Chapter 9 of Hands-on Machine Learning with SciKit-Learn, Keras and TensorFlow covers unsupervised learning techniques, which are methods for finding patterns and structure in unlabeled data, without any guidance or feedback from a human.

The chapter introduces the concept of Clustering in which the the goal is to group similar instances together into clusters, without using any labels. The chapter explains several clustering algorithms, such as K-Means, DBSCAN, and Gaussian mixtures. It also shows how to use clustering for image segmentation, preprocessing, semi-supervised learning, and anomaly detection. Gaussian Mixtures is a probabilistic model that assumes that the instances were generated from a mixture of several Gaussian distributions whose parameters are unknown. The book explains how to use the Expectation-Maximization algorithm to estimate the parameters of the model, and how to use the Bayesian Information Criterion or the Akaike Information Criterion to select the optimal number of clusters. The book also presents the Bayesian Gaussian Mixture model, which can automatically eliminate unnecessary clusters.

The chapter also presents several dimensionality reduction techniques, such as Principal Component Analysis (PCA), Kernel PCA, Locally Linear Embedding (LLE), and t-distributed Stochastic Neighbor Embedding (t-SNE). It also shows how to use dimensionality reduction for data visualization, noise reduction, and feature extraction.

The chapter concludes with a brief overview of other unsupervised learning techniques, such as association rule learning and generative adversarial networks (GANs). It also provides some tips and best practices for applying unsupervised learning to real-world problems.