# Trading Engine powered by Disruptive Technology

**CGS Engine Quants** 

# **Meet the Founding Quants**

#### **Yeonwoo Choi**

- A former top student at Korea Science Academy for the Gifted, he later earned degrees from Seoul National University and the University of Pennsylvania. A licensed attorney in both Korea and New York, and a partner at one of Korea's largest law firms, yet the legal work is almost a sideline; he pours the bulk of his time and energy into his true passion — Technology.
- System Architecture and Modeling, Trading Execution Deployment.

#### Jinwook Lee

- Brings extensive expertise in financial modeling, with
  a strong focus on risk measurement. His work centers
  on mathematical programming and AI system design.
  Dr. Lee holds a PhD in Operations Research from
  Rutgers and completed his undergraduate studies at
  Yonsei University. He is currently a professor at Drexel
  University.
- Quantitative Strategy, Financial Modeling/Engineering with Mathematical Validation.

## Founders & Origin

#### Where It All Began: Two Nerds in Philly (2019)

- Jinwook is a professor at Drexel University, where he teaches MBA students with a focus on computational and mathematical programming. His research includes multiple publications on Value-at-Risk and its applications in finance.
- In 2019, Jinwook met Yeonwoo while Yeonwoo was pursuing graduate studies at the University of Pennsylvania.
- From the start, they shared an intense fascination and deep obsession with programming, mathematics and puzzle solving.

#### **Obsession: Time-Series Data**

- They ended up spotting a fanciest puzzle to solve the complexity of the time-series data a puzzle which, once solved, would unlock the door to countless other complex problems.
- Soon they became deeply obsessed with extracting refined and meaningful signals and eliminating noise from massive chunk of numerical datasets.

## **Challenges & Solutions**

#### **Challenges**

- Time-series data across industries riddled with noise weather; trading; power-grid fluctuations
- Conventional models struggle to generalize across domains

#### **Our Approach**

- Our belief was complex-system dataset could be refined by intrinsic mathematical properties
- Based on such belief, after enduring the painful process of formulating hypotheses and running countless simulations, we "discovered" something new

#### **Solutions**

- We created the CGS Engine, a signal-processing system that systematically applies algebraic and geometric analyses to time-series big data.
- Our engine removes noise and detects hidden patterns across any time-series dataset.
- The engine is applicable to diverse domains and, when installed, adapts seamlessly—even to weather forecasting.

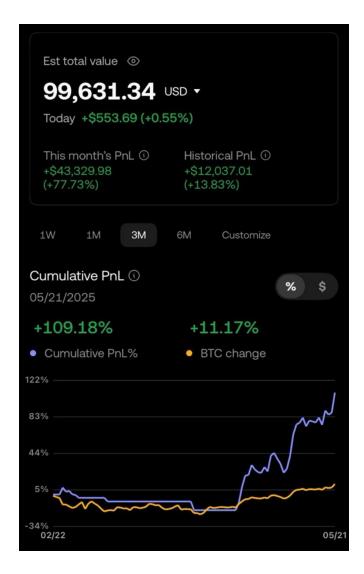
#### Commercialization initiated

#### **Traction**

- We implemented our engine to be an autonomous live trading system.
- System ideation completed in 2021, and establishment of core infrastructure and live real-market condition test conducted by 2023.
- In 2024, a soft launch initiated, deploying personal capital to validate our system in real market.

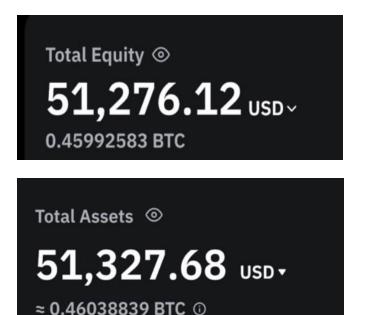
# Now, we are aiming to build a new hedge-fund powered by disruptive technology, which will rewrite the history of trading

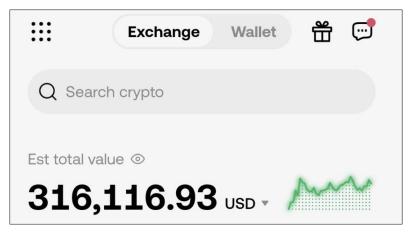
- Our trading platform capitalizes on volatility through a proprietary, in-house algorithmic engine with a track record of proven performance.
- Robust risk management is seamlessly embedded into our core infrastructure.



Personal capital deployed since mid-November 2024

Recording +120% ROI as of July 2025 (USD 518,350 in operation)





## What is it?

## What defines CGS Engine?

#### **Autonomous Al-bot Trading system**

- Human intervention brings emotions and mistakes into the process, increasing risk.
- The U.S. securities markets will soon operate 24/7, where only automated quants can respond to the markets effectively we've built an automated trading system to meet that shift.

#### Numeric data-refinement

• Each AI-bot's Logics driving those trades: Each bot relies on the data-processing signals generated by the CGS engine.

## Robot Army Execution: portfolio effect with a single asset class

- Our automated bot-trading system is designed to achieve a portfolio effect regardless of the underlying asset, thereby significantly lowering risk exposure.
- Between 200 and 10,000 robot traders with different profiles/features spread the seed capital across multiple positions.
- System's General Manager bot aggregates and synthesizes all the incoming signals and then executes the trades.

