viewed as single-layer neural networks. These allowed us to introduce several important concepts before we embark on a discussion of more complex multilayered networks in this chapter.

Chapter 4

Chapter 5

Given a sufficient number of suitably chosen basis functions, such linear models can approximate any given nonlinear transformation from inputs to outputs to any desired accuracy and might therefore appear to be sufficient to tackle any practical