



# Crypto Alpha Signal Dashboard for Quantitative Trading UMHackathon 2025

Team :Big O(1)

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# Problem Statement

- “Develop a ML model that analyzes on-chain data to generate alpha trading strategies.”
- Must use ML or HMM for implicit indicator extraction
- Trade frequency  $\geq 3\%$  per row, Sharpe Ratio  $\geq 1.8$ , MDD  $\geq -40\%$

# Our Objective

- Build an interactive crypto signal dashboard
- Integrate ML/HMM for alpha generation
- Use high-frequency data
- Visualize signals and metrics for traders

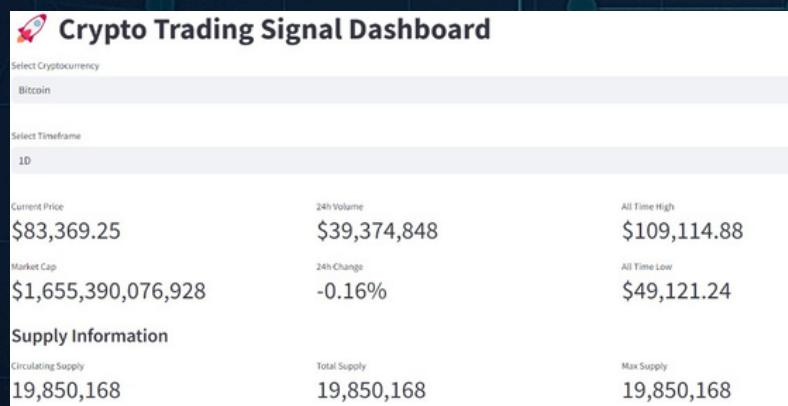
# Data Pipeline

- Source: Yahoo Finance
- Plans to integrate CryptoQuant/Glassnode
- Flow: Data API → Processing → Indicators → Signal Output



# Dashboard Overview

- Crypto & timeframe selector
- Key stats: Price, Volume, Market Cap, ATH/ATL
- Dynamic candlestick chart
- Crypto & timeframe selector



# Backtest Overview

- Hidden Markov Model (HMM) regime detection applied
- Strategy: BUY during low-volatility regime, SELL during high-volatility regime
- Strategy CAGR and Total Return printed
- Trading fees (0.1%) included

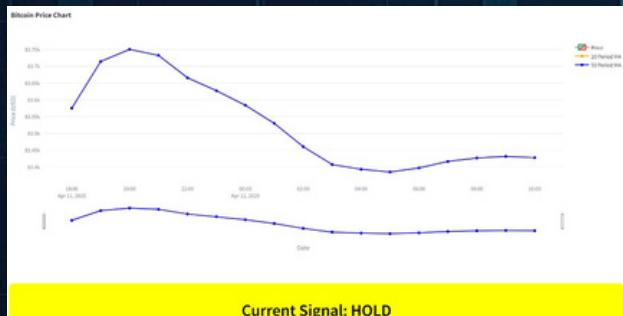


Sharpe Ratio: 1.04  
Max Drawdown: -48.95%

HMM strategy vs Buy & Hold returns for BTC & ETH(3Y)

# Current Strategy

- Technical Strategy: SMA20(Yellow) vs SMA50(Blue) Crossover
- Basis for developing more complex ML models
- Crypto & timeframe selector
- Signals generated: BUY on low-vol regime, SELL on high-vol regime
- Dynamic candlestick chart
- Current signal display with color
- Hidden Markov Model (HMM) classifies market into 3 volatility states
- Applies to Bitcoin(BTC) and Etherium(ETH) independently