## How does it work?

## Multi-AI-bot system with numerous single AI-bots

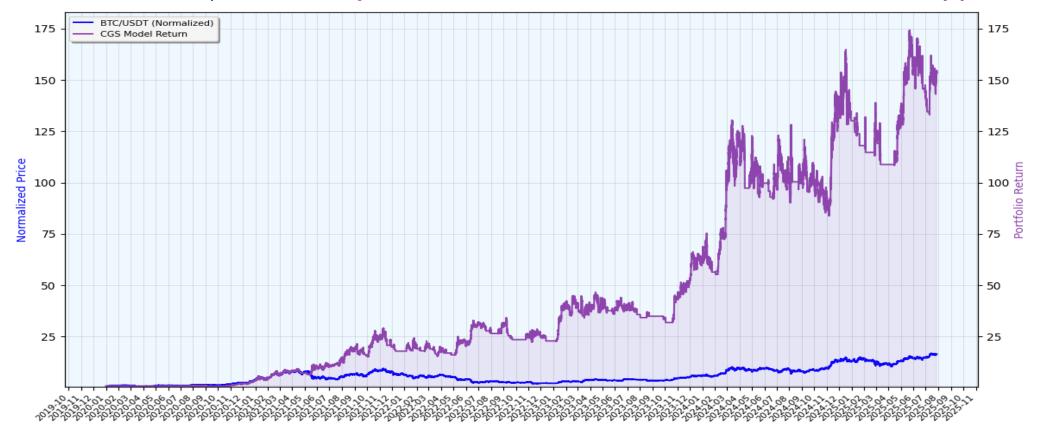
- CGS operates as an "army of bots" trading system. Each bot uses the CGS engine to refine data signals, then buys and sells target assets.
- The basic execution logic for each bot works as in below (while the actual is much more complex):
  - (Step 1) Initial Operation: Searching for equilibrium signals while standby.
  - **(Step 2) Equilibrium Signal Capture Phase:** Once an equilibrium signal is captured, the system remains on standby, preparing for a bet while maintaining the state.
  - (Step 3) Preliminary Signal Betting Phase: A bet is placed when a preliminary signal is confirmed.
  - (Step 4) Post-Analysis and Confirmation of Preliminary Signals: Conducting an evaluation to determine whether the signal is a true uptrend/downtrend.
  - If a true signal is confirmed: Continue holding the betting position.
  - **Else:** (1) Perform a loss cut to close the position; (2) Process noise data and redefine the next preliminary signal. Then, proceed with steps 3 and 4 when the next preliminary signal is observed.

(Step 5) Holding the betting position until the next equilibrium status. Once the next equilibrium signal is captured, the position is closed to take profit, then the process returns to Step 2.

## How well does it work?

## **BTC vs BTC CGS Engine**

• The chart below shows the cumulative return from investing in BTC using the CGS engine over the past five and a half years. The **blue line** depicts **BTC** price which rose roughly **13x with CAGR (+) 67.02%**, while over the same period the **Purple-line** of the **CGS BTC returns above 150× with CAGR (+)172%**.



## How well does it work?

#### What if the market is down?

- The chart below shows how CGS works in the down market like BTC in the year of 2022
- The Blue-line BTC price recorded (-)50%, while the Purple-line CGS cumulative return recorded (+)25%
- CGS employes both long and short derivative trades. Marks in color on the blueline represent actions

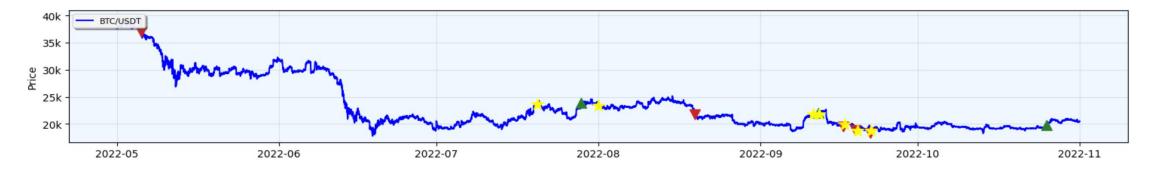


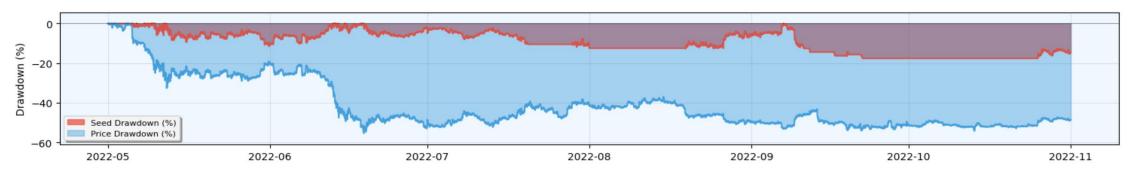


## How well does it work?

## What about Draw-Down volatility risk?

- Beyond ROIs, the Draw-Down Ratio (how deep the trading seeds fall after recording cumulative gain highs)
  is a critical metric; the smaller the Draw-Down, the stronger the performance.
- On top of the overwhelming returns, CGS also delivers far smaller Draw-Downs.
- In the bottom chart, Red-line represents the much smaller Draw-Down in CGS against BTC's blue-line.

