ST2 - Viral Propagation - El DEX

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Overview:

I. Context: Defining the Goal and the constraints

What are we trying to achieve?

II. Simulation: Assessing Our Solution

How will we evaluate the effectiveness of our proposed solution?

III. Solutions and Areas for Improvement

Detailing our approach and potential refinements.

Context : Mitigating Contagion and Herding on Crypto Trading Platforms (Perplex)

We analyze the problem, examine existing approaches, and propose a novel solution.

The Contagion and Herding Challenge

Rapid Contagion

Fast spread of market sentiment, trading activity across platforms → Amplified price fluctuations.

Can be triggered by external events, news, or even rumors.

Herding Behavior

→ Concentrated trading patterns and increased volatility.

Can create bubbles and exacerbate crashes.

Our approach to the problem

1. **Simulate a Crypto Market**

   With specific traders (Market Makers, etc.)

2. **Study propagation on the market**

   Like massive liquidation cascade

3. **Mitigating**

   Objective : mitigate and limit the spread of liquidation

Cryptocurency Market Simulator

Specific Traders

- Market Makers
- Degen Traders
- Swing Traders

Auto Liquidation

Automatically liquidates the trader when his loss exceeds a certain threshold.

Square Root Law of Price Impact

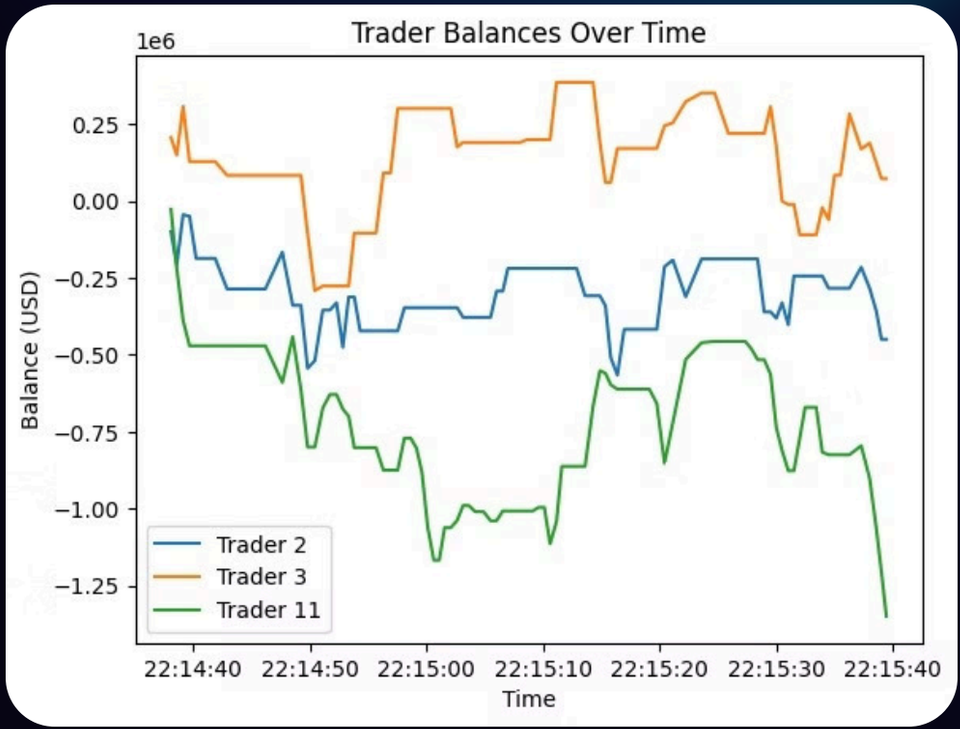
$$\Delta P = \alpha\sqrt{V} - \beta\sqrt{L}$$

Delta P is the impact on price, alpha is the volatility of the asset, V is the volume traded, L is the Liquidation Volume.

