

PROPOSAL: AI-POWERED TRADING BOT v2.0

Sustainable Long-Term Value Investing dengan Artificial Intelligence

Metadata	Detail
Tanggal	Januari 2026
Versi	2.0 (Updated)
Status	Active Development
Modal Awal	\$350 (existing)
Broker	Interactive Brokers (IBKR)
Repository	<u>modular-quant-backtest</u>

1. EXECUTIVE SUMMARY

Proposal ini mengusulkan pengembangan AI-powered trading bot untuk investasi saham jangka panjang (long-term value investing). Berbeda dengan trading bot konvensional yang mengandalkan indikator teknikal, sistem ini memanfaatkan Large Language Models (LLM) untuk melakukan analisa fundamental, sentiment analysis, dan risk assessment secara otomatis.

Perubahan dari Proposal v1.0

Aspek	v1.0	v2.0 (Current)
Broker	Alpaca	Interactive Brokers (IBKR)
Alasan Perubahan	-	Alpaca tidak tersedia dari Indonesia
Implementation Status	Concept	Prototype Ready (backtesting framework)
AI Provider	Claude/DeepSeek	DeepSeek API (confirmed, working)

Mengapa AI Trading Bot Berbeda dari Pendekatan Sebelumnya

- AI sekarang bisa membaca dan menganalisa laporan keuangan
- Sentiment analysis dari news, social media, dan earnings call
- Reasoning capability — AI bisa menjelaskan KENAPA beli/jual

- Bot menghilangkan emotional trading (panic sell)
- Quantifiable rules, bukan discretionary trading

2. PROBLEM STATEMENT

Berdasarkan pengalaman trading sebelumnya, masalah utama yang dihadapi:

Problem	Impact	Bot Solution
Emotional trading	Panic sell saat market turun, padahal fundamental bagus	Bot tidak punya emosi
Waktu terbatas	Tidak bisa monitoring market terus-menerus	Automated execution
Information overload	Terlalu banyak data untuk dianalisa manual	AI batch processing
Strategi tidak konsisten	Beli karena FOMO, jual karena takut	Rule-based decisions

3. PROPOSED SOLUTION

3.1 Investment Philosophy

Membangun trading bot yang berfokus pada long-term value investing dengan karakteristik Warren Buffett style:

Aspek	Pendekatan
Strategi	Value Investing (Warren Buffett style)
Holding Period	Minimum 6-12 bulan
Entry	Berdasarkan analisa AI (fundamental + sentiment + regime)
Exit	Hanya jika fundamental berubah, BUKAN karena harga turun
Emotion Control	Bot tidak bisa panic sell
DCA	Dollar Cost Averaging untuk reduce timing risk

3.2 Adaptive AI Trading Strategy

Sistem menggunakan **quantified voting system** yang menggabungkan multiple signals:

Signal Type	Weight	Source
AI Regime Score	30%	DeepSeek API (market condition classification)
AI Stock Sentiment	25%	DeepSeek API (company-specific analysis)
Fundamental Score	25%	Financial ratios (P/E, ROE, Debt/Equity)
Seasonal Pattern	10%	Historical monthly performance analysis
Technical Trend	10%	SMA crossover confirmation

3.3 Decision Rules

BUY Signal: Composite Score > 0.65 AND Regime != Defensive
HOLD: Default state (no action unless triggered)
SELL Signal: Fundamental deterioration OR Composite Score < 0.35 for 3 months
 BUKAN karena harga turun saja

4. TECHNICAL ARCHITECTURE

4.1 System Overview (Updated)

1. DATA MINING LAYER (✅ Implemented)	
- Fetch real market data (Yahoo Finance)	
- AI Annotation via DeepSeek API (weekly batch)	
- Forward fill untuk daily data	
2. STRATEGY LAYER (✅ Implemented)	
- Adaptive Strategy (3 modes: Bullish/Bearish/Sideways)	
- Quantifiable rules, NO discretion	
- Based on AI_Regime_Score & AI_Stock_Sentiment	
3. BACKTEST ENGINE (✅ Implemented)	
- Performance metrics (Sharpe, Max DD, Win Rate, etc)	
- Strategy comparison	
- Visualization & reporting	
4. EXECUTION LAYER (🔄 In Progress)	
- Interactive Brokers API integration	
- Paper trading → Live trading	

4.2 Tech Stack (Updated)

Component	Choice	Status	Cost
Language	Python 3.10+	✔ Ready	\$0
AI/LLM	DeepSeek API	✔ Working	~\$12-15/mo
Broker API	Interactive Brokers	🔄 Account Ready	\$0 (no minimum)
Market Data	Yahoo Finance	✔ Working	\$0
Database	SQLite	✔ Working	\$0
Backtesting	Custom Engine	✔ Working	\$0
Cloud Sync	Google Drive (rclone)	✔ Working	\$0
Server	Laptop/Local	✔ Ready	\$0







4.3 Interactive Brokers vs Alpaca

Kriteria	Alpaca	IBKR	Winner
Indonesia Access	✗ Tidak tersedia	✔ Tersedia	IBKR
Commission	\$0 stocks/ETFs	\$0.35-1.00/trade	Alpaca
API Quality	Excellent	Excellent	Tie
Global Markets	US only	135+ markets	IBKR
Account Minimum	\$0	\$0	Tie
Paper Trading	✔ Free	✔ Free	Tie
Fractional Shares	✔ Yes	✔ Yes	Tie
PDT Rule Impact	N/A (value investing)	N/A (value investing)	N/A

Keputusan: IBKR dipilih karena **satu-satunya opsi yang tersedia dari Indonesia** untuk US stocks dengan API access yang proper.