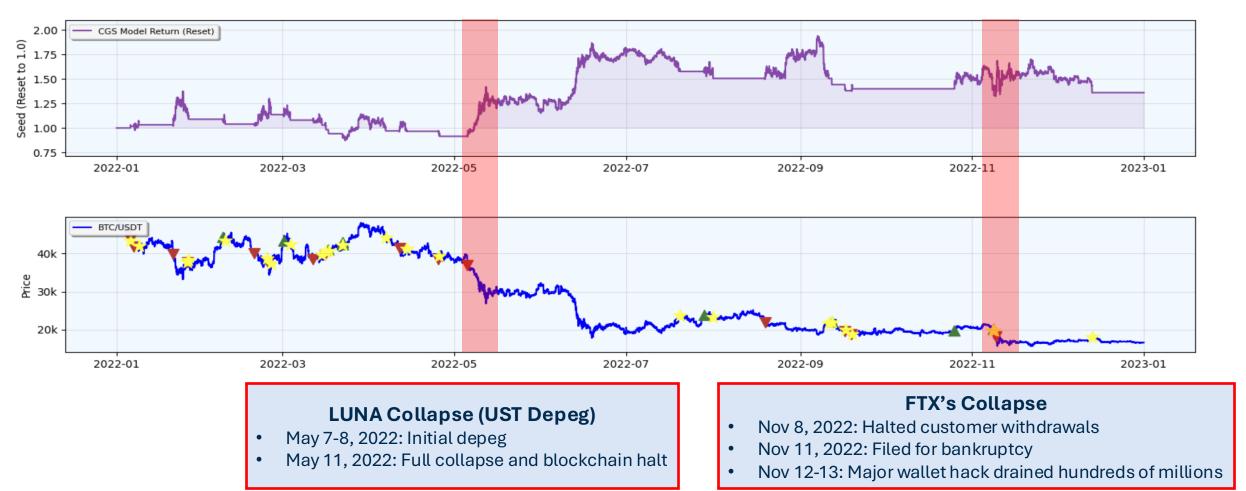




For a deeper look at detailed CGS system's Risk/Return data, refer to the Annex.

## Resilience in Market Crises

This chart highlights how the CGS model performed during two of the most severe market disruptions in 2022.



#### The CGS model avoided catastrophic drawdowns!

# Risk Control: Stop-Loss and No-Trade Protocols

#### **Stop-Loss Logic – Post Analysis of True Signals**

- After a **preliminary signal** is acted upon, the system enters a **post-analysis phase** to verify if it aligns with a *true signal* (confirmed trend).
- If post-analysis determines the signal was false (trend invalidated):
  - Trigger Stop-Loss Close the position immediately to limit drawdown.
  - Noise Processing Reclassify the invalidated movement as data noise.
  - Return to signal-search mode to await the next valid preliminary signal.

#### No-Trade Logic – Data Noise & Equilibrium Zones

- During equilibrium phases (price movements within a low-volatility range) or periods dominated by data noise (determined by the CGS Engine Noise Processing process):
  - No trades are initiated the system remains in standby.
  - Prevents unnecessary losses and protects capital during sideways or choppy markets.
  - Trading resumes only when a new preliminary signal is captured, leading back to the betting phase.

## Risk Controls During Connectivity or Gateway Failures

#### Q: What are your action plans for order-gateway outages or sudden system/network downtime?

We have a multi-layer contingency plan designed to protect open positions and minimize risk:

- **Built-in safety orders:** Every trade automatically includes a take-profit and stop-loss that live on the exchange's own servers. This means any active positions stay protected even if our system goes offline.
- Automatic cancellation on disconnect: If our connection drops, the exchange can automatically cancel any unprotected orders to avoid unintended trades.
- **Backup connection:** We keep a secondary order route ready so we can switch instantly if the main one fails.
- Automatic "safe mode": If our system detects a problem, it stops opening new trades and focuses only on managing or closing existing ones.
- Close positions if needed: If both main and backup routes fail, we close all open trades as soon as a connection is available.
- Independent monitoring: A separate "watchdog" system constantly checks that everything is working and triggers the safety plan if it's not.

# Risk Management I

## **Key Risk Mitigation Strategies**

- Advanced algorithmic controls to proactively manage risk
- Real-time monitoring across all trading activities
- Multi-layered security infrastructure safeguarding operations

## **Compliance Framework**

- Full regulatory compliance across jurisdiction
- Ongoing audits and transparent reporting
- Professional-grade custody and asset protection solutions

# Risk Management II

## **Mitigating Reverse Engineering**

- Multiple trading accounts across different exchanges
- Randomized order execution: variable delays, position sized, and splitting large trades
- Masking strategies: bots executing decoy trades to generate noise
- Random number parameters enhancing multi-bot variability

## **Preventing Code Leakage**

- Secure API and trading bot communications
- Continuous network monitoring for suspicious activity
- End-to-end encryption of all classes, functions, and variables
- Private networking with trusted servers

## Does it work with individual stocks?

- Definitely not. Our model isn't limited to a single asset class. It's designed to work with any time-series data. It performs just as well whether it's stocks, ETFs, or even entirely different domains.
- Right-hand-side is the performance of the CGS model on GE (General Electric).
- GE's stock went nowhere with CAGR (+)0.32%, but our model delivers over 10X returns with CAGR (+)9.99%



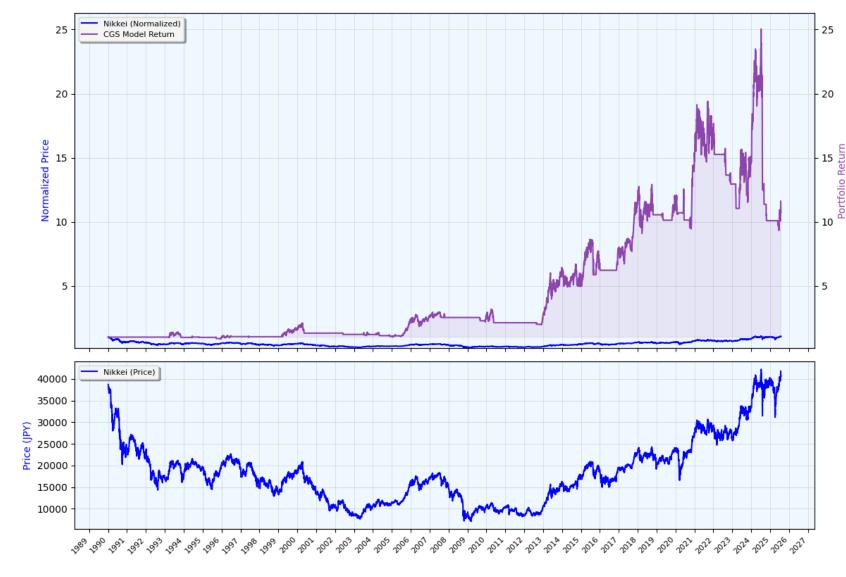
# Does it work with Nasdaq ETF (QQQ)?