Specific Traders Features

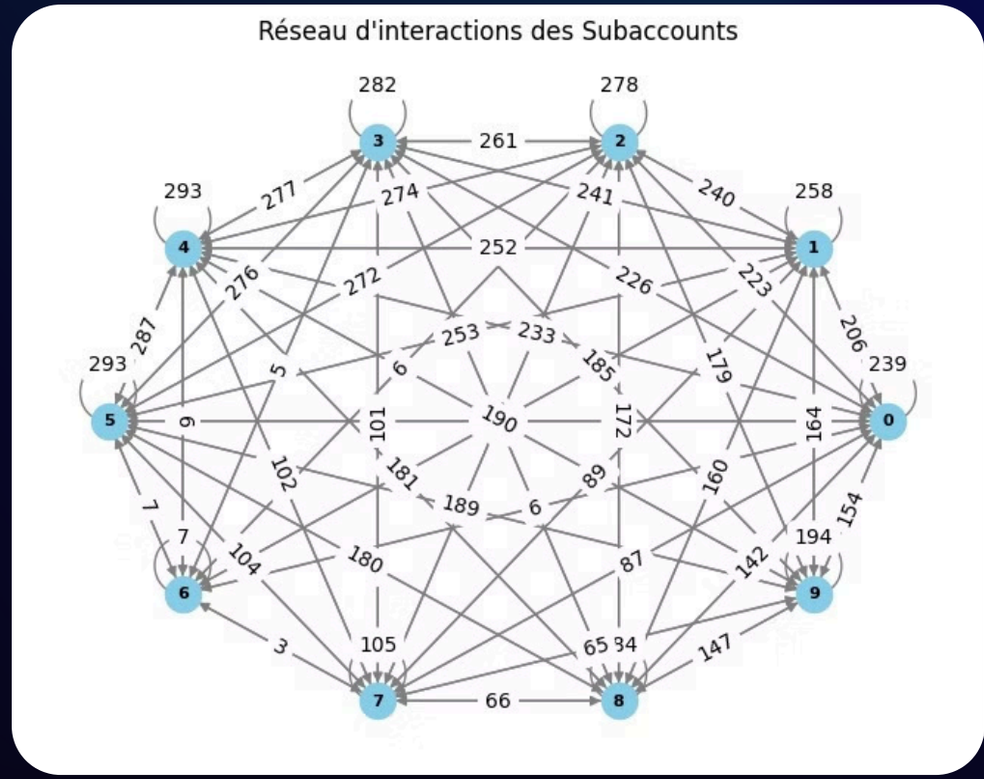
- **Market Makers:** Low apetite for risk
  - High trading frequency, provides liquidity
  - Low Herd probability
- **Degenerate Traders:** High-risk traders, aggressive positions
  - Higher Leverage
  - Less Trading but Panic Sells
  - High Herd probability
- **Swing Traders:** Opportunists
  - Medium Leverage
  - Trades frequently : Buys if Bullish Market, Sells if Bearish Market
  - Medium Herd Probability

Simulated Market : a small test



Non Liquidated Trader Balances Over Time

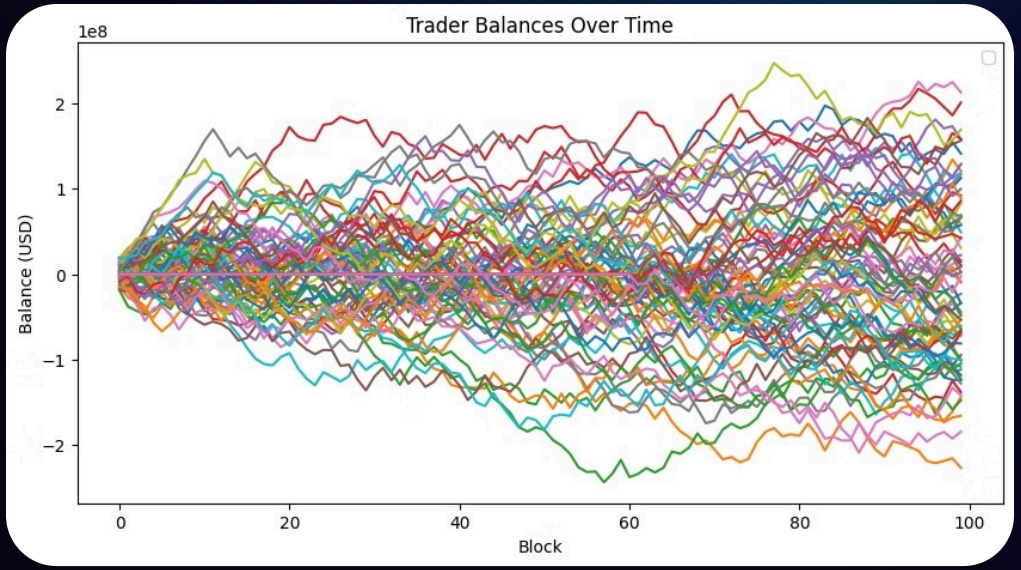
Trader balances react differently: Trader 3 remains stable, while Trader 2 fluctuates a lot and Trader 11 suffers heavy losses.



