

## INTRODUCTION

This project is an Automated Trading Bot application developed to test and simulate automatic buying and selling strategies in cryptocurrency markets. The project has the capability to perform backtesting on historical data and conduct live trading simulations with real-time data. Users can test their own trading algorithms using different technical indicators and strategies.

## GENERAL FEATURES OF THE PROJECT

### **Backtesting Process:**

- Testing the performance of buying and selling strategies on historical data.
- Ability to use different technical indicators and strategy parameters.
- Display results graphically.

### **Live Trading Simulation:**

- Simulating trading strategies with real-time data.
- Monitor instant trading results and ability to query trades/balance status via API.

### **Technical Indicators:**

- Ability to use indicators like RSI, MACD, Bollinger Bands, EMA, SMA, and SuperTrend.
- Adjust indicator parameters as desired.

### **Graph Generation:**

- Generating graphs that display the price data and buy-sell points after the backtesting process.

### **API Endpoints:**

- Starting backtesting and live trading simulations via a Flask-based web application.
- Retrieving results and trading status via API.

### **Multiple Trading Sessions:**

- Ability to start multiple backtests or live trading simulations simultaneously.
- Use of a unique session\_id for each session.

## FILE STRUCTURE AND FUNCTIONS

### 1) app.py

- **Description:**
  - The main Flask web server of the application.
  - API endpoints are defined and managed.
- **Functions:**
  - Starts the backtesting process with the /backtest endpoint.
  - Starts the live trading simulation with the /live\_trading endpoint.
  - Returns live trading status with the /live\_trading/<session\_id> endpoint.
- **Key Points:**
  - Generates a unique session\_id for each process.
  - Runs processes in separate threads.

### 2) backtest.py

- **Description:**
  - The main file where backtesting processes are performed.
  - Tests specific strategies on historical data.
- **Functions:**
  - Performs the backtesting process with the perform\_backtest function.
  - Calculates technical indicators and generates buy-sell signals based on the strategy.
  - Records trades and returns results.
- **Key Points:**
  - Generates graphs showing the price data and buy-sell points after trades.
  - Returns results as a dictionary.

### 3) live\_trading.py

- **Description:**
  - The file where live trading simulations are performed.
  - Simulates strategies with real-time data.
- **Functions:**
  - Runs the live trading simulation with the perform\_live\_trading function.
  - Fetches real-time data and makes buy-sell decisions based on the strategy.
  - Updates trade results and balance.
- **Key Points:**
  - Trade results and status are stored in the live\_trading\_results dictionary in shared.py.
  - Locks (Lock) are used for thread safety.

### 4) data\_fetcher.py

- **Description:**
  - The file where data fetching operations are performed.
  - Retrieves price data from Binance API.
- **Functions:**
  - Fetches historical data with the get\_historical\_data function.
  - Retrieves real-time data with the get\_live\_data function.
- **Key Points:**
  - Returns data in pandas DataFrame format.
  - Error handling is performed during data fetching.

## 5) indicators.py

- **Description:**
  - The file where technical indicators are calculated.
  - Adds the desired indicators to the provided DataFrame.
- **Functions:**
  - Calculates selected indicators and adds them to the DataFrame with the `add_indicators` function.
- **Supported Indicators:**
  - RSI (Relative Strength Index)
  - Bollinger Bands
  - EMA (Exponential Moving Average)
  - SMA (Simple Moving Average)
  - MACD (Moving Average Convergence Divergence)
  - SuperTrend

## 6) shared.py

- **Description:**
  - Contains shared variables and locks used throughout the application.
  - Created to prevent circular import issues.
- **Functions:**
  - Stores live trading results with the `live_trading_results` dictionary.
  - Ensures thread safety with the `results_lock`.

## 7) requirements.txt

- **Description:**
  - All Python packages required for the project to run are listed in the `requirements.txt` file.

## **DETAILED EXPLANATION OF THE PROJECT**

### **Backtesting Process**

- **Purpose:**
  - To test the performance of specified strategies on historical data.
- **Workflow:**
  - Symbol, timeframe, initial balance, indicator parameters, and strategy parameters are received from the user.
  - The perform\_backtest function in backtest.py is called.
  - Historical data is fetched using data\_fetcher.py.
  - Indicators are calculated and added to the DataFrame using indicators.py.
  - At each time step, buy-sell signals are evaluated based on the strategy.
  - Trades and balances are updated.
  - Results and graphs are generated.
- **Results:**
  - Initial and final balances.
  - Total profit/loss.
  - List of executed trades.
  - Number of trades.

## Live Trading Simulation

- **Purpose:**
  - To simulate trading strategies with real-time data and monitor them instantly.
- **Workflow:**
  - Symbol, trading duration (minutes), initial balance, indicator parameters, and strategy parameters are received from the user.
  - The `perform_live_trading` function in `live_trading.py` is run in a separate thread.
  - Real-time data is fetched at specific intervals (`time.sleep(60)`).
  - Indicators are calculated, and buy-sell decisions are made based on the strategy.
  - Trade results are stored in the `live_trading_results` dictionary in `shared.py`.
- **Results and Monitoring:**
  - The user can query the live trading status via API using the `session_id`.
  - Instant balance, trades, and trading status (running or completed) can be viewed.

## Calculating Technical Indicators

### RSI (Relative Strength Index):

- Used to determine overbought and oversold regions.
- Parameters:
  - **rsi\_period:** The number of periods used in RSI calculation. For example, `rsi_period: 14` calculates the RSI over 14 periods.

### Bollinger Bands:

- Shows the volatility of the price and possible reversal points.
- Parameters:
  - **bb\_period:** The number of periods used for moving average calculation. For example, `bb_period: 20`.
  - **bb\_std:** Standard deviation multiplier. Commonly used as `bb_std: 2`.

- **EMA and SMA (Moving Averages):**
  - Used to analyze price trends and movements.
  - Parameters:
    - For EMA:
      - **ema\_short\_period:** The period for calculating the short-term EMA. For example, ema\_short\_period: 12.
      - **ema\_long\_period:** The period for calculating the long-term EMA. For example, ema\_long\_period: 26.
    - For SMA:
      - **sma\_short\_period:** The period for calculating the short-term SMA.
      - **sma\_long\_period:** The period for calculating the long-term SMA.
- **MACD (Moving Average Convergence Divergence):**
  - Used to determine the momentum and trend reversals of the price.
  - Parameters:
    - **macd\_fast\_period:** Fast EMA period. For example, macd\_fast\_period: 12.
    - **macd\_slow\_period:** Slow EMA period. For example, macd\_slow\_period: 26.
    - **macd\_signal\_period:** EMA period for the MACD signal line. For example, macd\_signal\_period: 9.
- **SuperTrend:**
  - Shows the trend direction and possible buy-sell points.
  - Parameters:
    - **st\_period:** ATR (Average True Range) period used in SuperTrend calculation. For example, st\_period: 10.
    - **st\_multiplier:** ATR multiplier. For example, st\_multiplier: 3.0.

#### **Calculation:**

- The add\_indicators function in the indicators.py file is used.
- Indicators are calculated based on the indicators\_params dictionary received from the user.
- Calculated indicators are added to the DataFrame and used in strategies.

## GRAPH GENERATION

### Purpose:

- To analyze trade results visually. We also used “[TradingView Widgets](#)” for graph.