- Definitely not. Our model isn't limited to a single asset class. It's designed to work with any time-series data. It performs just as well whether it's stocks, ETFs, or even entirely different domains.
- Right-hand-side is the performance of the CGS model on Nasdaq ETF (QQQ).
- Even with QQQ posting a strong 10X return with CAGR (+) 10.06%, our model outperformed with over 70X with CAGR (+)18.67%.



## Does it work with Nikkei?

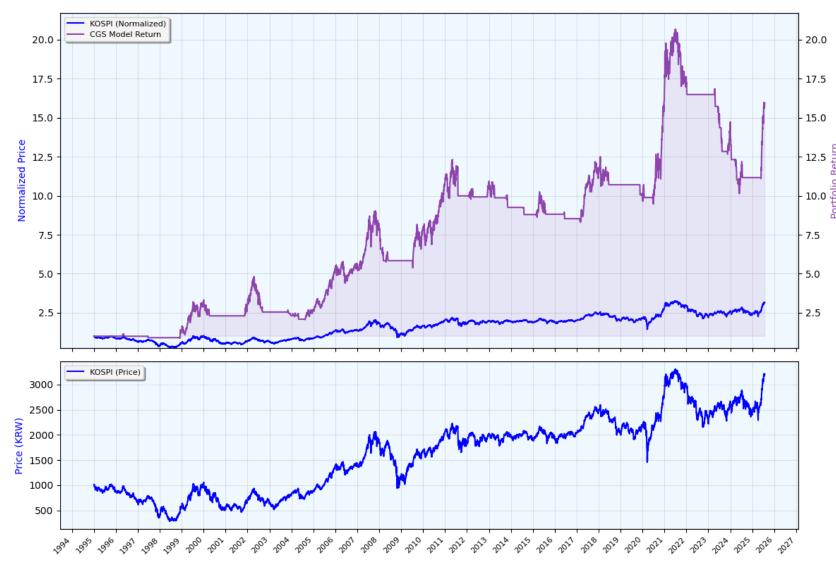
- Definitely not. Our model isn't limited to a single asset class. It's designed to work with any time-series data. It performs just as well whether it's stocks, ETFs, or even entirely different domains.
- Right-hand-side is the performance of the CGS model on Nikkei 225.
- Our model outperformed with CAGR (+)7.09% while Nikkei 225 side-walked with CAGR (+)0.08%.



## **Does it work with KOSPI?**

- Definitely not. Our model isn't limited to a single asset class. It's designed to work with any time-series data. It performs just as well whether it's stocks, ETFs, or even entirely different domains.
- Right-hand-side is the performance of the CGS model on KOSPI.
- Our model returns CAGR

   (+)9.90% regardless of
   whether KOSPI moving
   sideways with CAGR (+)3.84%.



## **Additional Features**

## **Next-gen Quant-Al Trading Framework**

#### An adaptive architecture fusing AI innovation with quantitative analysis

- Robot Army Execution Engine: Each AI bot runs a unique strategy conservative, aggressive, mixed tuned to different market noise profiles.
- Together they form a true portfolio of behaviorally diverse strategies

## **Human-AI collaboration with XAI-driven Insights**

#### True Human-Al collaboration

- Human design and direct; Al bots execute.
- No blind training unlike most AI quant teams relying on black-box models. Just smart math and clear logic.
- We work with the AI, understand every decision and deploy with confidence

## **Additional Features**

## **Intelligent Strategy Validation**

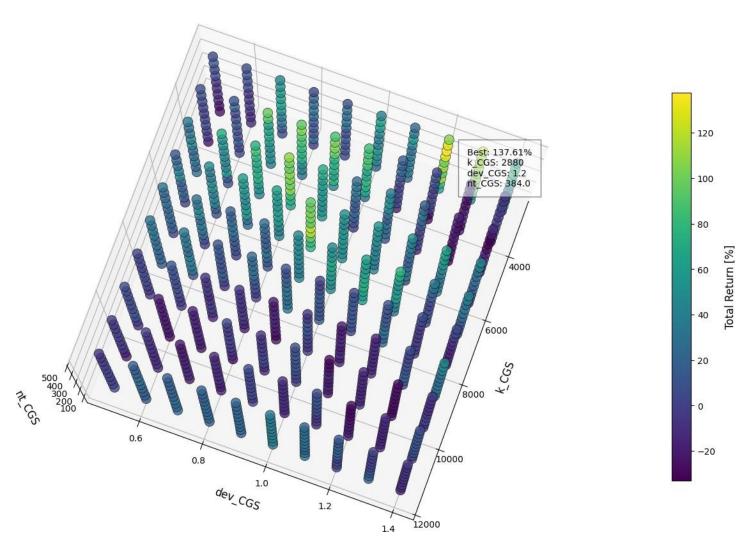
- AI-Powered high-resolution market simulation: Machine learning, pattern recognition and XAI for transparent and high-fidelity strategy evaluation
- Contest-Aware Analysis: Classification of market regimes and scenarios

## **Risk & Performance Management**

- Adaptive Risk Intelligence: ML-driven dynamic risk assessment and position sizing
- Al-Driven Optimization: Continuous strategy tuning via reinforcement learning and predictive models

