This part of Hands-on Machine Learning book discusses various clustering algorithms and Gaussian Mixture Models (GMM) for density estimation, clustering, and anomaly detection:

1. **Clustering Algorithms:**

* K-Means: Assigns data to k clusters based on centroids.
* DBSCAN: Forms clusters in dense regions, identifying noise.
* BIRCH: Tree-based approach for large datasets.
* Mean-shift: Iteratively shifts circles based on mean until convergence.
* Affinity Propagation: Instances elect exemplars through message exchange.
* Spectral Clustering: Uses a low-dimensional embedding from a similarity matrix.

1. **Gaussian Mixture Models (GMM):**

* Probabilistic model assuming data from a mixture of Gaussian distributions.
* Parameters include weights, means, and covariances for each cluster.
* Suitable for density estimation, clustering, and anomaly detection.

1. **Anomaly Detection using GMM:**

* Identifies anomalies in low-density regions.
* Density threshold set for anomaly detection and novelty detection.

1. **Selecting the Number of Clusters:**

* BIC and AIC used as information criteria for selecting optimal cluster count.

1. **Other Anomaly Detection Algorithms:**

* Fast-MCD: Assumes inliers from a single Gaussian distribution.
* Isolation Forest: Efficiently isolates anomalies using a random forest.
* Local Outlier Factor (LOF): Measures instance density relative to neighbors.
* One-Class SVM: Suited for novelty detection in high-dimensional space.
* PCA and Dimensionality Reduction: Anomalies often exhibit larger reconstruction errors.