### Workflow:

- **Backtest Graphs:**

- After the backtest process in backtest.py, the price graph and buy-sell points are plotted.
- Graphs are saved under to the “charts” directory.

## API Endpoints

### /backtest [POST]:

- Starts the backtesting process.
- Required parameters are sent in JSON format.
- The response includes final balance, nr of trades, profit, trades list and other infos.

#### Example Request:

```
1 v {  
2   "symbol": "BTCUSDT",  
3   "timeframe": "1d",  
4   "initial_balance": 10000,  
5   "indicators_params": {  
6     "rsi_period": 14,  
7     "bb_period": 20,  
8     "bb_std": 2,  
9     "sma_short_period": 50,  
10    "sma_long_period": 200,  
11    "ema_short_period": 50,  
12    "ema_long_period": 200,  
13    "macd_fast_period": 12,  
14    "macd_slow_period": 26,  
15    "macd_signal_period": 9,  
16    "st_period": 10,  
17    "st_multiplier": 3.0  
18  },  
19  "strategy_params": {  
20    "use_rsi": true,  
21    "rsi_buy_threshold": 40,  
22    "rsi_sell_threshold": 50,  
23    "use_bollinger_bands": false,  
24    "bb_buy_band": "lower",  
25    "bb_sell_band": "middle",  
26    "use_sma_cross": false,  
27    "use_ema_cross": false,  
28    "use_macd": false,  
29    "use_supertrend": false  
30  },  
31  "start_str": "1 January 2024",  
32  "end_str": "1 March 2024"  
33 }
```

#### Example Response:

```
1 v {  
2   "final_balance": 10477.938418728449,  
3   "initial_balance": 10000,  
4   "number_of_trades": 2,  
5   "profit": 477.9384187284486,  
6   "symbol": "BTCUSDT",  
7   "timeframe": "1d",  
8   "trades": [  
9     {  
10       "indicators": {  
11         "RSI": 36.67738068890887  
12       },  
13       "price": 41327.5,  
14       "time": "2024-01-18 23:59:59.999000",  
15       "type": "buy"  
16     },  
17     {  
18       "indicators": {  
19         "RSI": 54.9440550472431  
20       },  
21       "price": 43302.7,  
22       "profit": 477.9384187284489,  
23       "time": "2024-01-29 23:59:59.999000",  
24       "type": "sell"  
25     }  
26   ]  
27 }
```

### /live\_trading [POST]:

- Starts the live trading simulation.
- Required parameters are sent in JSON format.
- The response includes session\_id and the status of the process.

Example Request:

```
1 v {  
2   "symbol": "BTCUSDT",  
3   "initial_balance": 10000,  
4   "indicators_params": {  
5     "rsi_period": 2  
6   },  
7   "strategy_params": {  
8     "use_rsi": true,  
9     "rsi_buy_threshold": 40,  
10    "rsi_sell_threshold": 60,  
11    "use_bollinger_bands": false,  
12    "use_sma_cross": false,  
13    "use_macd": false,  
14    "use_supertrend": false  
15  },  
16  "trading_duration": 3  
17}  
18|
```

Example Response:

```
1 v {  
2   "session_id": "0f7728c4-12d5-498d-a12f-82366285c9b8",  
3   "status": "started"  
4 }
```

### /live\_trading/<session\_id> [GET]:

- Returns the live trading status and results for the specified session\_id.
- Instant balance, trades, and trading status can be viewed.

*Example Response:*

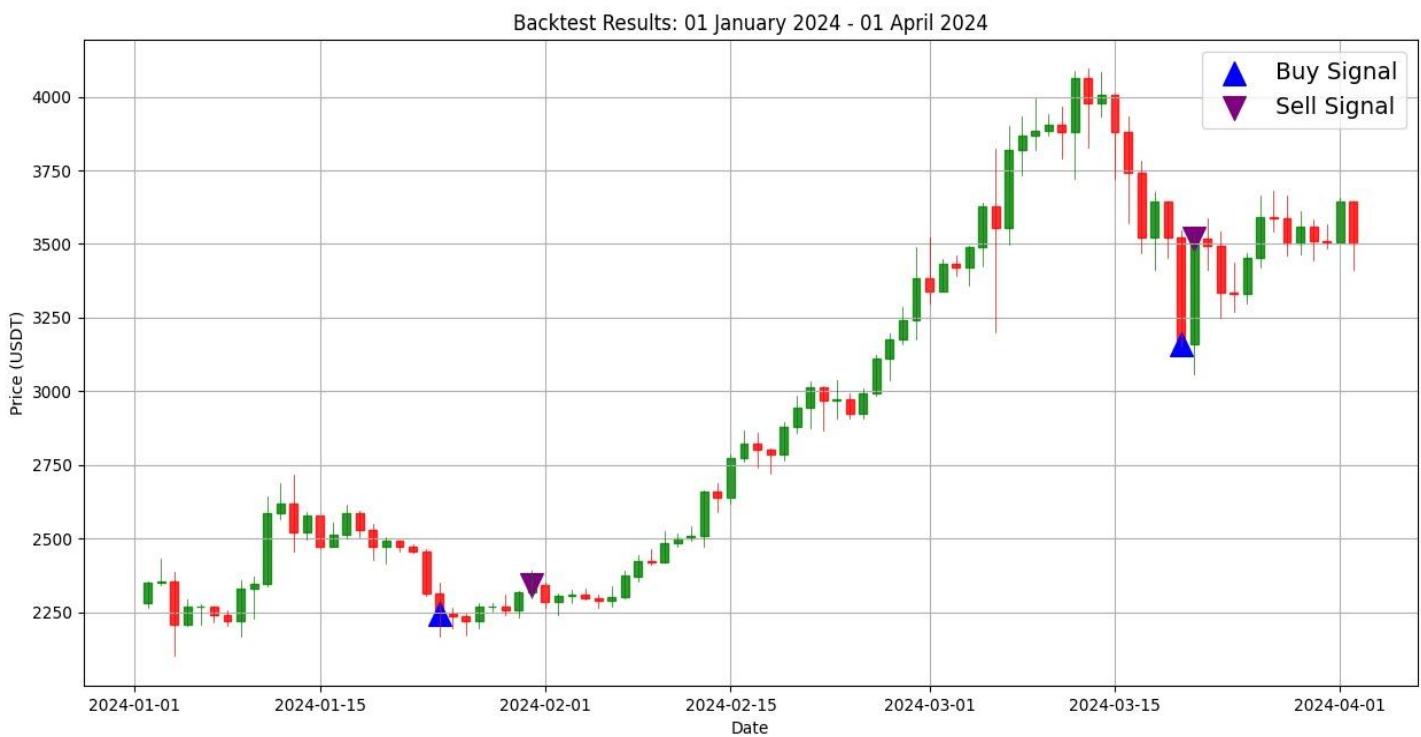
```
1 v {  
2   "current_balance": 9982.122905027933,  
3   "final_balance": 9982.122905027933,  
4   "initial_balance": 10000,  
5   "number_of_trades": 2,  
6   "profit": -17.877094972067425,  
7   "status": "completed",  
8   "symbol": "AVAXUSDT",  
9   "timeframe": "1m",  
10  "trades": [  
11    {  
12      "indicators": {  
13        "RSI": 14.782732472274073  
14      },  
15      "price": 44.75,  
16      "time": "2024-12-01 18:54:42",  
17      "type": "buy"  
18    },  
19    {  
20      "price": 44.67,  
21      "profit": -17.877094972066658,  
22      "time": "2024-12-01 18:58:42",  
23      "type": "sell"  
24    }  
25  ]  
26 }
```

(When the 5-minute period is over, we close our position at the current closing price)

**/photo/<filename> [GET]:**

- Returns the chart of the selected coin with timeframe for backtest process.

