**Performance Modeling and Evaluation of ATM Queue System at Jaffna Market**

**Mini Project Report**

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**1.System Description and Performance Goal**

The ATM queue system at Jaffna Market, Sri Lanka, serves a diverse customer base, including vendors, shoppers, and residents, performing transactions such as cash withdrawals, balance inquiries, and fund transfers. The system features two ATMs operated by a single bank, with customers forming a single queue to access either machine, creating a multi-server setup. The system's complexity stems from:

Random customer arrivals, driven by the market's dynamic activity, peaking during morning hours (9 AM–12 PM).

Variable transaction times, ranging from quick withdrawals (1–2 minutes) to complex inquiries (4–5 minutes).

Periodic ATM downtimes, due to cash refills, software updates, technical failures, reducing service capacity.

Peak-hour congestion, leading to long queues and delays.

This complexity enables modelling of performance bottlenecks (e.g., limited-service capacity), throughput (customers served per hour), resource utilization (ATM usage), and latency (waiting time), with implications for system scalability during high-demand periods.

**Performance Goal:**

Minimize average customer waiting time in the queue to enhance customer satisfaction and reduce congestion.

This goal targets the primary issue of excessive waiting times, critical for maintaining customer loyalty and operational efficiency in a busy market environment.