Compound V2 Wallet Credit Scoring

Methodology & Results

- **Github Link for the project - https://github.com/priyansh-agarwal02/Compound-V2-wallet.git**

1. Methodology Document

Overview

Zeru Finance aims to build an AIpowered, decentralized credit scoring system for Compound V2 wallets. The goal is to assign a credit score (0–100) to each wallet based solely on historical transaction behaviour, reflecting reliability and risk.

Data Processing Pipeline

Load & Parse: Raw JSON transaction data is loaded and normalized into a single Data Frame.

Feature Engineering: Walletlevel features are computed, including activity, volume, diversity, and behavioural metrics.

Scoring: Two approaches are used:

A. ClusteringBased (Unsupervised)

B. Explicit WeightedScore (RuleBased)

A. Clustering Based Approach

1. Feature Extraction:

- Total transactions, total/average/std transaction amount (USD), wallet age, asset diversity, transactions per day.
- Scaling & Dimensionality Reduction:
- Features are normalized (MinMaxScaler) and reduced (PCA) for clustering.
- Clustering:
- KMeans groups wallets by behavioral similarity (optimal clusters via silhouette score).
- Scoring:
- Each cluster is ranked by composite behavioral quality. Clusters are mapped to score bands (0–100).
- A small feature based adjustment is added for granularity.

2. Wallet Quality Band:

- Clusters are labeled as "Good" or "Bad" based on whether their median activity, age, and diversity exceed global medians.
- Unsupervised clustering reveals natural groupings and outliers, supporting protocol health and explainability.

B. Explicit Weighted Score Approach

1. Feature Extraction:

Same as above.

2. Scoring:

- Each feature is normalized and combined using a weighted sum:
- Transaction consistency (30%)
- Risk management (25%)
- Protocol engagement (20%)
- Financial stability (15%)
- Timebased factors (10%)
- The result is scaled to 0–100.

3.Score Band:

Scores are mapped to bands: Risky, Low, Good, Very Good, Excellent.

4.Rationale

This approach is transparent, customizable, and easy to justify in interviews or audits.

2. Code Submission

Notebook: compound_wallet_scoring.ipynb

Notebook: rule_based_approach.ipynb

- Loads and processes raw JSON data
- Extracts wallet level features
- Implements both scoring approaches
- Outputs scores (0–100) for each wallet

3. CSV Output

- `wallet_features.csv` (clustering approach, includes wallet address, score, and quality band)
- `wallet_scores.csv` (Clustering approach) – Top 1000 wallets
- ` wallet_features_new.csv ` (weighted core approach)
- `wallet_scores_new.csv` (weighted core approach) – Top 1000 wallets

4. Wallet Analysis

- **Rule based Approach -**

wallet_address	weighted_score	score_band	l_transact	l_amount	_amount_	amount_	let_age_d	set_divers	xn_per_da	pattern_explanation_rule
0x37acfef331e60	100	Excellent	1084	39683482	36608.38	63049.08	45	2	24.08889	High activity, Long wallet age, Diverse assets, High variance in transaction sizes
0x6168bb05ccb4a	71.85617443	Very Good	118	8801.386	74.58802	123.2582	80	7	1.475	High activity, Long wallet age, Diverse assets, High variance in transaction sizes
0x42b9df65b219b	70.8145149	Very Good	95	36.84354	0.387827	0.758901	79	7	1.202532	High activity, Long wallet age, Diverse assets, Stable transaction sizes
0xdf0635793e91c	69.77170432	Very Good	37	59.17334	1.599279	4.116838	87	7	0.425287	High activity, Long wallet age, Diverse assets, High variance in transaction sizes
0xa17f75c6d5295	69.49423858	Very Good	57	664.0555	11.6501	13.65525	80	7	0.7125	High activity, Long wallet age, Diverse assets, High variance in transaction sizes
0xa592cb9bde3df	19.71316529	Risky	3	784622.4	261540.8	317101.3	1	1	3	High activity, Short wallet age, Low asset diversity, High variance in transaction sizes
0xc1852f917835a	12.3553458	Risky	15	21314551	1420970	1334265	54	1	0.277778	High activity, Long wallet age, Low asset diversity, High variance in transaction sizes
0x9d11b1e1445b	12.28218583	Risky	2	849741.4	424870.7	600836.5	1	1	2	Low activity, Short wallet age, Low asset diversity, High variance in transaction sizes
0x320bb16ad49c2	1.135788894	Risky	4	4799960	1199990	1235584	23	1	0.173913	High activity, Long wallet age, Low asset diversity, High variance in transaction sizes
0x4becca336d9d7	0	Risky	3	6646780	2215593	1251628	12	1	0.25	High activity, Long wallet age, Low asset diversity, High variance in transaction sizes