5. IMPLEMENTATION STATUS

5.1 Progress Report

Phase	Status	Deliverable
1. Data Mining Pipeline	 Complete	<code>data_miner.py</code> - fetches real data + AI annotation
2. Backtesting Engine	 Complete	Custom engine with Sharpe, Max DD, Win Rate metrics
3. Adaptive Strategy	 Complete	3-mode strategy based on AI signals
4. IBKR Account	 Registered	API access ready
5. Paper Trading Integration	 Next	Connect engine to IBKR paper
6. Live Trading	 Pending	After paper trading validation

5.2 Backtesting Results (Real Data)

NVDA 2023:

Strategy	Return	Sharpe	Max DD	Trades
Buy & Hold	+231%	1.42	-18.0%	1
Adaptive (AI)	+174%	1.79	-11.6%	6
Momentum	+109%	1.31	-14.6%	10

S&P 500 2023:

Strategy	Return	Sharpe	Max DD	Trades
Buy & Hold	+22%	1.52	-9.6%	1
Momentum	+16%	1.54	-7.6%	7
Adaptive (AI)	+12%	1.39	-6.4%	2

Key Insight: Adaptive strategy shows **better risk-adjusted returns** (higher Sharpe, lower Max Drawdown) even when absolute returns are lower. This aligns with value investing philosophy of capital preservation.

6. RISK MANAGEMENT

6.1 Position Sizing

Parameter	Value	Rationale
Max per position	20%	Diversification across 5 stocks max
Entry method	DCA	Reduce timing risk
Cash reserve	20% minimum	Opportunity buffer
Account size	\$350 → target \$100 initial live	Start small, scale if proven

6.2 Stop Loss Philosophy

Berbeda dengan trading konvensional, kita TIDAK menggunakan price-based stop loss:

- ✗ TIDAK jual karena harga turun 10%
- ✓ JUAL jika fundamental deterioration (revenue drop, management issue)
- ✓ JUAL jika AI Score < 0.35 selama 3 bulan berturut-turut

Ini mencegah panic selling saat market volatil tapi fundamental masih bagus.

6.3 Worst Case Scenarios

Scenario	Impact	Mitigation
Market crash 50%	-\$175 (dari \$350)	DCA, long-term view, quality stocks
AI salah analisa	Wrong picks	Diversifikasi, human review
Broker issue	Cannot trade	IBKR regulated, established
API cost overrun	Unexpected expense	DeepSeek sangat murah (~\$0.001/request)
IBKR commission	Reduce profits	Value investing = few trades/year

7. TIMELINE & MILESTONES (Updated)

Phase	Duration	Deliverable	Success Criteria	Status
1. Setup	1 minggu	Data pipeline, API keys	Bot bisa fetch data	✅ Done
2. AI Integration	1-2 minggu	AI analysis pipeline	AI bisa scoring stocks	✅ Done
3. Backtesting	2 minggu	Strategy comparison	Positive simulated returns	✅ Done
4. IBKR Integration	2 minggu	Paper trading connection	Orders execute correctly	🔄 Current
5. Paper Trading	2-3 bulan	Simulasi dengan virtual money	Positive returns dalam simulasi	⌚ Next
6. Live Small	3 bulan	Live dengan \$100	Tidak rugi lebih dari 20%	⌚ Pending
7. Scale Up	Ongoing	Tambah modal jika proven	Consistent positive returns	⌚ Pending

8. RESOURCES & COSTS

8.1 One-Time Setup

Resource	Cost	Notes
IBKR Account	\$0	No minimum for cash account
Development Tools	\$0	Python, VS Code, Git
Modal Trading	\$350	Existing, sudah ada

8.2 Monthly Running Costs

Resource	Cost	Notes
DeepSeek API	~\$12-15/mo	~50 analyses/day capacity
IBKR Data	\$0	Free delayed data sufficient for value investing
IBKR Commission	~\$1-5/mo	Few trades with value investing approach
Server/Hosting	\$0	Run on laptop
Total	~\$15-20/mo	Very lean operation

8.3 Existing Resources (No Additional Cost)

- Claude Pro subscription (for development assistance)
 - Gemini Edu (alternative AI option)
 - Suno Premium, Kling AI (not needed for this project)
 - Google Drive (cloud sync)
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9. SUCCESS METRICS