10 Traders Correlated Actions

- 6 Market Makers : trade a lot, high correlation
- 2 Degenerates : trade less, might get liquidated
- 2 Swing Traders : often trade simultaneously

Simulated Market : a larger market



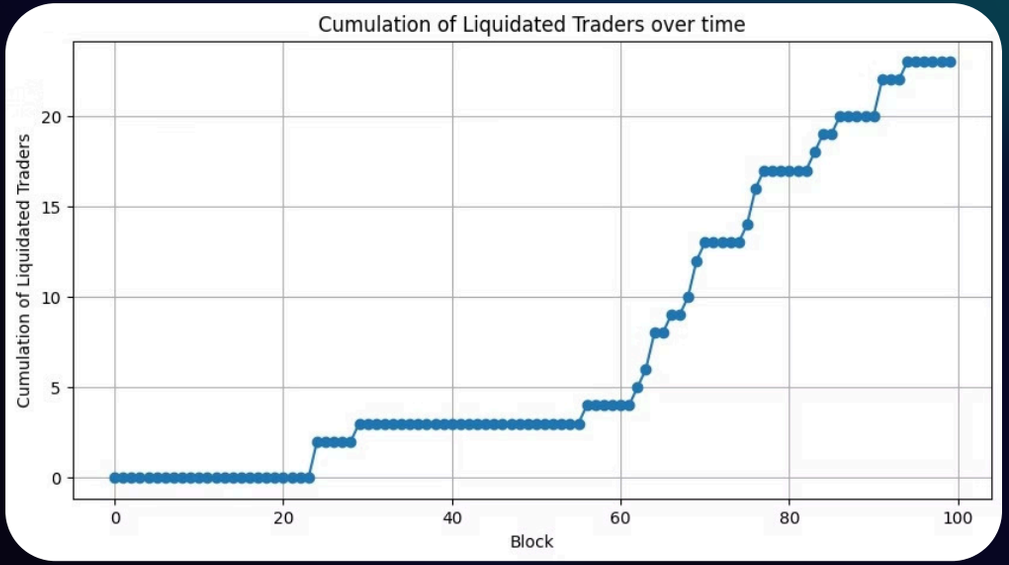
Non Liquidated Trader Balances Over Time

We observe a normal distribution with a tendency of the mass to get richer as the market prices go up, and poorer when it goes down.