## **Data Validations with AI**





# CGS Data Validation AI pack (A) - Interrelation analysis on robot-trader features value and market data

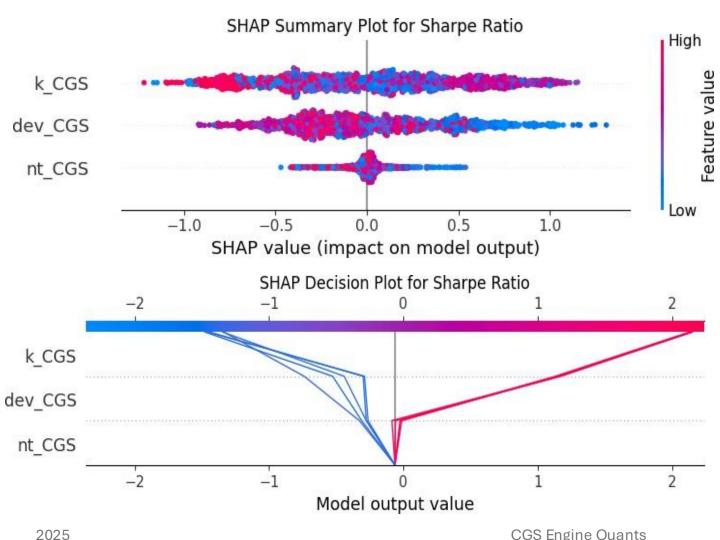
- We generate each bot's traits in a neutral manner and then verify that these settings remain grounded in market reality.
- The x-, y- and z-axes each encode parameters representing individual bots' features.
- By visualizing this as a heat map, we can check whether we're effectively capturing the market's underlying dynamics.

## **Data Validations with AI**

The CGS framework uses Explainable AI (XAI) to analyze parameter combination, ensuring strategies remain robust and transparent across real-market simulation and live trading.

- Prevent Overfitting: Distinguish change from genuine patterns
- Parameter Sensitivity: Gauge performance impact of parameter changes
- Optimization Guidance: Prioritize tuning of critical parameters
- Transparency: Clarify why certain combinations excel
- Adaptability: Adjust parameters as market conditions evolve

## **Data Validations with Al**



## **CGS Data Validation Al** Pack (B) - Impact analysis on robot-trader parameter and CGS performance output data

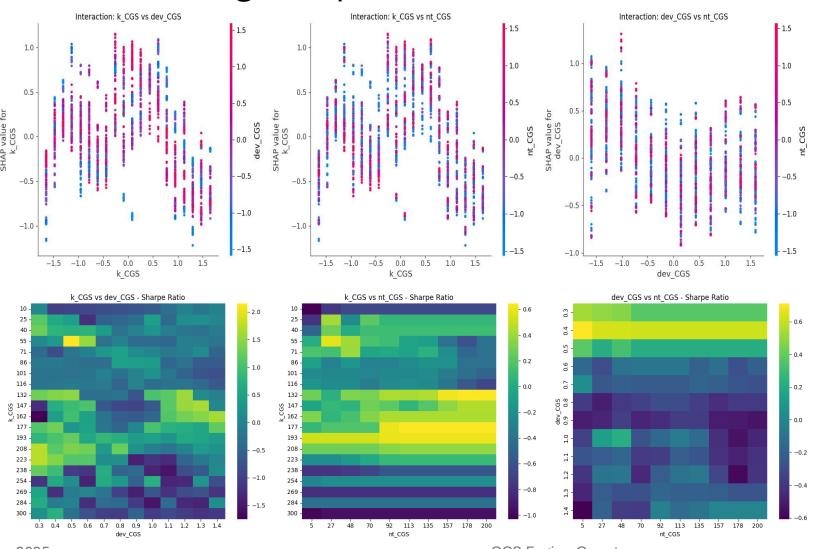
- Validation on each bot's settings to be grounded in market reality from the different angle.
- "k\_CGS", "dev\_CGS" and "nt CGS" in the left chart represent each of parameters, defining each bot's trading tendency features.
- Heatmaps show contribution of each parameter to trading output.

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## **Data Validations with Al**

## Understanding how parameter interact is crucial.



## CGS Data Validation Al Pack (C) - Interaction analysis on robot-trader parameter distributions and combinations

 Heatmaps show contribution of distribution and combination of robotparameters to trading output.

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# Q1. There are many firms claiming to do algorithmic trading. How are you different? What makes you unique?

While most AI quant teams rely on black-box models, we, as quants and system architects, built trading system for full transparency and control so that we understand exactly how it works and why it behaves the way it does. **Simple, yet powerful: We design; AI bots execute.** 

#### Explainable decision making

- Our approach is rooted in pure mathematics-based analysis of raw prices and time series data.
- Using a universal, asset- and frequency-neutral framework, we ensure that every trading decision is logical, transparent, and fully explainable – again, never a black box.

#### Built on pure math. Focused, low-frequency execution

- We intentionally avoid high-frequency noise and fragile short-term signals.
- We use robust noise filtering and signal-amplifying logics engineered to extract meaningful market dynamics and deliver stable, explainable performance over time.

## Q2. Why seek investment when you already perform well?

We believe that our trading engine will fundamentally disrupt the market. **The strategy works, the infrastructure is built. The engine is up and running. The track record is real.** Now, let's consider the most rational decisions a person could make:

- Option 1: Stay as an individual trader and earn a modest side income.
- Option 2: Build a hedge fund company capable of generating exceptional, institutional-level returns.

Option 1 is the safer choice—but it offers limited upside potential. The same level of income could likely be earned by simply working harder at our current jobs. Option 2 requires deep commitment and focus, but it's the most compelling path for a serious entrepreneur.

We are creating what we believe could become the most successful hedge fund in history – one that aims to outperform Renaissance Technologies. We are seeking investors who have the vision to recognize this potential and join us on the ground floor. Together, we can craft something special that has the power to reshape the future of finance.

