Research, implement some clustering and classification algorithms and their applications.

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Abstract: This study investigates, implements, and applies selected clustering and classification algorithms for data analysis. The research focuses on the theoretical foundations of key techniques, including k-means and hierarchical clustering for unsupervised learning, alongside decision trees and support vector machines for supervised classification. A primary objective is the practical implementation of these algorithms to evaluate their performance on benchmark datasets, comparing metrics such as accuracy, computational efficiency, and scalability. Furthermore, the study explores a specific real-world application, demonstrating how these models can be integrated to solve a practical problem in data mining. The results highlight the strengths and limitations of each algorithm under varying data conditions, providing insights into optimal algorithm selection. This work contributes a systematic framework for deploying clustering and classification methods, offering both a technical reference and a validated application case for researchers and practitioners in the field of data science.

Keywords: clustering algorithms, classification algorithms, data mining, machine learning