BTC Price Over Time

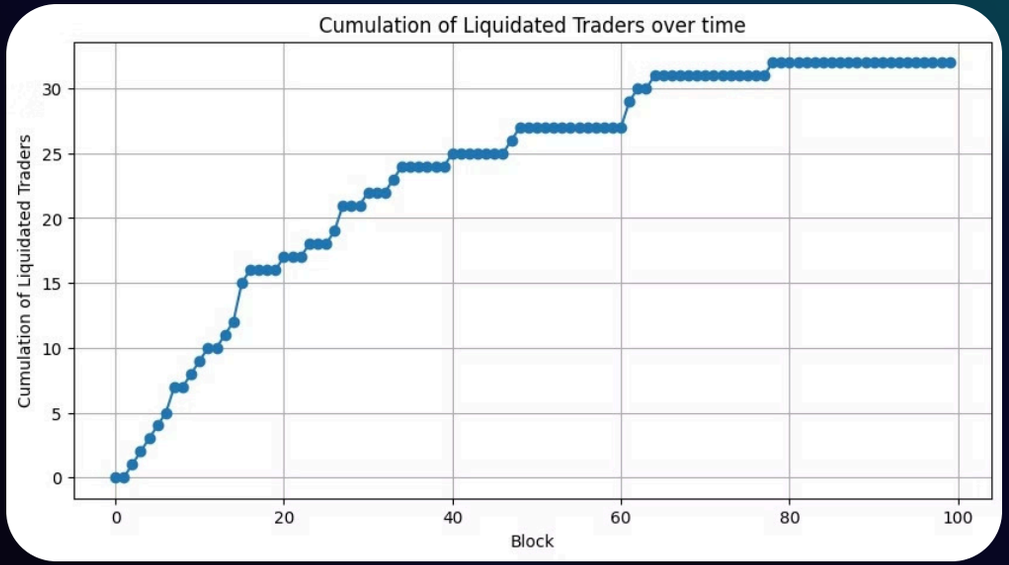
The BTC price graph shows high volatility with sharp rises and drops.

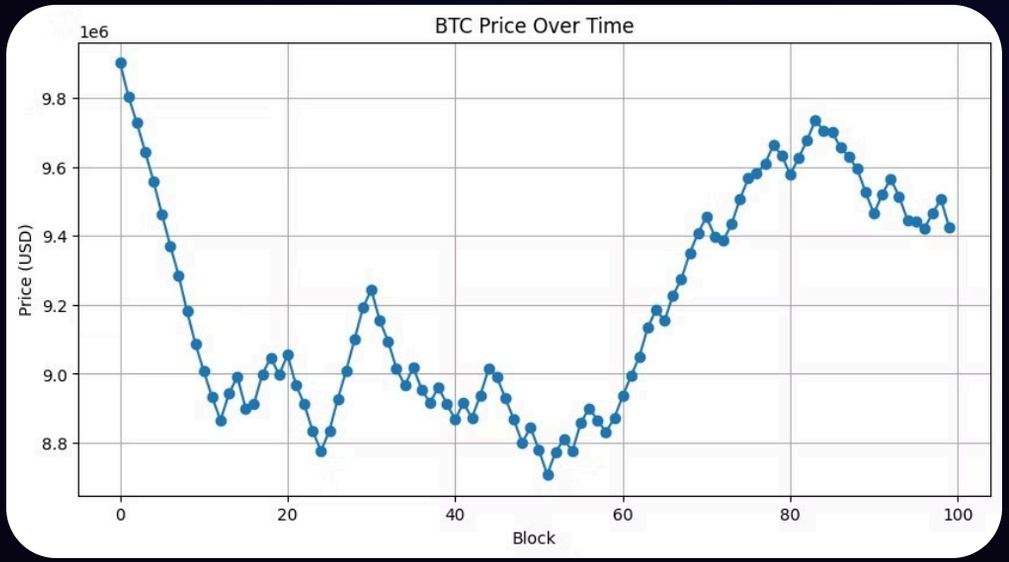
This suggests varied trading strategies, with some traders handling volatility better than others.



Liquidation on the market with the late introduction of degenerates

- 70 market makers and 10 swings traders are introduced : few liquidated traders
- 20 degenerates are introduced at step 60 : observation of a liquidation cascade





Liquidation on the market with the late introduction of market makers

The number of liquidated traders rises sharply at the beginning, indicating a cascade of forced liquidations due to BTC price volatility. Traders who follow the crowd and trade in risky ways lead to great market instability.

However, the market volatility stabilises and starts decreasing when market makers are added the market.

Our Proposed Solution:

Give Out Free Risk Management Formations

Educate clients on risk management :

- Use a leverage adapted to its wallet
- Place limit orders to prevent liquidation

Introduction Of Low Risk Apetite Traders

The introduction of Market Makers, Swing Traders dilute Degenerates' influence.

Reduces the Cascade Liquidation effect, or even stops it.

Validation and Testing

1

Backtesting

Analyze historical market data (alpha, volatility,...)