## Q3. If I invest, how will the funds actually be managed, allocated, and returned?

- We are seeking investors with a minimum two-year commitment, targeting a four-year investment horizon, which aligns with the global M2 liquidity cycle. While we encourage long-term commitment, capital withdrawals will be permitted after the initial two-year lock-up period.
- Investment Vehicles: The capital will be deployed through investment vehicles in the Cayman Islands and Hong Kong. Investors can participate as shareholders in these entities, operating as proprietary investment companies. At the end of the investment period or upon early redemption after the lock-up investors will receive their principal along with any realized returns.
- R&D Entity: Separately, we are also raising equity for our R&D entity, which owns the core trading system.
   This entity licenses the system to the investment vehicles, generating recurring fee income. Structurally, the R&D entity will function as the parent company, while the investment vehicles will operate as execution arms, supporting scalability, IP protection, and long-term value creation.

Q4. Looks like your strategies have done great with a few hundred thousand dollars so far. But as you scale up, how do you make sure the core assumptions – like expected returns – still hold up?

- We allocate seed capital to a large number of autonomous trading bots ranging from at least 288 to as many as 5,000 even when operating on the same underlying asset. Each bot is assigned to a distinct set of features and parameters, effectively creating a portfolio diversification within a single asset class. The bots differ in entry timing and directional bias (long or short), while actual execution is centralized through a master manager bot that submits only the net synthetic positions.
- This multi-bot architecture enables micro-fragmented trade entries across a broad time spectrum, thereby minimizing slippage. It also replicates the benefits of portfolio diversification without requiring multiple asset classes.
- As a result, even after accounting for transaction costs including slippage and fees this structure remains mathematically scalable and capable of maintaining comparable performance levels with no degradation in efficiency, even up to several billion dollars under management.

## Q5. Why did you guys start with BTC?

- First, the Bitcoin market operates 24/7, offering significantly more trading opportunities.
  - Traditional stock markets: 6.5 hours/day, 252 days/year → about 16,380 hours over 10 years
  - Bitcoin market: 24 hours/day, 365 days/year → about 17,520 hours over 10 years
  - This means 2 years of BTC trading time exceeds 10 years of stock market hours.
- Second, BTC is one of the most challenging markets to trade due to its higher volatility, rapid market shifts.
  - Our reasoning is simple: If a model consistently performs in the BTC market, it should perform even better in more stable and structured markets.
  - This is why: Not because it's easy, but because it's hard.

## Q6. Do you have plans to expand to other financial markets?

#### Absolutely.

- The U.S. stock markets are on the verge of moving towards 24-hour trading, and that's going to change the game.
- Once the U.S goes fully 24 hours of trading, other global markets will follow.
- We believe that this marks the return (or a new era) of quants and systematics trading a shift back to fast, data-driven strategies.
- And yes, we're fully prepared to expand into those markets as they evolve.

## Q7. Are there risks if the two co-founders have disagreements or part ways?

We understand this is an important concern for investors and business partners, especially since both co-founders have full knowledge of our proprietary algorithms and trading strategies. We have addressed this risk with strict, lifetime legal agreements:

- **Lifetime non-compete & non-disclosure:** Both co-founders are permanently prohibited from working in any competing or related business, anywhere in the world.
- **Equal stake & aligned incentives:** The two co-founders share profits 50-50, ensuring both are equally motivated toward the company's success.
- **Binding mutual agreement:** This restriction is part of a formal, enforceable agreement between the co-founders, in addition to standard corporate protections.
- Secure systems & shared control: Access to code, data, and operational systems is structured so no single co-founder can operate the business independently.
- Long-term alignment: The co-founders have a proven track record of collaboration and share the same strategic and financial goals.

# **Investment Proposal**

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## **CGS offers Institutional Grade Investment Products**

## Revenue streams across multiple value generation channels

- Performance fees
- Management fees
- Potential fund expansion
- Technology licensing
- Equity appreciation

## Go to market roadmap

- 2025: Incubate platform
- 2026-2027: Seed Fund
- 2027-2030: Growth Fund I
- Beyond: Additional Fund

## Seed investment provides potential for strong returns

2023-2025 2026-2027 2028-2030

Incubation

**Seed (\$10M)** 

**Growth (\$100M)** 

#### **Technology POC:**

- Core platform IP was generated
- Trading strategy was back tested utilizing best practices

#### POC Capital: \$500K

- Proof of concept
- Personal capital deployed using models in November 2024 demonstrating 1.2X return

#### **Equity Investment: \$2M**

- Develop trading platform
- 10% Company Ownership
- \$20M Post-Money Valuation

#### Seed Capital: \$8M

- Dedicated Trading Allocation to build investment track record required for institutional
- Principal Protection from Preferred Repayment
- No Equity Dilution

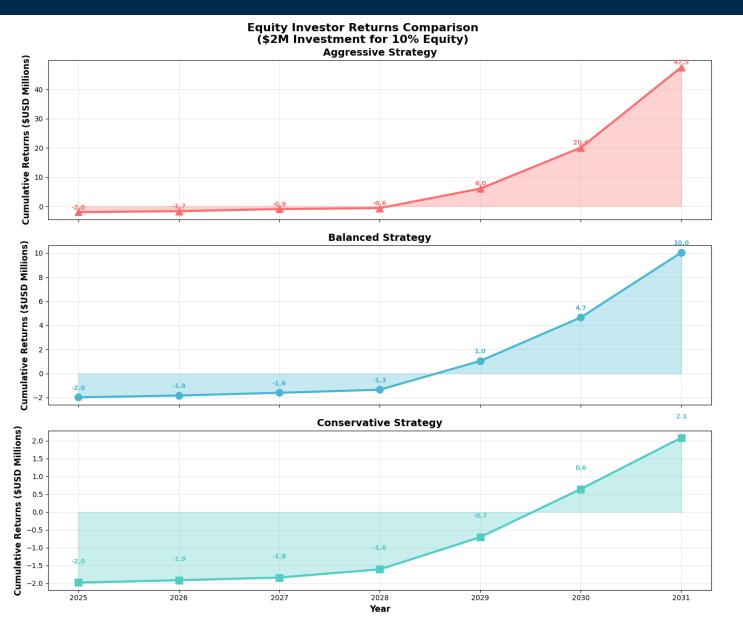
#### **Growth Fund I: \$100M**

- Our first institution grade investment fund
- Separate Investment Vehicle with New External Investors
- Pure Performance-Based Returns Professional Management
- No Company Equity

Potential for \$350M Enterprise Value from \$10M seed in 5yrs.

