Criminal Investigations and Network Analysis
A DHS CENTER OF EXCELLENCE AT GEORGE MASON UNIVERSITY

Combating Dynamic and Networked Financial Crimes: Characterization, Monitoring, and Human-AI-Collaborative Visual Analytics

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Criminal Network Analysis

Dynamic Patterns of Criminal Activity

SUMMARY

The Department of Homeland Security (DHS) faces increasing challenges due to the rise of sophisticated financial crimes such as money laundering, insider trading, and identity fraud. Traditional financial crime detection techniques, which rely on fixed rules, often fall behind as criminals adapt their methods. The proposed project seeks to develop an advanced system that enhances financial crime detection by integrating real-time monitoring, AI-powered analysis, and human collaboration. By leveraging diverse data sources and intelligent analytics, the system will equip DHS to swiftly detect and respond to emerging financial threats, ensuring a more proactive and flexible approach to enforcement.

PROBLEM STATEMENT

Detecting financial crimes is challenging because they are uncommon, constantly evolving, and often disguised within everyday financial transactions. Traditional detection methods face difficulties due to limited examples of financial crimes, diverse financial data, and the ever-changing tactics of financial criminals. This project aims to create an intelligent, real-time system that uncovers hidden patterns in financial criminal activities while incorporating human expertise to enhance decision-making and improve the detection of financial crimes.

APPROACH

This project focuses on three key research areas, **(1) Financial Crime Characterization:** Identifying common patterns in criminal activities by analyzing financial transactions and connections over time to uncover illicit networks; **(2) Financial Crime Monitoring over Time:** Develop tools that track suspicious activities in real-time, assess risks, and offer clear explanations for detection results, and **(3) Human-AI-Collaborative Crime Monitoring:** Building an intuitive system that helps DHS analysts review alerts, track emerging threats, and refine AI decisions with expert insights. By integrating advanced AI techniques, network analysis, and interactive visualization tools, this system will improve the detection and response to financial crimes.

ANTICIPATED IMPACT FOR DHS

This project will equip DHS with an advanced system to identify and prevent financial crimes in real-world scenarios. The platform developed will allow DHS to integrate its own financial crime data and track emerging threats, benefiting agencies such as ICE, CBP, USSS, USCIS, and the Office of Intelligence and Analysis. By combining AI with human expertise, the proposed system will improve detection of evolving financial crime patterns, strengthen regulatory compliance, and prevent illegal financial activities from escalating into larger issues.