DETECTING & PREVENTING FRAUDULENT TRANSACTIONS USING DEEP LEARNING

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What ?

We introduce a deep learning-based system to detect and prevent fraudulent transactions, in which we have:

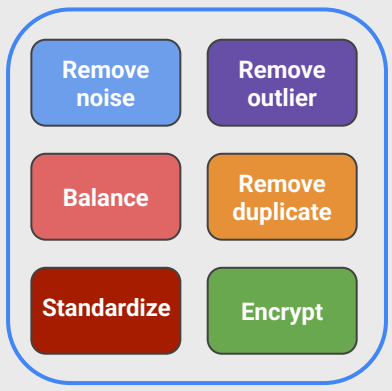
- Detecting and fraudulent transactions at high precision and accuracy.
- Real-time fraud detection using AI models.
- Seamless integration into financial systems to enhance security.

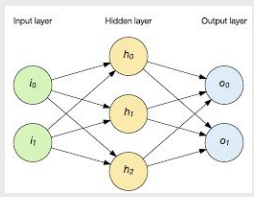
Why ?

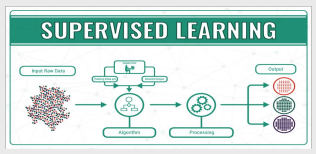
- Financial fraud is on the rise with increasing digital transactions.
- Traditional rule-based methods fail to adapt to evolving fraud tactics.
- AI-driven models offer **higher accuracy** and **adaptive learning capabilities**.

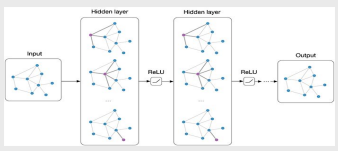
Overview

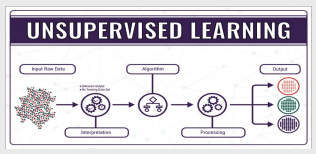
Data Processing → Model Architecture → Implementation & Evaluation

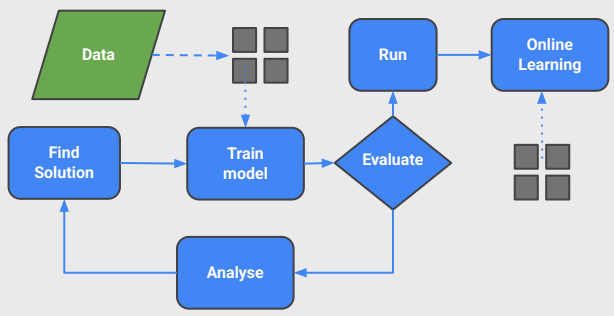












Description

1. Data Processing

- Preprocessing data to ensure that the data fed into the deep learning model is clean, structured, and meaningful.

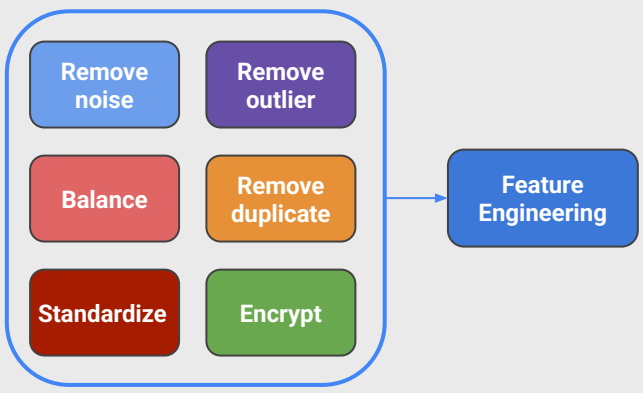


Figure 1. Data Processing.

2. Model Architecture

Implementing multiple models for fraudulent transactions detection:

- **RNN (LSTM):** Identifies transaction patterns over time by analyzing sequential dependencies, helping detect suspicious activities based on behavioral history.
- **GNN (Graph Neural Network)**: Maps transactional relationships to detect fraud rings and abnormal interactions, effectively uncovering coordinated fraud schemes.
- **Autoencoder & Isolation Forest:** Learns normal behavior to flag outliers and anomalies in transaction data, allowing detection of novel fraudulent behaviors without labeled data.
- **LSTM with Attention:** Focuses on key fraud indicators in sequences, improving detection accuracy by emphasizing the most relevant transaction attributes.

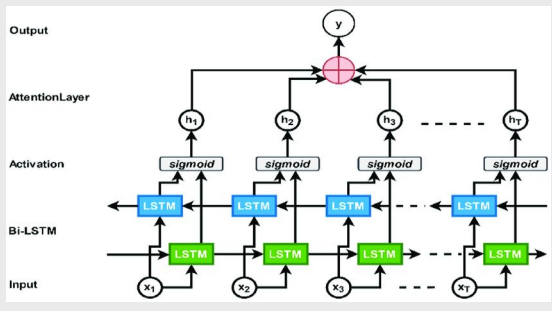


Figure 4. LSTM with attention.

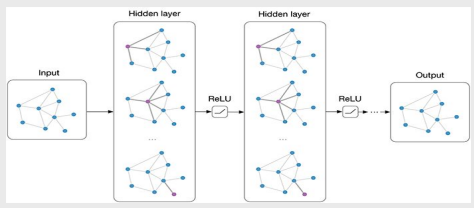


Figure 2. Graph neural network.

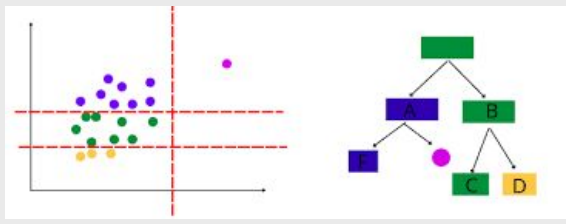


Figure 3. Isolation forest.

3. Implementation & Evaluation

- Integrate API-based real-time fraud detection to existing systems.

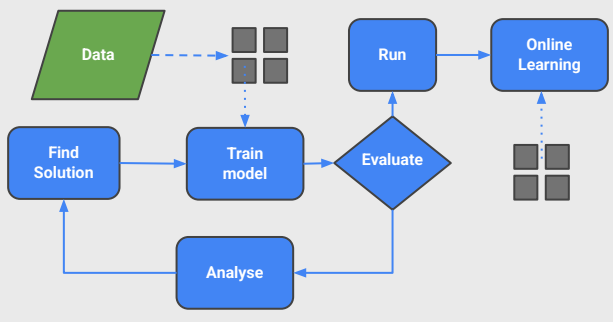


Figure 5. Updates model dynamically with new fraud patterns.

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