User Risk Monitoring and Control System Dashboard

Aave Grants Proposal

Solution and Potential Downstream Value

SOLUTION

*To better understand and identify levels of user risk, like-groups, and hierarchical cohorts, a **user risk monitoring and control system dashboard** will enable **greater visibility** of user risk profiles and aid in **uncovering potential threats** to the Aave protocol*

POTENTIAL VALUE TO THE COMMUNITY

Quantifiable risk at the user, LP, market, and protocol levels

Insights into borrower concentration between LPs, markets, and protocols

Development of strategic assumptions to apply risk-adjusted interest rates to individuals

Inputs for development of other financial products to maximize revenue while mitigating risk

Protocol trend metrics displaying aggregate risk over time (i.e., user, insolvency)

Opportunity

BACKGROUND

With over $20B+ deposited in Aave lending pools, ensuring the solvency and health of the Aave protocol is a necessity. Understanding users and cohorts of users is essential in quantifying the risk from the user level to the market level.

PROBLEM

No monitoring tools are available to the community to classify user risk and to understand the associated potential threats these risks may have on lending pools, markets, and protocols.

Scope of the Project

Project Description/Objectives:

- Utilize indexing protocols to collect historical and current borrowing activity of Aave users in V1, V2, and V3 markets
- Develop real-time user metrics and machine learning insights
- Create a dashboard linking user metrics and risk trends over time

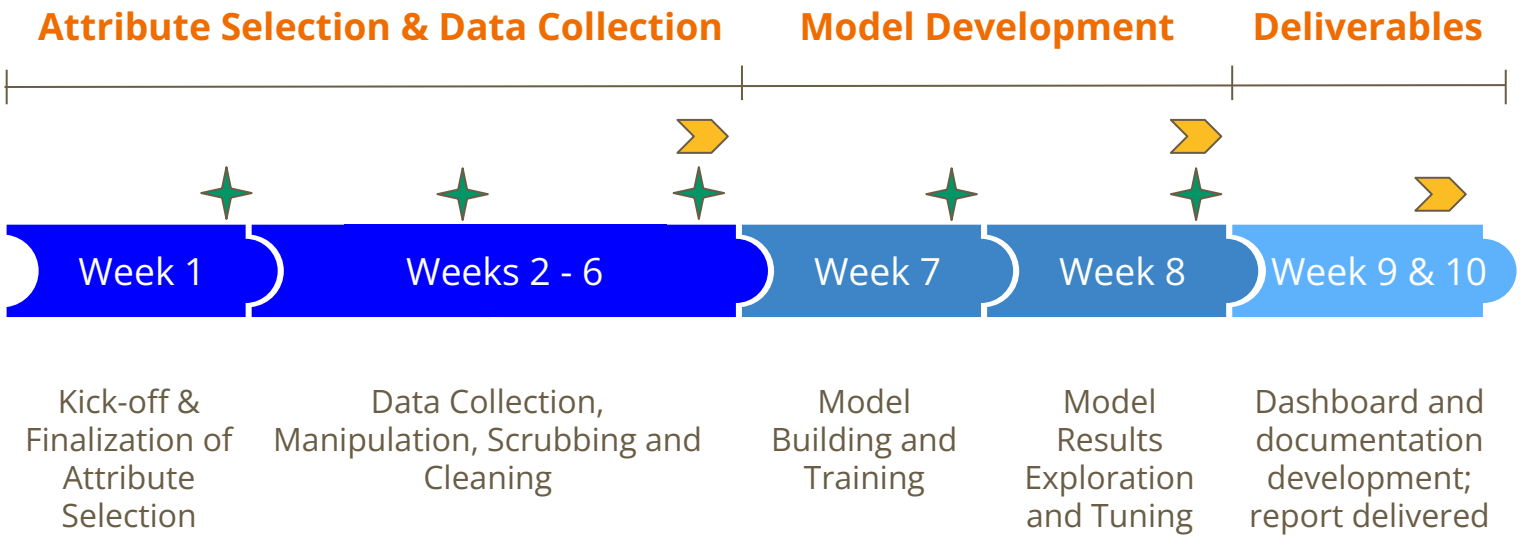
Deliverables

- Machine learning model to classify users by risk profiles based on historical borrowing activity
- User risk monitoring and control system dashboard displaying user metrics like total collateral, total borrowed, liquidation history, risk profile classification and other historical and active borrowing activity

= Weekly Internal Meeting

= Grant Status Meeting

Timeline and Milestones



Tools Used

Dune Analytics

the graph

GraphQL

python

tableau

Detailed Timeline View

Week 1:

- Kick-off call and review SOW
- Finalize attributes of interest
- Understand limitations of data collection
- Schedule meetings with developers to understand smart contract functions

Weeks 2 - 6:

- Develop pseudocode and high level code framework
- Establish queries to collect attribute data
- Run queries and collect data
- Clean, manipulate, and summarize data
- Separate training and test data

Week 7:

- Develop initial clustering and hierarchical clustering models
- Identify any other models that may be appropriate for profiling

Week 8:

- Review results of model
- Create quantitative and qualitative risk descriptions for each cluster

Weeks 9 - 10:

- Continuation of Week 8 milestones
- Initiate dashboard ideation and wireframing
- Build Tableau dashboard
- Create final report and documentation

Previous Works / Work in Progress

Projects

- CredAave - ML model to determine individual address' probability of default
- Gauntlet - simulation based modeling, describing what could go wrong with current parameters
- User Retention Dashboard - shows user churn and other metrics
- Cred Protocol - ML-based defi credit scores (maps historical user activity with probability of liquidation)

Differentiation

- Utilizing clustering to determine risk profiles rather than a single continuous distribution of credit scores
- Beyond user risk profiling (credit score parent), additional insights at the lending pool, market and protocol levels will not only provide granularity of risk but larger undiscovered risks
- Flagging of large accounts adding to Aave's V3 withdrawal / supply caps

Preliminary Machine Learning Model Details

#	Attribute	Description
1	*# of Liquidations*	Count of the total liquidations an address has undergone
2	*# of Borrows*	Count of the total number of borrows an address has engaged in
3	*# of Deposits*	Count of the total number of deposits an address has supplied
4	*# of Total Repays*	Count of the total number of full loan repayments
5	*# of Payments*	Count of the total number of payments
6	*Type of Collateral Borrowed*	Weighted average of the level of riskiness of the collateral borrowed
7	*Amount Borrowed (% of LTV Used)*	Of the allowable LTV, the percentage used against the collateral
8	*Average # of Open Positions*	Defined as the average number of positions opened over some time period

#	Attribute	Description
9	*Average Position Size*	Defined as the average position size over some time period
10	*Average Duration of Repaid Loan*	Average duration of a repaid loan - a loan that was fully repaid
11	*Average Duration of Liquidated Loan*	Average duration of a liquidated loan - a loan that reached the liquidation threshold
12	*Types of Markets**	Principal weighted average of total number of markets engaged with
13	*Average difference in borrow APY and lend APY*	Principal weighted average of difference in borrow APY and lend APY
14	*% of Stable vs % of Variable Rate Loans*	Ratio of stable vs variable loans opened
15	*Average Lending Pool Utilization Rate*	Principal weighted average of Lending pool utilization rate

*Risk associated with each market to be determined