9.1 Continue Signals (Lanjut & Scale Up)

- ☒ Paper trading: Positive return setelah 3 bulan
- ☒ Live trading: Beat market (S&P 500) dalam 6 bulan
- ☒ Drawdown < 25% di periode apapun
- ☒ AI recommendations masuk akal saat di-review manual
- ☒ Time investment < 5 jam/minggu

9.2 Stop Signals (Evaluasi Ulang/Berhenti)

- ☒ Paper trading: Negative return setelah 3 bulan
 - ☒ Live trading: Rugi > 30% dari modal
 - ☒ AI consistently salah (< 40% akurasi)
 - ☒ Terlalu banyak waktu tersedot (> 10 jam/minggu)
 - ☒ IBKR costs exceed reasonable threshold
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10. REALISTIC EXPECTATIONS

10.1 Growth Projections

Years	\$350 only @10%	\$350 + \$100/mo @10%
1	\$385	\$1,683
3	\$466	\$4,760

Years	\$350 only @10%	\$350 + \$100/mo @10%
5	\$564	\$8,578
10	\$908	\$21,575

Key Insight: \$100/month DCA adalah **lever terbesar**. Optimizing returns dari 10% ke 15% matters far less than consistent contributions.

10.2 Industry Reality Check

Statistic	Value	Source
Day traders profitable long-term	1-4%	Various studies
Quantopian backtest vs live correlation	~0%	Quantopian research
Average retail trader underperformance	-6.5%/year	After costs

Our Edge:

- NOT day trading (value investing, hold 6-12 months)
- Systematic approach eliminates emotional decisions
- Focus on capital preservation, not moonshot returns
- Realistic target: 10-15% annual, not 100%+

10.3 Why This is Different from Previous Ventures

Aspek	YouTube Kids	AI Trading Bot
Skill Match	Low (bukan content creator)	HIGH (coding, NLP, AI)
Competition	Tinggi (Cocomelon, dll)	Ada, tapi AI edge baru
Capital	2 tahun waktu, hasil \$0	\$350 existing
Time Investment	Konsisten harian	Setup once, monitor weekly
Scalability	Butuh watch time, CPM rendah	Profit langsung compound
Worst Case	Waktu hilang	Uang hilang (controlled)
Best Case	Adsense kecil	Passive compound income
Emotional Fit	Boring, sudah capek	Exciting, sesuai passion

11. NEXT STEPS (Immediate Actions)

Week 1-2: IBKR API Integration

- 1. Setup IBKR TWS/Gateway for API access
- 2. Test paper trading connection
- 3. Implement order execution module
- 4. Add position tracking & logging

Week 3-4: Paper Trading Validation

- 1. Deploy adaptive strategy on paper account
- 2. Monitor daily signals vs actual execution
- 3. Validate AI scoring accuracy
- 4. Document any issues for refinement

Month 2-3: Extended Paper Testing

- 1. Run full paper trading cycle
 - 2. Compare results vs backtest expectations
 - 3. Refine strategy parameters if needed
 - 4. Prepare for live trading decision
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12. APPENDIX

A. Repository Structure

```
modular-quant-backtest/  
├── main.py           # Backtesting entry point  
├── data_miner.py     # ETL Pipeline (real data + AI)  
├── requirements.txt  # Python dependencies  
├── .env              # API keys (NOT in git)  
├──  
├── src/  
│   └── data/
```

```
| | └─ data_generator.py # Mock data generation
| └─ strategies/
|   └─ adaptive_strategy.py # Adaptive, Buy&Hold, Momentum
|   └─ engines/
|     └─ backtest_engine.py # Backtest runner & metrics
|
└─ data/ # Generated data files
    └─ {TICKER}_real_data_{YEAR}.csv
|
└─ output/ # Backtest results
    └─ *.csv, *.html
```

B. Key Commands

```
bash

# Data Mining
python data_miner.py --ticker NVDA --start 2023-01-01 --end 2024-01-01

# Backtesting
python main.py --compare

# Cloud Sync
rclone sync data/ gdrive:quant_backtest_data/
```

C. LLM Cost Comparison

Strategy	Model	Est. Monthly Cost
Budget (Current)	DeepSeek V3	\$12-15
Mid-tier	Claude Haiku 4.5	\$55
Performance	Claude Sonnet 4.5	\$162

KESIMPULAN

AI Trading Bot dengan IBKR sebagai broker adalah **opsi yang viable** untuk kondisi Indonesia. Dengan prototype backtesting yang sudah berjalan, fokus selanjutnya adalah:

- 1. **Integrasi IBKR API** untuk paper trading
- 2. **Validasi** strategi dengan paper trading 2-3 bulan

3. **Live trading** dengan modal kecil (\$100) jika proven

Ini **bukan get-rich-quick scheme**. Value investing automation menghilangkan emotional trading dan enforces discipline, tapi tidak mengubah fundamental math: small capital + compound growth memerlukan time + consistent contributions.

Target realistis: 10-15% annual return dengan drawdown terkontrol, bukan 100%+ moonshot.

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