*Example Response:*



## **PROJECT SETUP AND EXECUTION**

The backend infrastructure of this project was developed with Python v3.11.3, Flask v3.1.0.

The frontend infrastructure of this project was developed with the React library. (Node v20.11.1).

### **1) Installing Required Libraries:**

#### **Frontend:**

- Change directory to the “frontend” folder.
- Then run “npm install” command.
- All Node packages required for the project to run are listed in the “package.json”

#### **Backend:**

- Change directory to the “backend” folder.
- Then run “pip install -r requirements.txt” command.
- All Python packages required for the project to run are listed in the “requirements.txt”.

### **2) Starting the Application:**

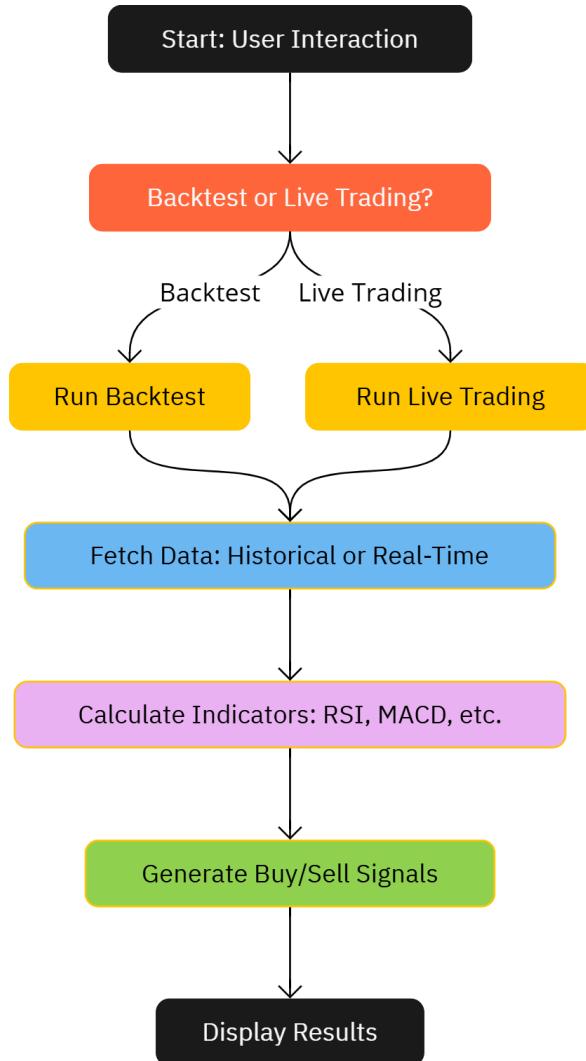
#### **Frontend:**

- Run “npm start” command into the “frontend” directory.

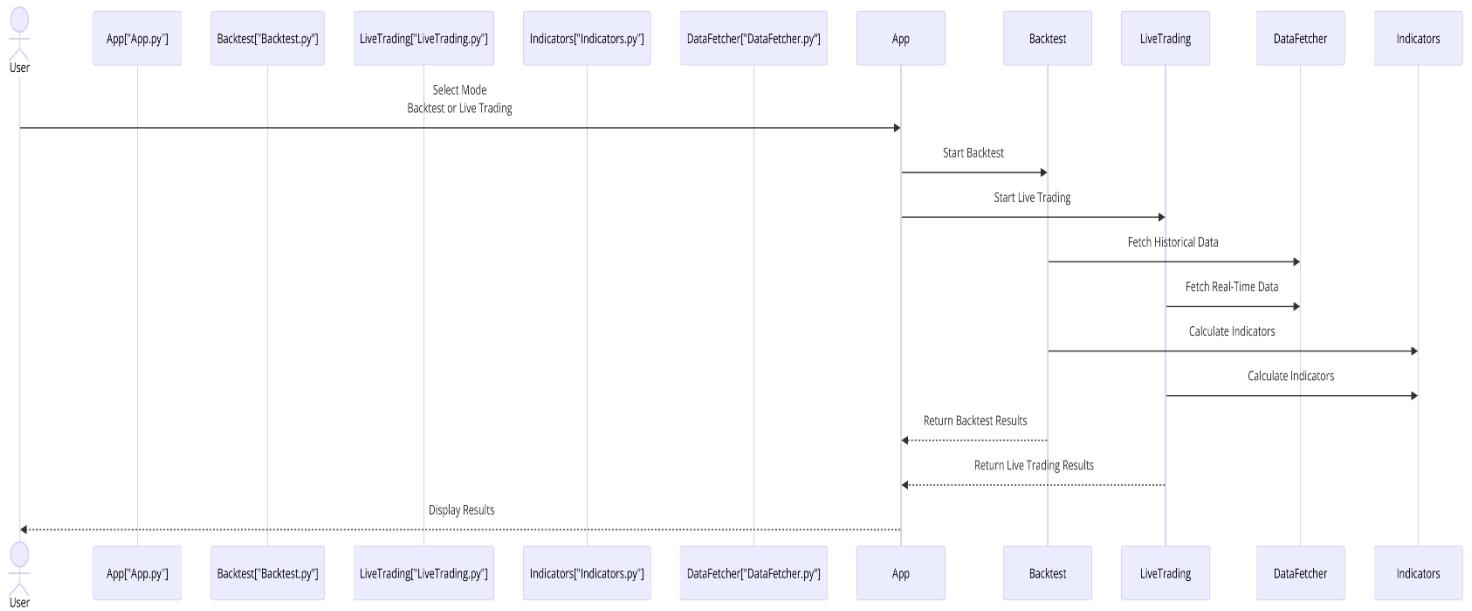
#### **Backend:**

- Run “python app.py” command into the “backend” directory. (The application runs by default at <http://localhost:5000>)

## PROGRAM'S FLOW



## SEQUENCE DIAGRAM



### References:

- Binance API Client Libraries: <https://github.com/binance/binance-spot-api-docs/blob/master/rest-api.md#client-libraries>
- Python Binance Library: <https://github.com/sammchardy/python-binance>
- TradingView Widgets: <https://www.tradingview.com/widget-docs/widgets/tickers/>
- TA-Lib: <https://ta-lib.org/functions/>
- Pandas: <https://pandas.pydata.org/docs/>
- Matplotlib: <https://pypi.org/project/matplotlib/>
- Mplfinance: <https://github.com/matplotlib/mplfinance>
- Python Threading and Concurrency: <https://docs.python.org/3/library/threading.html>
- Sigma Coding Trading Bot Tutorial: [https://www.youtube.com/watch?v=QAoox9fE6ck&list=PLcFcktZownNmdgAdv4-YI\\_nzS5LiKhnNn](https://www.youtube.com/watch?v=QAoox9fE6ck&list=PLcFcktZownNmdgAdv4-YI_nzS5LiKhnNn)
- Flask: <https://flask.palletsprojects.com/en/stable/>

