Project Report: BTC Options Trading Simulator

Module 1: Simulator.py

Explanation: The Simulator class loads historical BTC options and futures market data, processes them in timestamp order, and interacts with the Strategy class to simulate trading decisions. It tracks buy/sell values, current holdings, and logs timestamped PnL to a CSV.

What Worked:

- Event-driven architecture allowed precise simulation at each tick.
- The system correctly accumulated buy/sell values and position quantities.
- Output file timestamped_pnl.csv is well structured for analysis.

What Didn't Work:

- If the right strike symbols aren't in config.symbols, trades are skipped.
- No handling for missing or malformed CSVs.

Improvements:

- Auto-detect all available option symbols from data directory.
- Include fallback handling for missing fields or timestamps.

Module 2: Strategy.py

Explanation: The Strategy class executes a simple short straddle: it sells ATM call and put options at 1 PM daily if not already in a position, and exits the trade when price moves by more than 1% or PnL exceeds a threshold.

What Worked:

- Dynamic ATM strike calculation based on BTCUSDT futures.
- Entry and exit logic was clearly defined and correctly triggered.
- Trade confirmation updated internal PnL for tracking.

What Didn't Work:

- Highly dependent on exact timestamp (13:00:00); missing it causes no trades.
- Requires exact matching of dynamically constructed strike names.

Improvements:

- Generalize timestamp tolerance (e.g., allow 1:00 PM ± 1 interval).
- Match nearest available strikes based on price if exact one is missing.

Module 3: printStats.py

Explanation: This script reads the simulator's output CSV and calculates:

- PnL statistics: mean, median, std dev.
- Daily returns and Sharpe ratio.
- Max drawdown, VaR (95%), Expected Shortfall.
- Generates and saves PnL and drawdown plots as PNGs.

What Worked:

- Plots clearly show trends and risk in strategy.
- Correct statistical computation using pandas/numpy.
- Sharpe, VaR, and ES are calculated from daily returns.

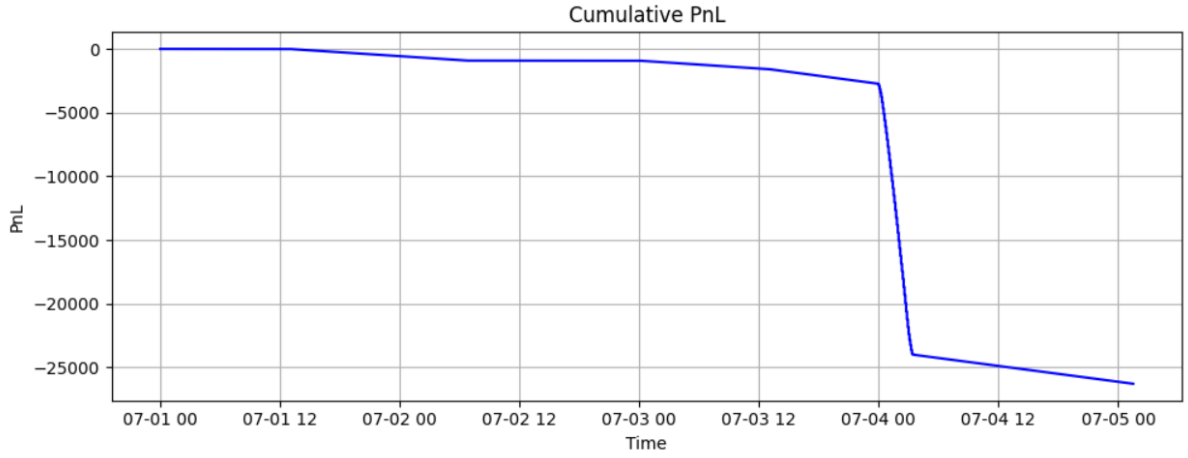
What Didn't Work:

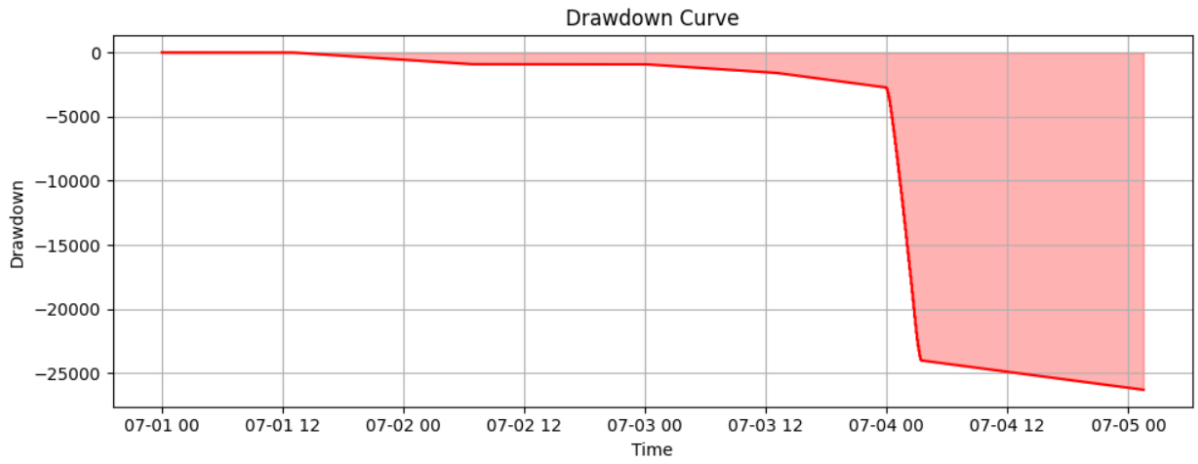
- Assumes column names in CSV are timestamp,PnL. Requires renaming inside script.

Improvements:

- Add CLI arguments to load different CSVs.
- Better error messages for missing columns or NaNs.

GRAPHS




Drawdown Curve
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−25000
Drawdown
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07-01 12
07-02 00
07-02 12
07-03 00
07-03 12
07-04 00
07-04 12
07-05 00
Time