

IGES AI White Paper: AI-Driven Blockchain Analysis Platform

Abstract:

This white paper outlines the development of IGES AI, an AI-driven blockchain analysis platform designed to expose insider trading, pump-and-dump schemes, and coordinated manipulation within the Solana ecosystem. The platform leverages machine learning, NLP (Natural Language Processing), and blockchain tracking tools to provide users with actionable insights, visualizations, and educational resources.

Introduction:

Blockchain technology promises transparency and decentralization, yet malicious actors often exploit the complexity of on-chain data to manipulate markets. IGES AI aims to democratize blockchain investigation by merging AI with existing blockchain tools like Solscan, Bubble Maps, and Helius. Through this integration, we will provide intuitive transaction analysis, wallet tracking, and social media linkage to uncover the identities behind manipulative activities.

Problem Statement:

- **Lack of Accessibility:** Existing tools provide raw data but lack comprehensive correlation across transactions and wallets.
- **Manual Effort:** Understanding complex blockchain activity requires significant manual effort and technical expertise.
- **Limited Transparency:** Retail investors are left vulnerable to manipulative trading practices without the means to track insider groups.

Solution and Approach:

Key Components:

- **AI Wallet Analysis:** Machine learning algorithms will detect transaction patterns indicative of pump-and-dump schemes or wash trading.
- **Social Profiling Integration:** By linking wallet activity with public social profiles through AI, we create a holistic picture of actors behind transactions.
- **Real-time Tracking and Visualization:** Blockchain transaction flow will be mapped using bubble charts, heatmaps, and AI-generated visual paths.
- **On-chain Alerts:** AI will monitor wallet movements and alert users to unusual liquidity shifts.

AI Methodologies and Formulas:

1. Pattern Recognition for Wallet Activity:

a. Formula:

i. Where:

1. = Insider probability score.
2. = Individual transaction value.
3. = Mean of transaction values in the ecosystem.
4. = Standard deviation of transaction values.
5. = Weight of wallet interactions.

2. Advanced K-means for Cabal Detection:

a. Distance formula incorporating dynamic weights:

i. Where:

1. = Weighted distance between wallet and cluster centroid .
2. = Transaction feature of wallet .
3. = Centroid feature of cluster .
4. = Dynamic weight for feature , emphasizing high variance features.

3. Eigenvalue Decomposition for Network Analysis:

a. To detect wallet influence and flow dominance:

- i. Where A is the adjacency matrix of wallet interactions, λ represents eigenvalues indicating strength, and v denotes eigenvectors capturing dominant pathways.

4. PageRank Algorithm for Wallet Ranking:

- a. Assess wallet significance in the ecosystem:
 - i. Where:
 1. = PageRank of wallet .
 2. = Damping factor (typically 0.85).
 3. = Wallets linking to .
 4. = Total outbound links from wallet .

5. Social Media Correlation (TF-IDF):

- a. Formula:

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Platform Architecture:

- **Data Layer:** Real-time Solana blockchain data is pulled using Helius APIs and stored for analysis.
- **AI Processing Layer:** AI models parse and analyze transactional data, applying clustering and scoring algorithms.
- **Visualization Layer:** User-facing dashboards powered by Bubble Maps and custom heatmaps.
- **User Layer:** Interactive tutorials and visual guides on Solscan and transaction analysis.

Use Cases:

1. **Retail Traders:** Safeguard investments by understanding abnormal market activities.
2. **Auditors:** Track large wallet flows and detect suspicious fund movements.
3. **Regulators:** Monitor compliance and identify illicit trading patterns.
4. **DeFi Projects:** Enhance transparency within decentralized projects.

Roadmap:

- **Phase 1:** AI model training and Solana data integration.
- **Phase 2:** Visualization layer development.
- **Phase 3:** Social media integration and public launch.

- **Phase 4:** Community engagement and governance rollout.

Conclusion:

IGES AI will redefine how market manipulation and insider activities are detected on Solana. By merging AI with existing blockchain tools and social insights, we lower the barrier to understanding blockchain transactions, fostering transparency and fairness in decentralized ecosystems.