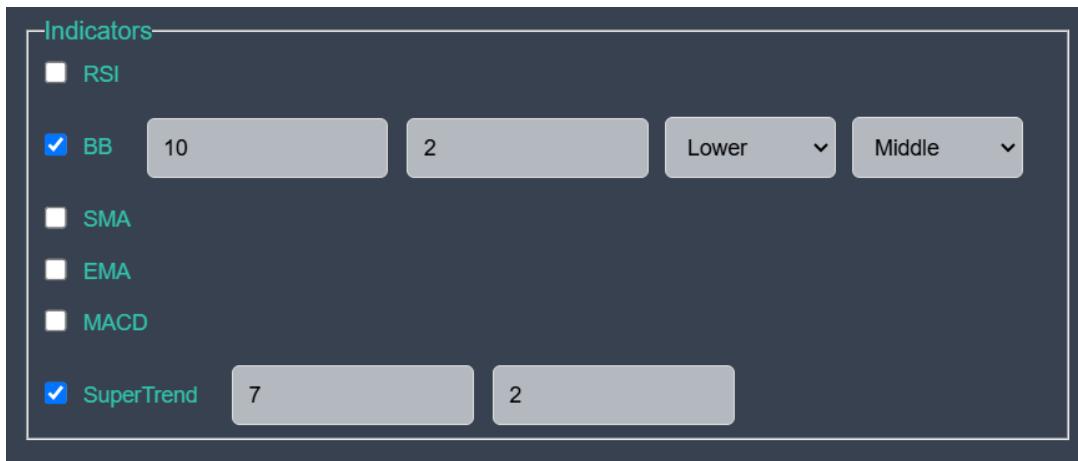
## BACKTEST RESULTS

(Last 4 months)

\*For backtests with a large number of trades, the trades table is very long, so only the first part of the table is included in the report.

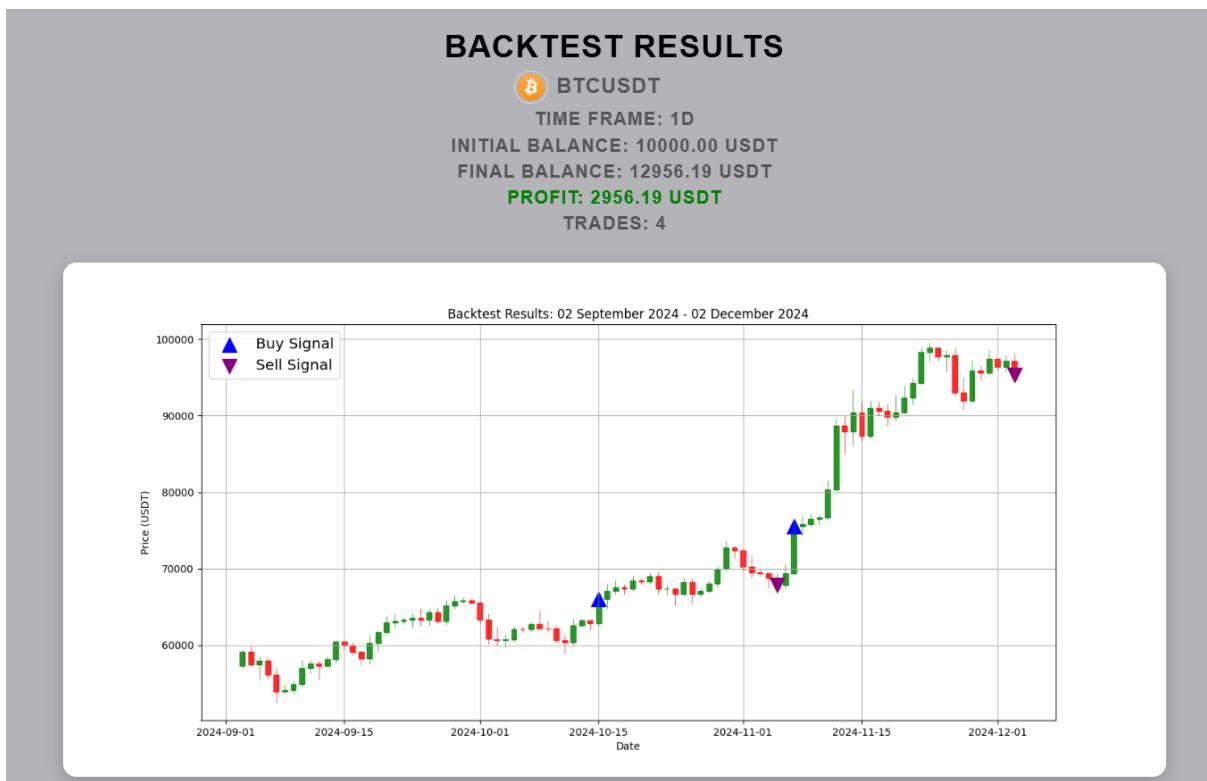
### Our Strategy and Indicator Parameters:

- **BollingerBands:** Period = 10, Std. Dev = 2, Buy = Lower Band, Sell = Middle Band
- **SuperTrend:** Period = 7, Multiplier = 2



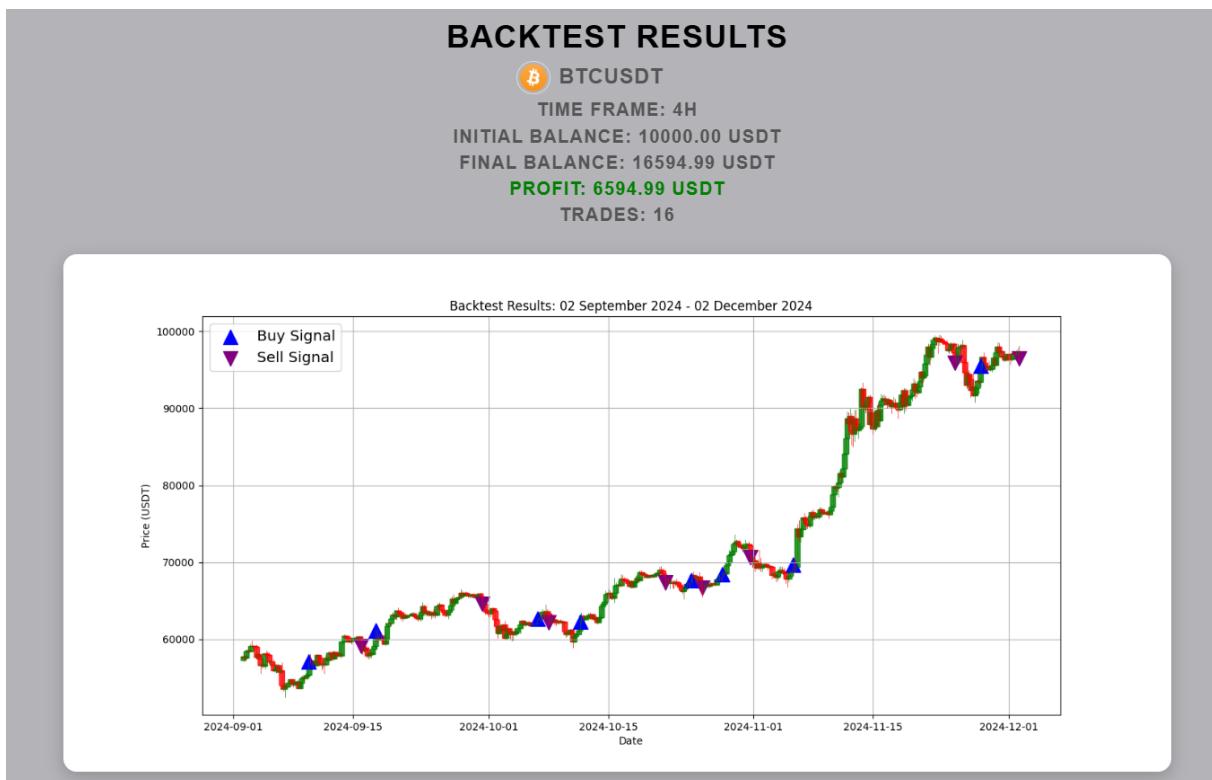
### BITCOIN

1 day:



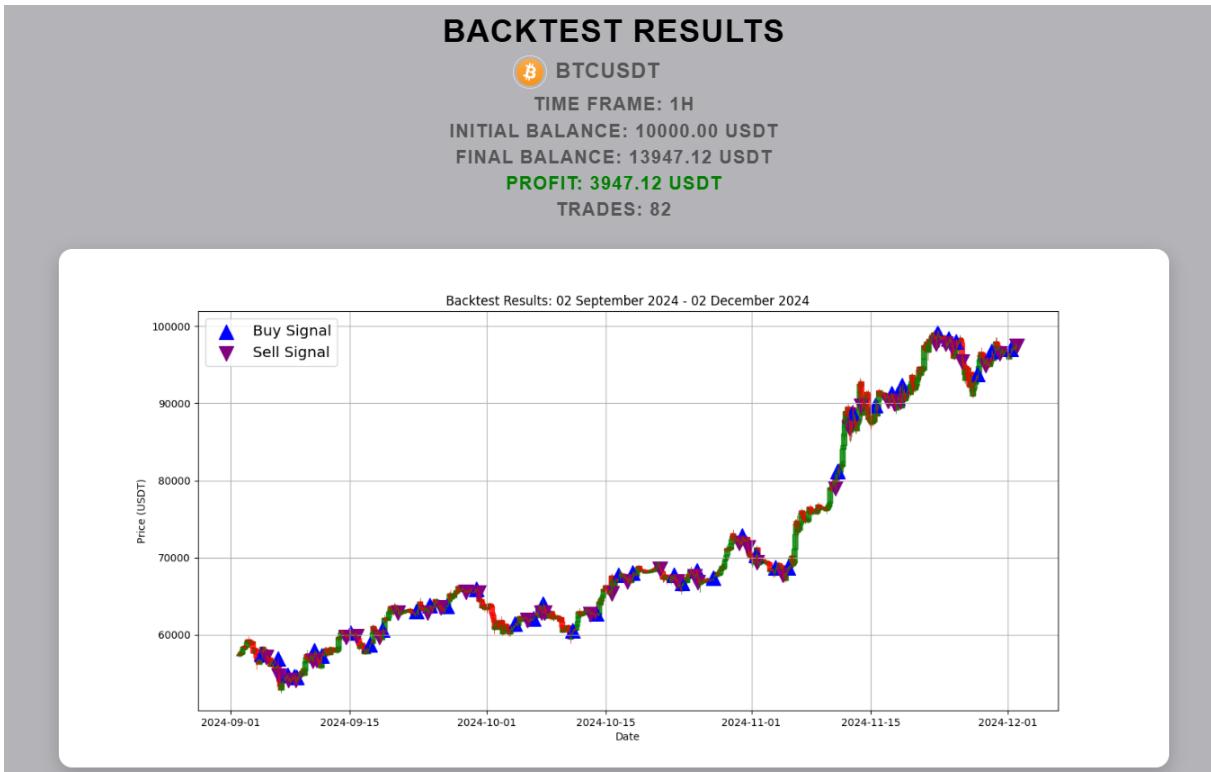
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-10-14 23:59:59	Buy	BBL: 59514.6 BBM: 62492.5 BBU: 65470.4 SUPERT: 60119.7 SUPERTd: 1.0	66083.990	-
2024-11-04 23:59:59	Sell	BBL: 66098.3 BBM: 69594.7 BBU: 73091.0 SUPERT: 72552.2 SUPERTd: -1.0	67850.010	<b>267.239</b>
2024-11-06 23:59:59	Buy	BBL: 66198.4 BBM: 70577.6 BBU: 74956.8 SUPERT: 66838.9 SUPERTd: 1.0	75571.990	-
2024-12-02 23:59:59	Sell		95511.240	<b>2708.954</b>

4 hours:



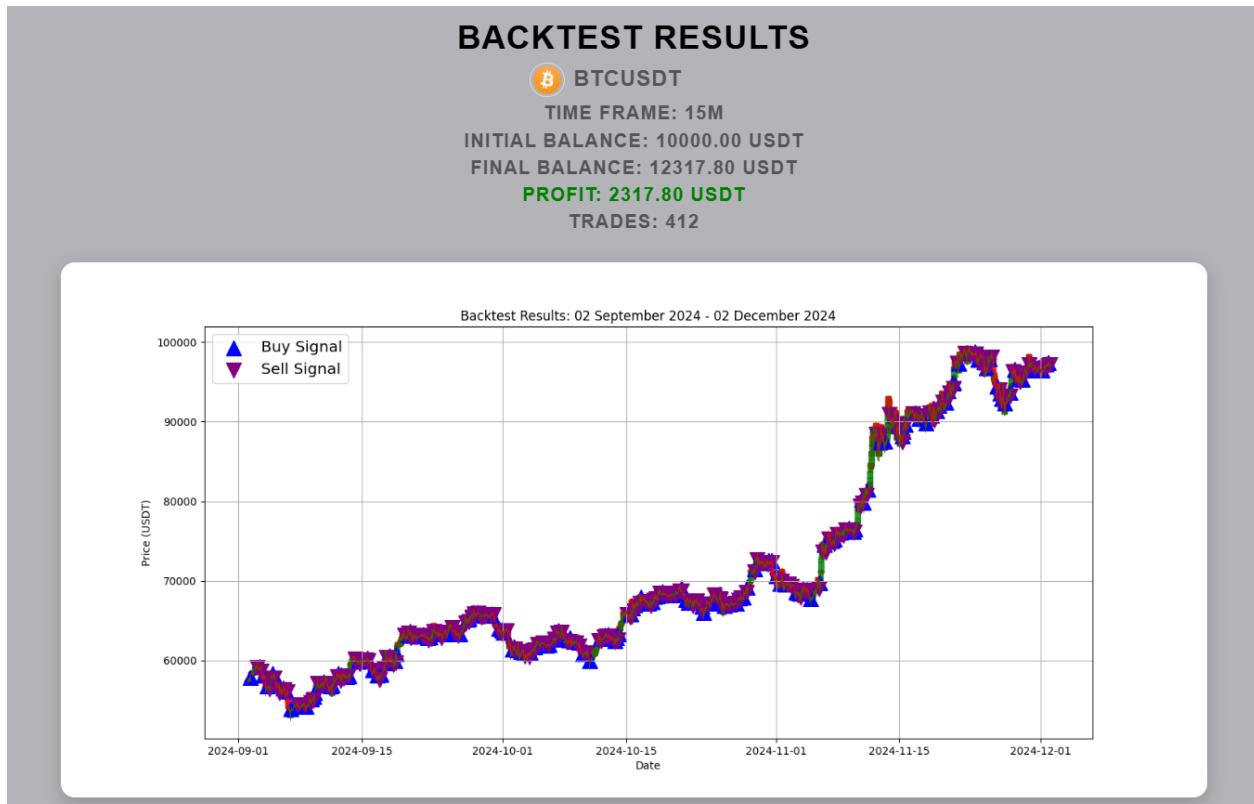
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-09 19:59:59	Buy	BBL: 53264.4 BBM: 54971.6 BBU: 56678.8 SUPERT: 54424.1 SUPERTd: 1.0	57089.540	-
2024-09-15 23:59:59	Sell	BBL: 59276.8 BBM: 59908.3 BBU: 60539.9 SUPERT: 60561.5 SUPERTd: -1.0	59132.000	<b>357.764</b>
2024-09-17 15:59:59	Buy	BBL: 56924.8 BBM: 58716.2 BBU: 60507.6 SUPERT: 58113.4 SUPERTd: 1.0	61135.500	-
2024-09-30 03:59:59	Sell	BBL: 64857.2 BBM: 65605.2 BBU: 66353.2 SUPERT: 66070.6 SUPERTd: -1.0	64553.680	<b>579.119</b>
2024-10-06 15:59:59	Buy	BBL: 61599.7 BBM: 62084.2 BBU: 62568.7 SUPERT: 61461.3 SUPERTd: 1.0	62720.010	-

