# AI Brain – Full Trading Knowledge & Modules

## ML Modules and Responsibilities

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| Module Name | Model Type | Function |
| Candlestick Pattern Classifier | MLP / CNN | Recognize 1–3 candle formations like Engulfing, Doji, Hammer, etc. |
| Chart Pattern Detector | MLP / CNN | Detect market structures such as Double Top, Head & Shoulders, Wedges, etc. |
| Market Condition Classifier | MLP / Random Forest | Classify current market state into one of 8–10 predefined types. |
| Indicator Fusion Engine | XGBoost / MLP | Analyze confluence among EMA, RSI, MACD, ATR, Bollinger Bands, etc. |
| Strategy Selector | MLP | Select the most suitable trading strategy out of 6 based on the current context. |
| Signal Confidence Scorer | Logistic Regression / MLP | Calculate confidence level (%) for each generated signal. |
| Reinforcement Learning Trade Scorer | Q-learning / Bandit | Score and adapt based on past simulated trade outcomes. |
| LLM Explainer | distilgpt2 | Explain the reason for each signal in human-understandable text. |
| Trade Simulator | Logic Module | Simulate BUY/SELL signals internally and record result (WIN/LOSS). |
| News Filter (Optional) | API + Rules | Prevent or warn about signals during high-impact news events. |

## Additional Knowledge Modules (from 34 Pillars)

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| Module Name | Model Type | Function |
| Support & Resistance Detector | Rules / ML Hybrid | Identify key horizontal support and resistance levels for price action. |
| Trendline & Channel Analyzer | Geometry + ML | Recognize trendlines, ascending/descending channels, and breakouts. |
| Volume Flow Analyzer | OBV / VWAP | Analyze institutional vs retail flow and confirm price moves with volume. |
| Multi-Timeframe Analyzer | MLP | Align signals from M1, M5, H1, D1 for stronger confluence. |
| Market Phase Classifier | Random Forest | Distinguish between trending, ranging, accumulation, and distribution phases. |
| Volatility State Detector | ATR + ML | Recognize high/low volatility conditions for adaptive risk. |
| Session Classifier | Rules Engine | Tag signals by market session (London, NY, Asia) for timing filters. |
| Breakout/Fakeout Detector | CNN | Identify true vs false breakouts from consolidation zones. |
| Economic Event Monitor | API Integration | Block/flag trades around CPI, GDP, NFP, rate decisions. |
| Macro Cycle Analyzer | Long-Horizon ML | Detect bull/bear macro trends and economic cycles. |
| Sentiment Analyzer | NLP + APIs | Use Fear/Greed index, news headlines, and COT data for sentiment. |
| Institutional Flow Tracker | Volume Profile + ML | Detect institutional positioning and order blocks. |
| Scalping Strategy Module | Logic / ML | Apply short-term strategies for high-frequency trades. |
| Swing Strategy Module | Logic / ML | Identify medium-term trades with multi-day holding periods. |
| Position Strategy Module | Logic / ML | Handle long-term trades based on macro cycles. |
| Grid/Hedging Strategy Module | Logic Module | Automate grid trading and hedging systems. |
| Risk & Money Manager | Logic + ATR | Calculate lot sizes, enforce 1–2% risk per trade, maintain equity protection. |
| Position Sizing Engine | Math + ML | Dynamically size positions based on account balance and risk model. |
| Stop-Loss & Take-Profit Manager | Logic + ATR | Attach adaptive SL/TP levels to all trades. |
| Trading Psychology Guard | Rules | Block revenge trades, enforce cooldown after losses. |
| Overtrading Detector | Rules | Prevent excessive entries beyond system rules. |
| Patience & Discipline Module | Rules + Logs | Delay execution until full confluence criteria are met. |
| Financial Advisor Module | Logic + ML | Manage portfolio allocation, compounding, taxes, and long-term goals. |

## System Roles Summary

1. Signal Generation Layer:  
 - Pattern Recognition (candles + charts)  
 - Indicator Analysis  
 - Market State Detection  
 - Strategy Selection  
 - Final Signal Output (BUY / SELL + Confidence)  
  
2. Learning Layer:  
 - Trade Simulation  
 - Result Logging (WIN / LOSS)  
 - Reinforcement Learning Feedback  
 - Weekly Auto-Retraining  
  
3. Knowledge Layer (New):  
 - Candlestick & Chart Knowledge  
 - Market Phases & Macro Cycles  
 - Risk, Psychology & Money Management  
 - Financial Advisor Functions  
  
4. Communication Layer:  
 - Telegram Command Handling (/signal, /why)  
 - LLM-Based Explanation  
 - Flask Web UI Dashboard  
 - Optional News Guard Integration