**Problem Statement: Optimizing ATM Network for Improved Performance and Cost Efficiency**

**Background:**  
The current ATM network includes underperforming ATMs in low-traffic areas and lacks sufficient coverage in high-demand regions. Maintaining ATMs involves substantial fixed and operational costs (cash handling, maintenance, rent, etc.), so the efficiency and utilization of each machine are critical for profitability and customer service.

**Business Need:**  
To optimize ATM operations, the bank needs to:

* **Identify underutilized ATMs** for potential closure to reduce costs.
* **Determine strategic locations** to open new ATMs based on customer demand, transaction volume, and competition.

**Objectives:**

1. Analyze ATM usage data (transaction frequency, withdrawal amounts, downtime, etc.).
2. Cluster or segment ATMs based on performance metrics and local demographics.
3. Recommend which ATMs to close, retain, or relocate.
4. Identify high-demand areas underserved by existing ATMs.
5. Forecast potential transaction volume at proposed new locations.
6. Optimize the ATM network to improve cost-effectiveness while maintaining or improving customer service coverage.

**Data Requirements:**

* ATM transaction logs (location, volume, frequency, errors).
* Customer footfall and demographic data.
* Operational costs per ATM (rent, maintenance, security, etc.).
* Competitor ATM locations.
* GIS or location coordinates of all current and candidate sites.

**Potential Methods:**

* Clustering (e.g., K-Means) for location grouping.
* Time-series or regression analysis for transaction forecasting.
* Geospatial analysis using tools like QGIS or Python (folium/geopandas).
* Optimization modeling for placement decisions (facility location problem).

**Expected Outcomes:**

* List of ATMs recommended for closure with cost savings estimates.
* Map of ideal new ATM locations with expected demand.
* Overall improvement in ATM network ROI and customer convenience.