1D



5D



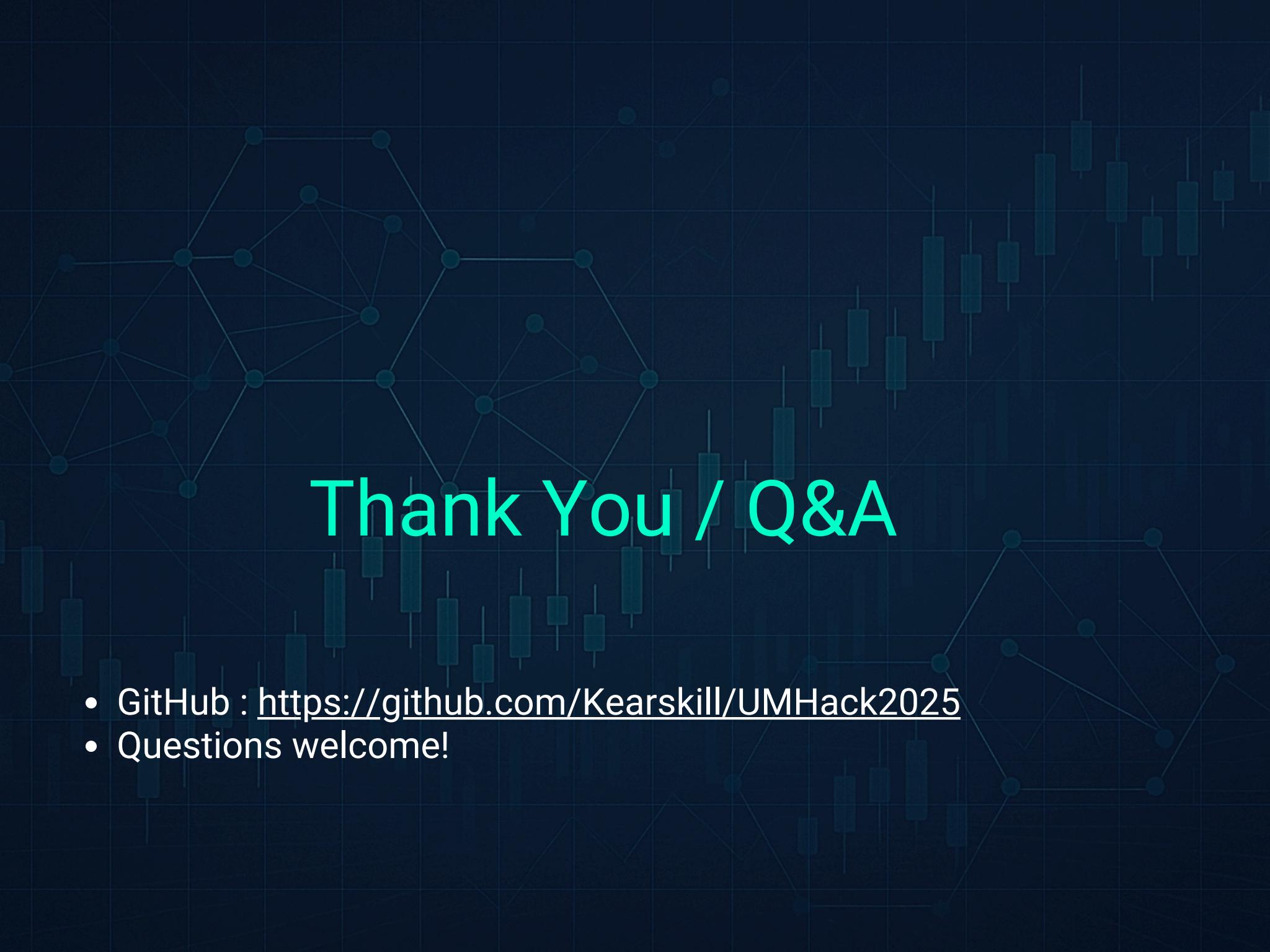
1M

# Criteria Evaluation

- ML or HMM model Yes
- Hourly data usage Dashboard only
- Trade signal frequency Generated but not quantified
- Execution logic based on regime Yes
- Backtesting 3-year historical data
- Sharpe & MDD Calculated in backtest
- Multiple years data 3 years
- Sentiment/NLP Planned
- Forward test (1 year) Not yet implemented

# Final Vision

- Adaptive, alpha-generating ML strategy based on volatility regimes
- Combine technical + on-chain + sentiment indicators
- Use HMM for regime-based logic
- Visual dashboard for traders and strategists



# Thank You / Q&A

- GitHub : <https://github.com/Kearskill/UMHack2025>
- Questions welcome!