

ABSTRACT

A system for dynamically routing digital transactions to mitigate failures caused by system downtime and overcapacity is provided. The system includes a processor and a memory, where the processor retrieves real-time performance data of multiple transaction systems upon receiving a transaction request. This data includes time-window-based features, event-based features, and transaction success metrics. A first machine learning model predicts system downtimes by analyzing past failure rates, response latency, and scheduled maintenance. A second machine learning model determines transaction success probabilities by dynamically weighting real-time features. The processor selects the optimal transaction system based on predicted success probabilities, ensuring a higher likelihood of transaction completion. An adaptive feedback loop refines predictions by continuously updating model parameters using an adaptive decay-rate technique. This approach enhances transaction reliability by intelligently routing payments through the most stable and efficient system, significantly reducing transaction failures in digital payment ecosystems.

FIG. 1