2

Simulation Testing

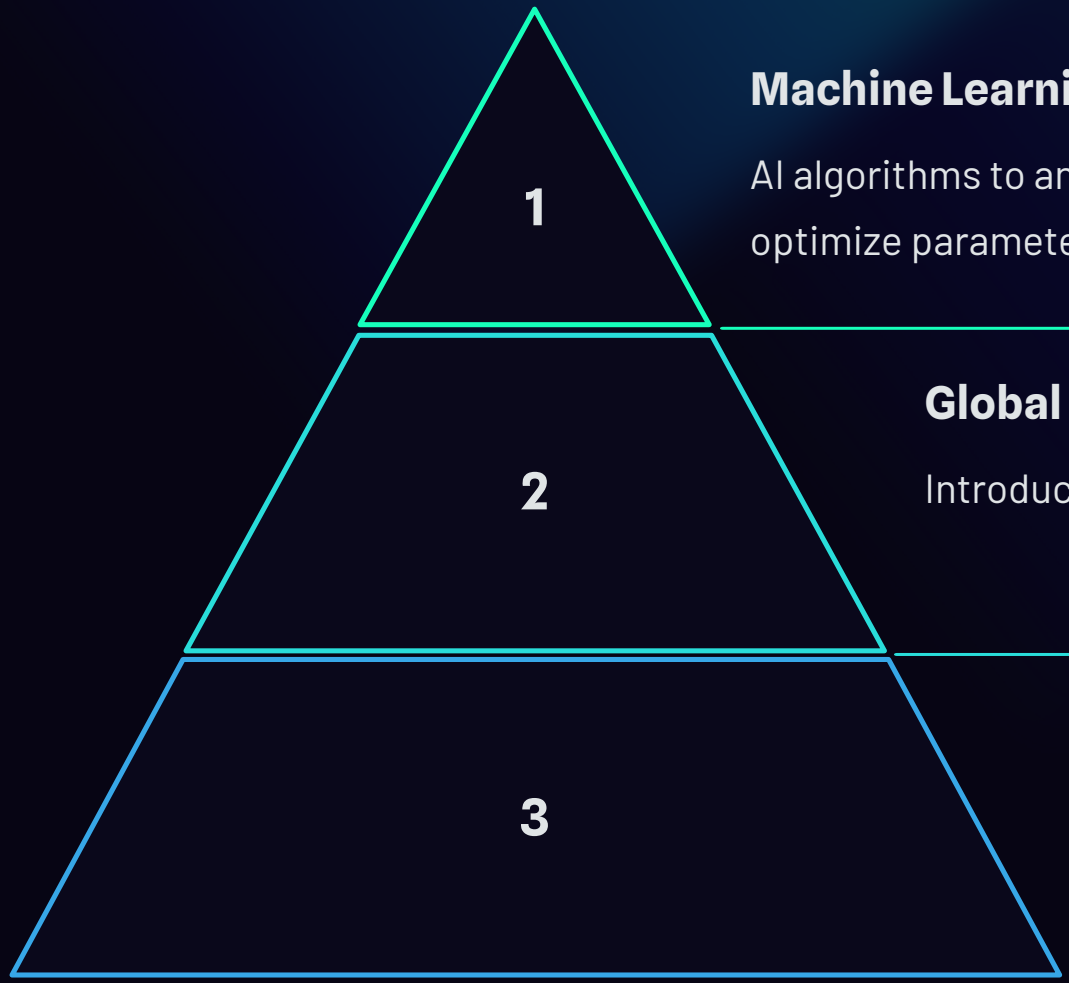
Simulate various market scenarios and contagion events

3

Pilot Implementation

Deploy the solution in a controlled environment (managed by parameters)

Model Implementation : areas for improvement



Machine Learning Models

AI algorithms to analyze trading data and to optimize market indicators to optimize parameters (alpha, volatility,...)

Global market's dependencies

Introduce the dependence of other cryptocurrencies, of events

Introduce realistics sets of trader profiles

Collect more comprehensive data on the market

Thanks for your attention !

Bibliography

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