- **Clustering Based Approach –**

wallet_address	credit_sco	cluster	behavior_	total_trans	total_amoun	avg_amou	std_amou	wallet_ag	asset_dive	txn_per_day	pattern_explanation
496aaf7b745251	100	5	Good	76	770814.616	10142.3	5740.49	30	3	2.53333333	tivity, Long wallet age, Diverse assets, High variance in transactic
d5d29416ac07b2	100	5	Good	5	98.9351388	19.78703	20.35675	21	2	0.23809524	tivity, Long wallet age, Diverse assets, High variance in transactic
9f45d557d93bc7	100	5	Good	11	3272.05403	297.4595	264.6027	22	2	0.5	tivity, Long wallet age, Diverse assets, High variance in transactic
f66a6286b0a235	100	5	Good	2	7346.58818	3673.294	1676.86	20	2	0.1	tivity, Long wallet age, Diverse assets, High variance in transactic
0c46327252dbf0	100	5	Good	2	20.8023112	10.40116	0.566245	22	2	0.09090909	w activity, Long wallet age, Diverse assets, Stable transaction siz
9fafc0272a61b0	0.032139	2	Bad	1	3.25E-09	3.25E-09	0	1	1	1	activity, Short wallet age, Low asset diversity, Stable transaction
ad42c6a0d7e4a9	0.032139	2	Bad	1	0	0	0	1	1	1	activity, Short wallet age, Low asset diversity, Stable transaction
5f07e59c239f4c8	0.032139	2	Bad	1	2.19E-16	2.19E-16	0	1	1	1	activity, Short wallet age, Low asset diversity, Stable transaction
6e51c9d43eca66	0.032139	2	Bad	1	0	0	0	1	1	1	activity, Short wallet age, Low asset diversity, Stable transaction
15a6acca291a81	0.032139	2	Bad	1	0	0	0	1	1	1	activity, Short wallet age, Low asset diversity, Stable transaction

Justification

High scores: Indicate responsible, consistent, and engaged protocol usage.

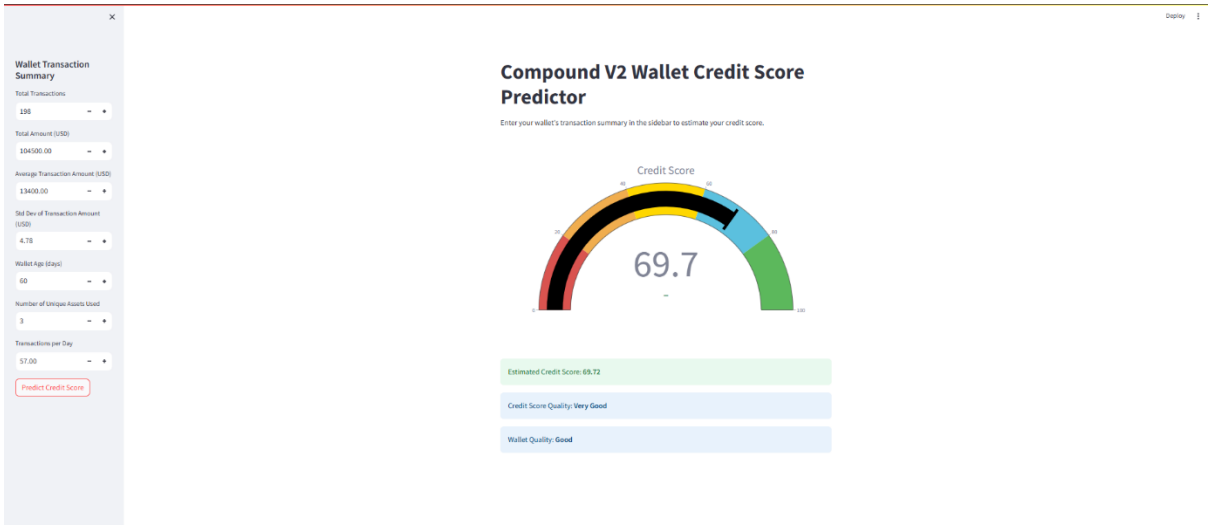
Low scores: Indicate risky, botlike, or minimal engagement behavior.

5. Visualization & Streamlit App

App: `app.py` (Streamlit UI)

- Sidebar for inputting wallet features
- Main area displays animated gauge, credit score, credit band, and wallet quality band

Screenshots:



THANK YOU