**Introduction:** Our client, a leading financial institution, aims to enhance their understanding of customer behavior and improve market segmentation strategies. They want to leverage advanced unsupervised learning techniques to analyze credit card usage patterns and identify distinct customer groups.

**Project Goal:** Develop comprehensive unsupervised learning models to accurately segment credit card customers based on their spending and payment behaviors. By utilizing these models, the institution aims to improve targeted marketing, risk assessment, and overall customer relationship management.

**Project Benefits:**

1. Customer Insights: The models will help identify distinct customer segments, allowing for more personalized product offerings and services.
2. Risk Management: Understanding spending patterns can assist in better credit risk assessment and fraud detection.
3. Marketing Optimization: Segmentation can guide more effective and targeted marketing campaigns.

**Deliverables:**

1. A set of unsupervised learning models designed for customer segmentation based on credit card usage data.
2. Comprehensive data visualizations illustrating relationships between various financial features and customer segments.
3. A comparative analysis of different unsupervised learning algorithms for the segmentation task.

**Project Guidelines:**

* Data Exploration: Conduct comprehensive EDA using visualization techniques to understand feature distributions and relationships within the credit card data.
* Data Preprocessing: Handle missing values, apply appropriate scaling techniques for numerical variables, and perform any necessary feature engineering.
* Dimensionality Reduction: Implement PCA and t-SNE for visualizing high-dimensional data in 2D space.
* Model Selection: Evaluate various unsupervised learning algorithms including K-Means, Mini-Batch K-Means, and Agglomerative Clustering.
* Performance Evaluation: Use appropriate metrics such as silhouette score or inertia to assess clustering quality.
* Visualization: Create clear and informative visualizations using libraries like matplotlib and seaborn to communicate data insights and clustering results.
* Code Quality: Ensure well-structured, commented Python code following best practices.

**Methodology:**

1. Load and explore the dataset using pandas, matplotlib, and seaborn.
2. Preprocess the data, including handling missing values and scaling numerical features.
3. Implement and compare multiple unsupervised learning algorithms for customer segmentation.
4. Apply dimensionality reduction techniques (PCA, t-SNE) for visualization.
5. Generate and interpret clustering results and visualizations.

**Submission:**

* Submit Jupyter notebook (.ipynb) or Python script (.py) containing data analysis, preprocessing steps, and model implementation.
* Submit final report as .docx or PowerPoint Presentation.
* (Optional) Submit interactive dashboard for exploring customer segments and their characteristics.

NOTE: Create a zip file of the above-mentioned items for the final submission.