1 hours:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-04 14:59:59	Buy	BBL: 55954.6 BBM: 56628.6 BBU: 57302.5 SUPERT: 55864.2 SUPERTd: 1.0	57511.100	-
2024-09-05 03:59:59	Sell	BBL: 57303.9 BBM: 57884.0 BBU: 58464.1 SUPERT: 58206.7 SUPERTd: -1.0	57135.420	-65.323
2024-09-06 12:59:59	Buy	BBL: 55535.0 BBM: 56263.2 BBU: 56991.4 SUPERT: 55215.2 SUPERTd: 1.0	56873.990	-
2024-09-06 14:59:59	Sell	BBL: 54924.5 BBM: 56007.9 BBU: 57091.2 SUPERT: 56692.0 SUPERTd: -1.0	54733.240	-373.944
2024-09-07 15:59:59	Buy	BBL: 54107.1 BBM: 54443.8 BBU: 54780.5 SUPERT: 54146.0 SUPERTd: 1.0	54780.000	-
		BBL: 54074.6 BBM: 54443.2		

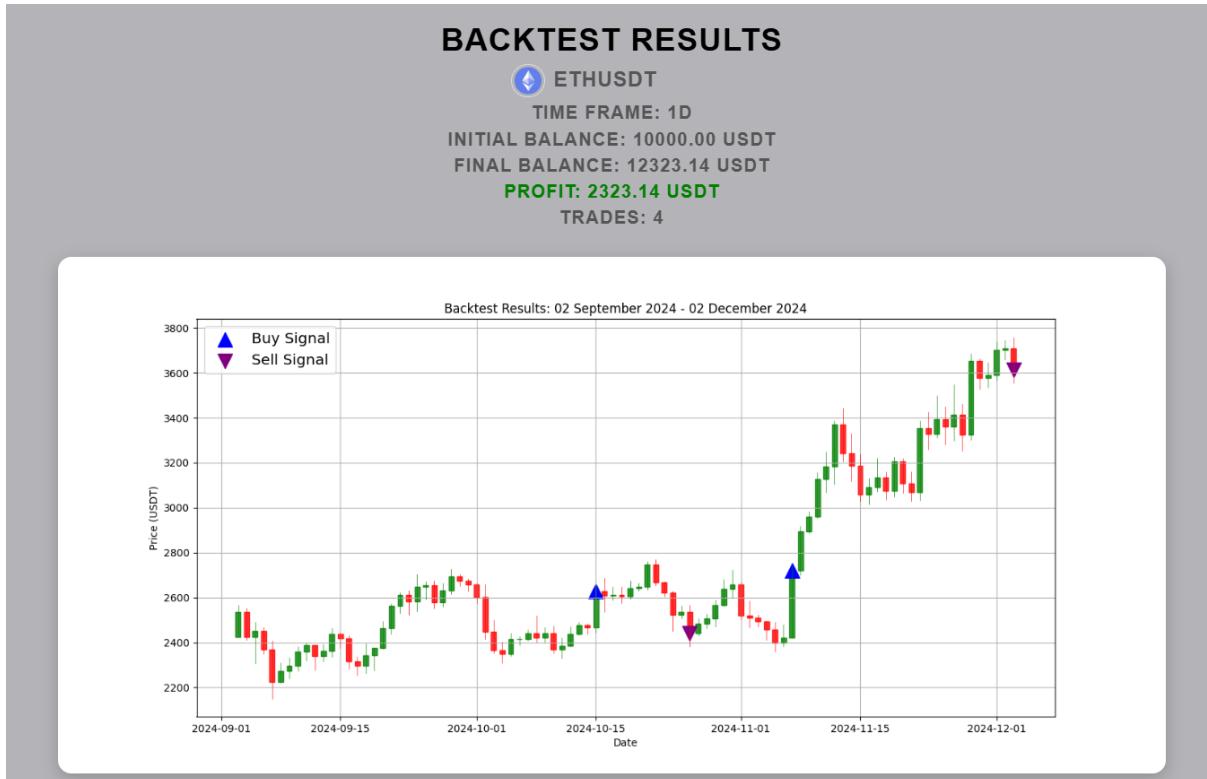
15 minutes:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-02 08:14:59	Buy	BBL: 57446.2 BBM: 57682.9 BBU: 57919.7 SUPERT: 57295.3 SUPERTd: 1.0	57833.010	-
2024-09-03 03:29:59	Sell	BBL: 59006.6 BBM: 59365.5 BBU: 59724.4 SUPERT: 59601.9 SUPERTd: -1.0	59126.650	<b>223.685</b>
2024-09-03 10:29:59	Buy	BBL: 58673.0 BBM: 58922.0 BBU: 59170.9 SUPERT: 58764.1 SUPERTd: 1.0	59181.000	-
2024-09-03 13:44:59	Sell	BBL: 58743.0 BBM: 59095.6 BBU: 59448.2 SUPERT: 59253.9 SUPERTd: -1.0	58628.260	<b>-95.487</b>
2024-09-03 20:14:59	Buy	BBL: 57679.1 BBM: 57966.7 BBU: 58254.3 SUPERT: 57700.0 SUPERTd: 1.0	58186.000	-
		BBL: 57740.3 BBM: 59002.5		