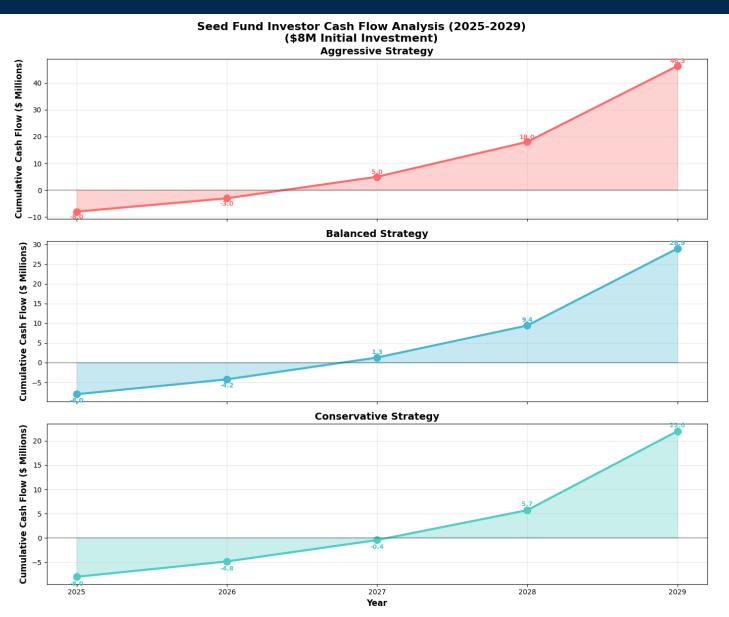
Note: prospective financial model can be shared

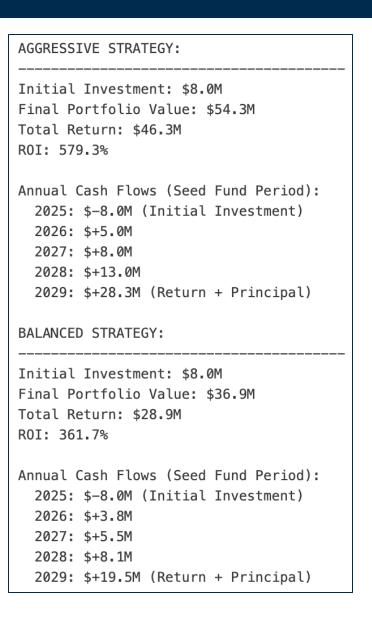
## Cash Flow Projection - Holdco Equity



=== ANNUAL FEE INCOME PROJECTION ===							
Year	Balanced	Cons	servative	Aggressive			
2025	0.2M		0.2M	0.2M			
2025	1.5M		0.7M	2.6M			
2027	2.3M		0.9M	6.0M			
2028	2.5M		2.3M	3.2M			
2029	23.9M		9.2M	59.2M			
2030	36.1M		13.0M	131.1M			
2031	53.9M		15.1M	238.6M			
=== EQUITY	INVESTOR RETU						
Year	Balanced	Cons	servative	Aggressive			
2025	-2.0M		-2.0M	-2.0M			
2026	0.2M		0.1M	0.3M			
2027	0.2M		0.1M	0.6M			
2028	0.3M		0.2M	0.3M			
2029	2.4M		0.9M	5.9M			
2030	3.6M		1.3M	13.1M			
2031	5.4M		1.5M	23.9M			
=== CUMULATIVE EQUITY RETURNS (2025-2031) ===							
	Total Re						
Balanced	1	.0 <b>.</b> 0M	602.3%				
Conservativ	ve	2.1M	206.4%				
Aggressive	4	2.1M	2204.1%				

## **Cash Flow Projection - Trading Seed**





# Thank you

## Let's keep in touch!

The strategy works, The infrastructure is built. The engine is up and running. The track record is real. This isn't just a capital raise – it's partnership opportunity to scale a proven system together.

