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(57) Abstract :

ABSTRACT OF THE INVENTION: The present invention provides an AI-Driven Automated Risk Assessment and Regulatory Compliance System (ARCS) for real-time monitoring of financial transactions. The system ingests high-velocity transaction streams and enriches them with customer behavioral profiles, device data, and external intelligence. Advanced graph neural networks model complex entity relationships to uncover sophisticated laundering or fraud networks that evade traditional rules. Hybrid AI models deliver precise risk scores, while explainable AI ensures transparency and auditability. Upon detecting elevated risk, the system automates holds, alerts, and regulatory report generation (SARs), significantly reducing false positives and investigation times. A closed-loop feedback mechanism with human oversight enables continuous model improvement. The invention addresses critical gaps in legacy compliance systems by offering scalability, low latency, predictive capabilities, and seamless integration with existing banking infrastructure. It enhances detection accuracy, operational efficiency, and regulatory adherence for banks, fintechs, and payment processors in the digital economy. Key advantages include 30-60% false positive reduction, proactive threat mitigation, and support for evolving global compliance standards.

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