Behavioural Credit Scoring System for DeFi Wallets

Zeru Finance Challenge

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1. Executive Summary

This report presents a rule-based credit scoring system for Compound V2 protocol users. The system quantifies wallet behaviour in terms of financial health and contribution to protocol stability using only raw transaction logs of deposits and liquidations, without relying on predefined labels or supervised training.

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2. Data Description

Three selected datasets were used containing the following transaction types:

Transaction Type	**Description**
Deposits	User wallet deposits into the Compound protocol
Liquidates	Records of liquidations where users' collateral is forcibly sold to cover their debts

Note: borrows, repays, and withdraws were excluded to maintain a focused modelling scope per challenge constraints.

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3. Feature Engineering

We extracted wallet-level behavioural features signalling financial quality across multiple dimensions:

Feature	**Description**	**Signal Type**
total_deposit_usd	Total USD value deposited across all transactions	Activity & Commitment
num_deposits	Number of deposit transactions	Engagement
deposit_duration_days	Time between first and last deposit (in days)	Longevity
unique_assets	Number of different tokens deposited	Diversity

Feature	Description	Signal Type
times_liquidated	How many times the wallet was liquidated	Risk Behaviour
total_liquidated_usd	Total USD value liquidated from this wallet	Loss Severity

4. Scoring Methodology

4.1 Raw Score Formula

We defined a raw score that balances positive and negative behavioural signals:

raw_score = (0.4 * log1p(total_deposit_usd) +

0.2 * deposit_duration_days +

0.2 * unique_assets -

0.2 * times_liquidated -

0.2 * log1p(total_liquidated_usd))

Where *log1p(x) = log (1 + x)* is used for scale normalization of monetary values.

4.2 Scoring Rationale

Behavior	Weight	Impact	Justification
Higher deposits	0.4	Positive	Signals engagement and stake in protocol
Longer duration	0.2	Positive	Indicates loyalty and ongoing participation
Asset diversity	0.2	Positive	Reduces volatility risk, shows financial planning
Liquidation count	0.2	Negative	Signals financial instability
Liquidation value	0.2	Negative	Measures severity of over-leveraging

5. Normalization and Ranking

To create the final credit scores:

1. Raw scores were min-max scaled to a **0-100** range
2. Wallets were ranked by normalized score
3. The top 1,000 wallets were selected

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6. Results and Deliverables

- Successfully developed a behavioural credit model without relying on labelled data
- Created scoring that reflects meaningful, protocol-aligned behaviours
- Produced ***wallet_scores.csv*** containing the top-scoring wallet addresses
- Demonstrated potential for on-chain reputation assessment based solely on transaction behaviour

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7. Conclusions

This credit scoring system provides Zeru Finance with:

- A foundation for assessing user financial behaviour
- Metrics that align with protocol stability and health
- A framework that can be expanded with additional transaction types and features
- A methodology for identifying high-quality wallets without supervised learning