Email us at contact@cgstech.co

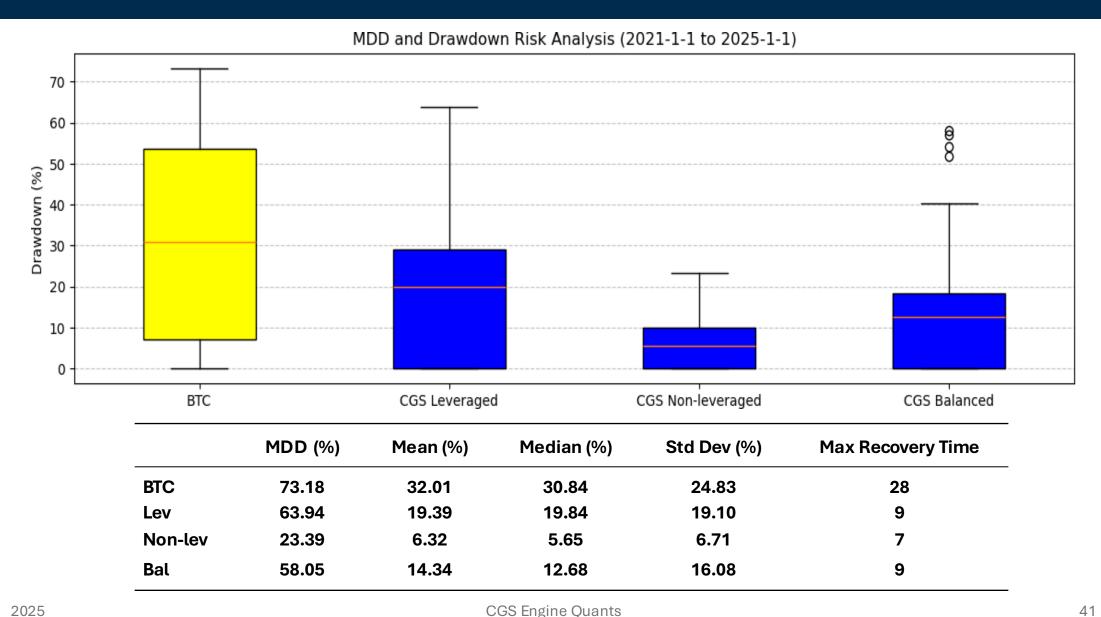
## Join us in shaping the future

- Schedule a detailed discussion
- Review complete investment documentation

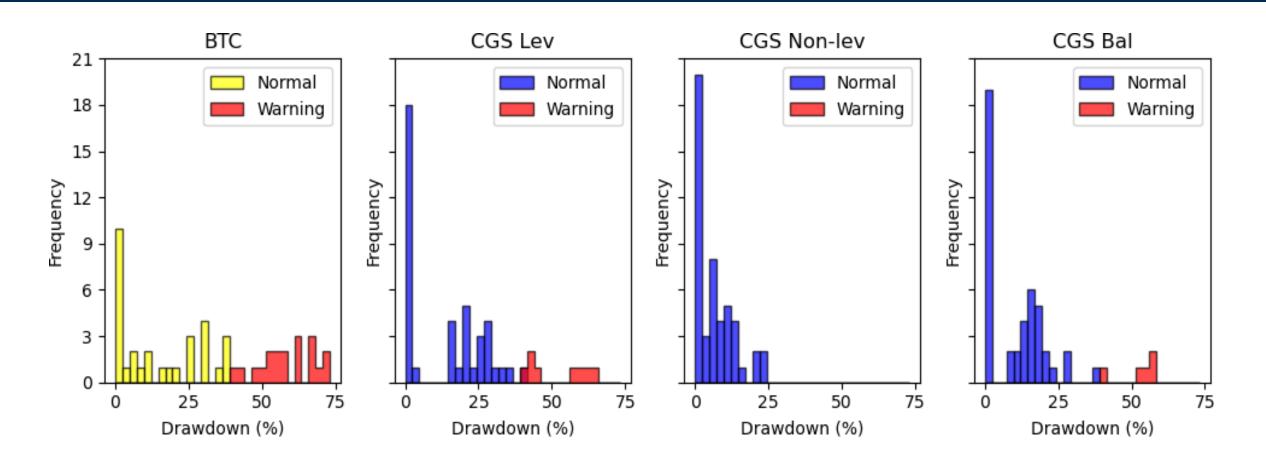
# Annex

**CGS Engine Quants** 

# Maximum Drawdown (MDD) and Risk Analysis



# Drawdown distribution comparison



A passive BTC holding results in the most frequent and severe drawdowns (highest MDD) while also requiring the longest recovery time.

# Sharpe Ratio, ROI and Volatility Comparison

		2021	2022	2023	2024	Cumul. <sup>1</sup>
Sharpe Ratio <sup>2</sup>	CGS Lev. CGS Bal. CGS Non-lev. BTC	2.55 2.25 1.93 0.62	-0.29 -0.17 - <b>0.01</b> -1.01	<b>5.29</b> 3.88 2.29 3.20	1.27 1.32 1.34 <b>2.04</b>	2.65 <b>3.29</b> 2.59 0.87
ROI(%)	CGS Lev. CGS Bal. CGS Non-lev. BTC	<b>414.85</b> 213.60 146.51 60.53	-36.66 -6.27 <b>3.85</b> -64.31	<b>729.68</b> 258.99 102.09 156.18	183.74 96.16 66.97 119.95	196.86 125.58 71.44 34.00
Vol(%)	CGS Lev. CGS Bal. CGS Non-lev. BTC	162.43 94.84 75.76 97.44	141.59 62.56 36.72 68.21	137.05 65.47 42.26 47.19	141.40 69.52 46.88 56.68	72.98 37.10 26.31 34.99

<sup>&</sup>lt;sup>1</sup>Annualized cumulative values

<sup>&</sup>lt;sup>2</sup>The average 3-month Treasury bill rates (for the risk-free rate) are: approx. 0.05% in 2021, approx. 4.25% in 2022, approx. 5.24% in 2023, approx. 4.27% in 2024; and the annualized cumulative risk-free rate is 3.39%.

# **Sharpe and Sortino Ratios with Downside Deviation**

	2021		2022		2023		2024	
	Sharpe	Sortino	Sharpe	Sortino	Sharpe	Sortino	Sharpe	Sortino
CGS Lev	2.55	10.59	-0.29	-1.17	5.29	19.07	1.27	6.17
CGS Bal	2.25	8.22	-0.17	-0.47	3.88	10.97	1.32	3.64
CGS N-lev	1.93	14.67	-0.01	-0.03	2.29	8.01	1.34	7.00
BTC	0.62	1.31	-1.01	-2.08	3.20	12.53	2.04	8.30
	σ	<b>σ</b> d						
CGS Lev	1.62	0.39	1.42	0.35	1.37	0.38	1.41	0.29
CGS Bal	0.95	0.26	0.62	0.22	0.65	0.23	0.69	0.25
CGS N-lev	0.76	0.10	0.37	0.11	0.42	0.11	0.47	0.09
ВТС	0.97	0.46	0.68	0.33	0.47	0.12	0.57	0.14