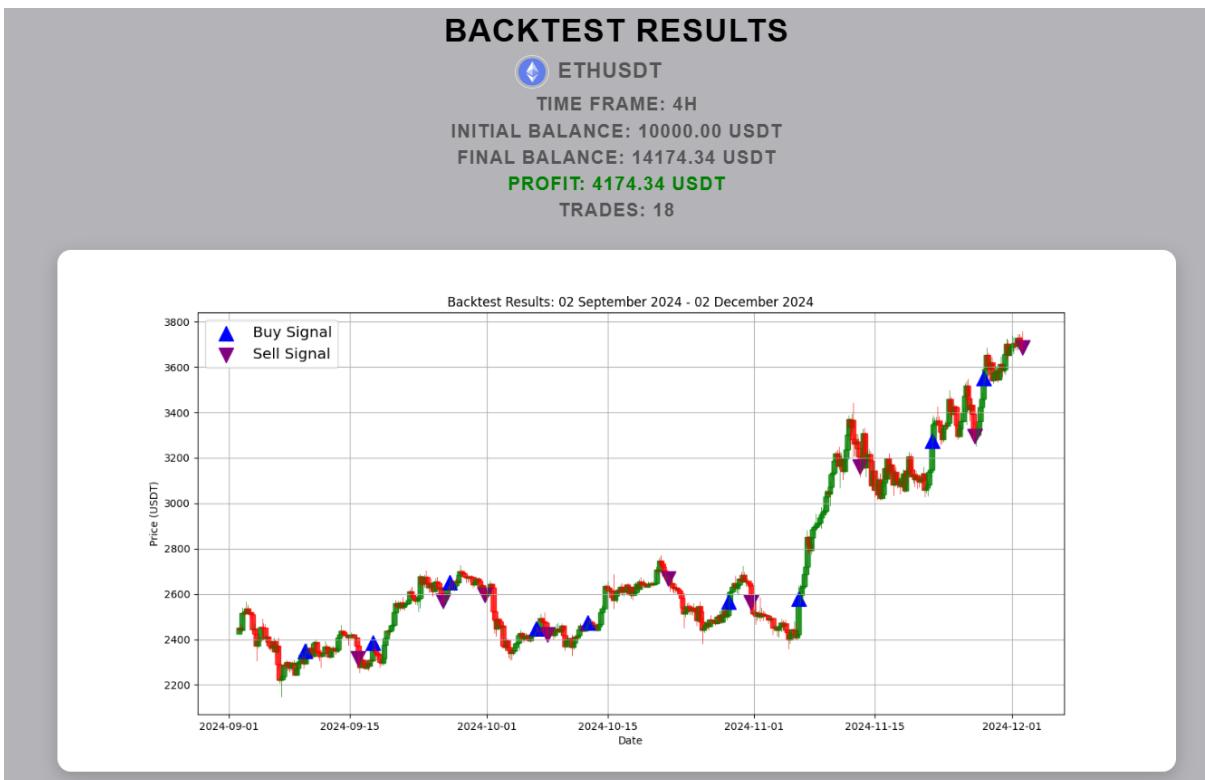
## **ETHEREUM**

1 day:



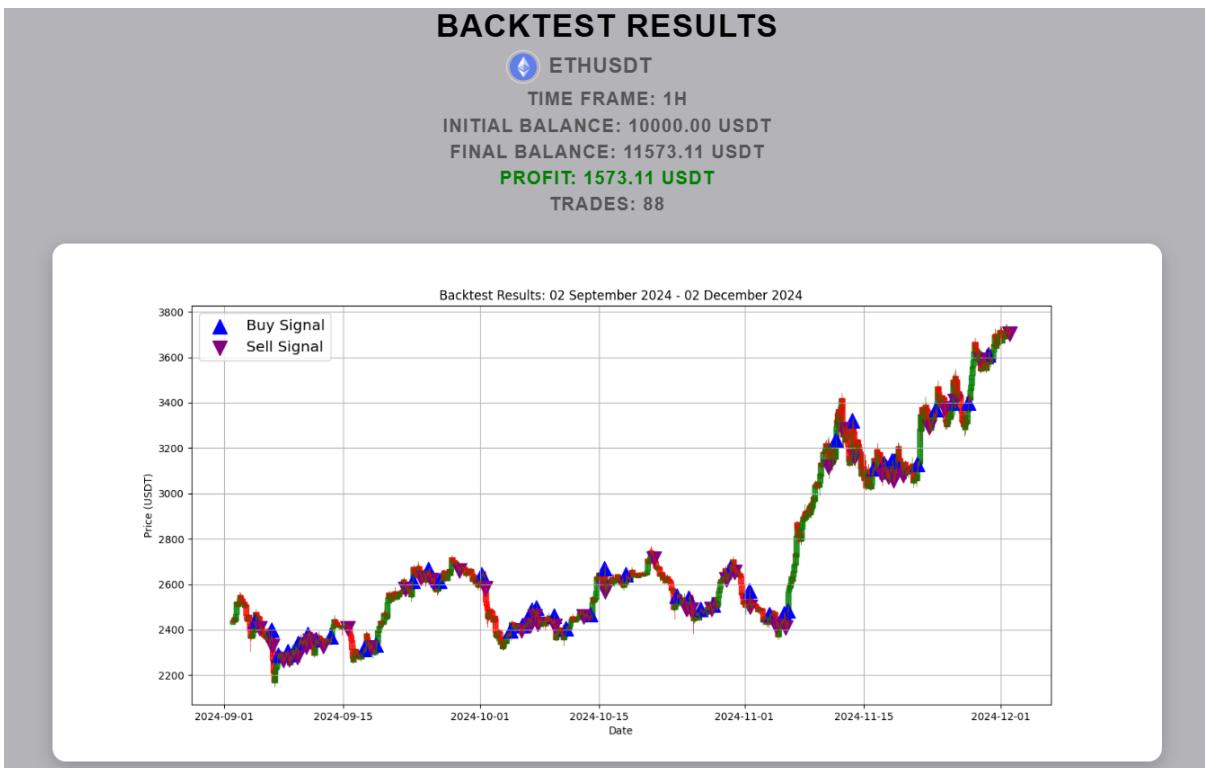
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-10-14 23:59:59	Buy	BBL: 2313.3 BBM: 2449.0 BBU: 2584.7 SUPERT: 2343.3 SUPERTd: 1.0	2629.790	-
2024-10-25 23:59:59	Sell	BBL: 2442.2 BBM: 2604.5 BBU: 2766.7 SUPERT: 2692.2 SUPERTd: -1.0	2440.620	<b>-719.335</b>
2024-11-06 23:59:59	Buy	BBL: 2337.2 BBM: 2539.0 BBU: 2740.8 SUPERT: 2306.6 SUPERTd: 1.0	2721.870	-
2024-12-02 23:59:59	Sell		3614.180	<b>3042.478</b>

4 hours:



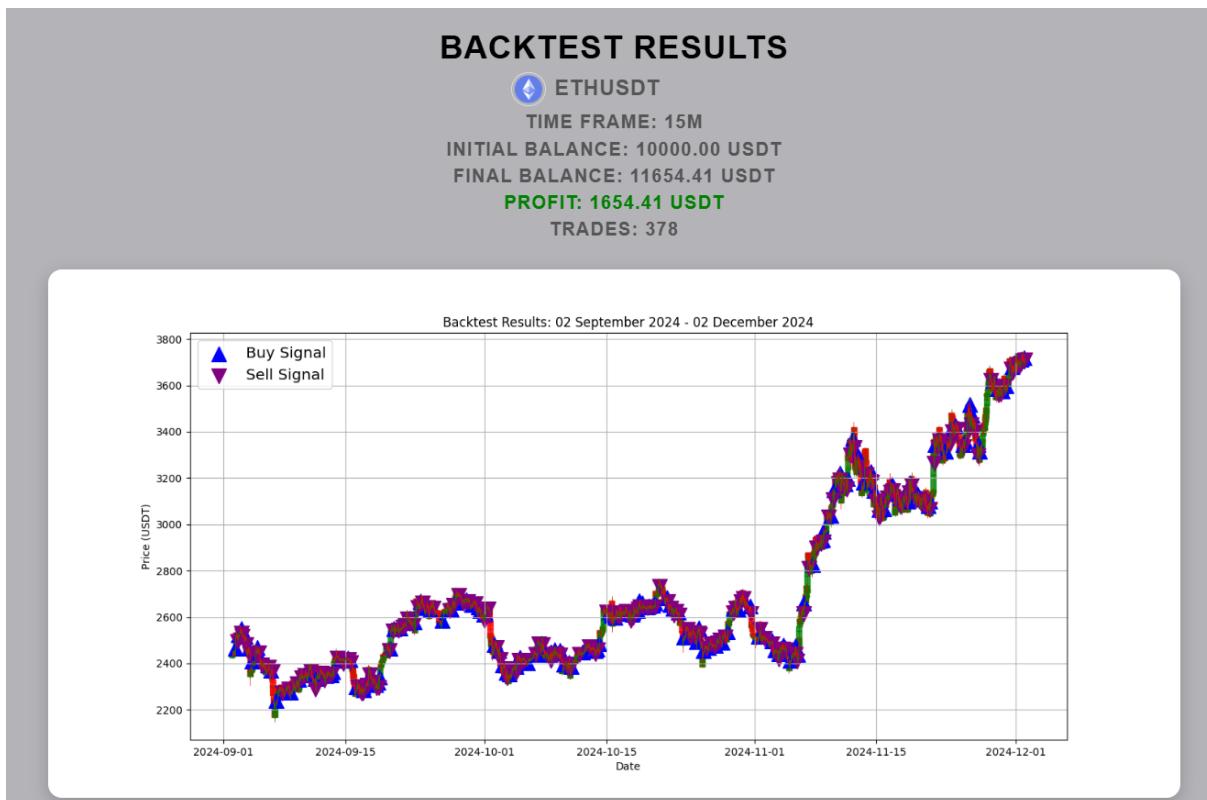
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-09 19:59:59	Buy	BBL: 2246.2 BBM: 2298.4 BBU: 2350.6 SUPERT: 2232.9 SUPERTd: 1.0	2350.570	-
2024-09-15 23:59:59	Sell	BBL: 2338.1 BBM: 2400.9 BBU: 2463.8 SUPERT: 2399.5 SUPERTd: -1.0	2316.100	<b>-146.645</b>
2024-09-17 15:59:59	Buy	BBL: 2245.1 BBM: 2304.1 BBU: 2363.0 SUPERT: 2261.0 SUPERTd: 1.0	2383.790	-
2024-09-25 19:59:59	Sell	BBL: 2576.8 BBM: 2626.7 BBU: 2676.6 SUPERT: 2666.0 SUPERTd: -1.0	2570.690	<b>772.548</b>
2024-09-26 15:59:59	Buy	BBL: 2564.9 BBM: 2616.0 BBU: 2667.0 SUPERT: 2554.5 SUPERTd: 1.0	2652.010	-

1 hours:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-04 14:59:59	Buy	BBL: 2359.2 BBM: 2396.9 BBU: 2434.5 SUPERT: 2369.7 SUPERTd: 1.0	2438.490	-
2024-09-05 03:59:59	Sell	BBL: 2417.5 BBM: 2449.1 BBU: 2480.8 SUPERT: 2469.6 SUPERTd: -1.0	2405.550	<b>-135.084</b>
2024-09-06 12:59:59	Buy	BBL: 2338.8 BBM: 2373.6 BBU: 2408.3 SUPERT: 2332.0 SUPERTd: 1.0	2399.770	-
2024-09-06 14:59:59	Sell	BBL: 2324.8 BBM: 2364.7 BBU: 2404.6 SUPERT: 2403.2 SUPERTd: -1.0	2327.210	<b>-298.278</b>
2024-09-07 07:59:59	Buy	BBL: 2197.3 BBM: 2244.7 BBU: 2292.2 SUPERT: 2234.3 SUPERTd: 1.0	2288.110	-

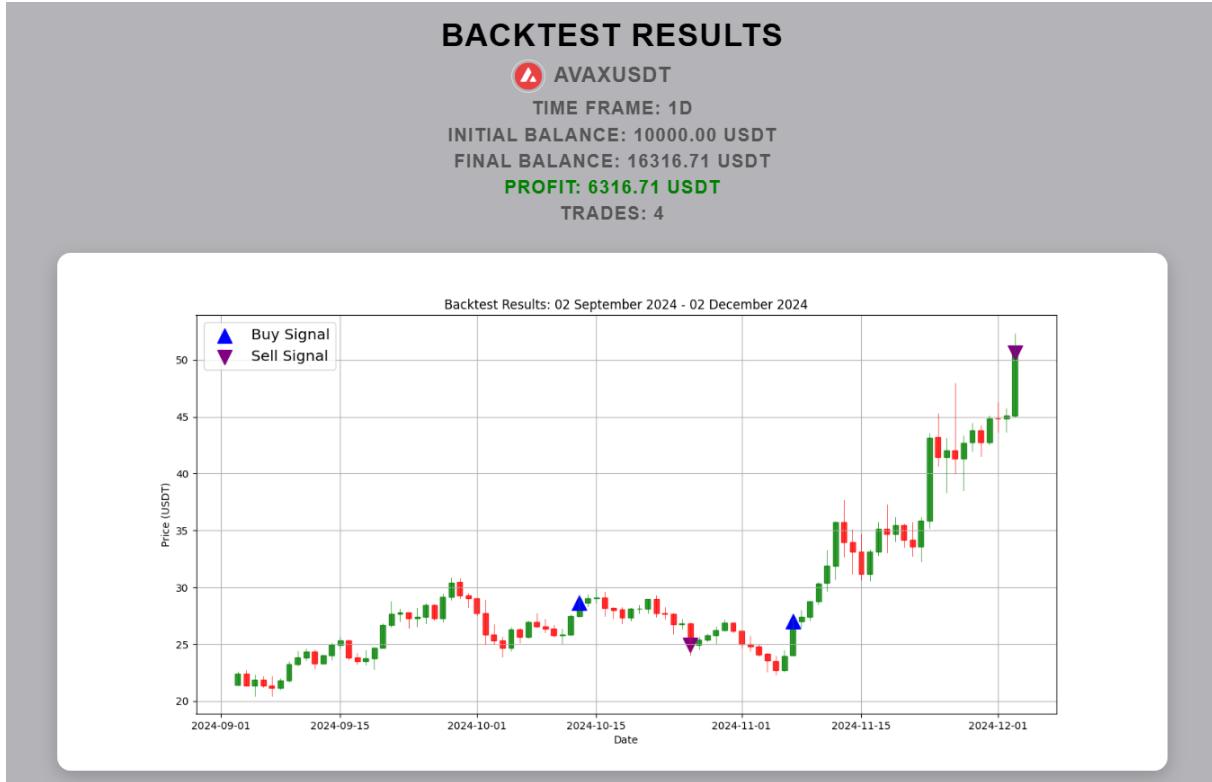
15 minutes:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-02 08:29:59	Buy	BBL: 2433.2 BBM: 2447.9 BBU: 2462.7 SUPERT: 2435.8 SUPERTd: 1.0	2465.520	-
2024-09-02 14:14:59	Sell	BBL: 2496.4 BBM: 2513.0 BBU: 2529.5 SUPERT: 2522.4 SUPERTd: -1.0	2494.210	<b>116.365</b>
2024-09-02 17:59:59	Buy	BBL: 2508.1 BBM: 2516.7 BBU: 2525.2 SUPERT: 2502.2 SUPERTd: 1.0	2522.780	-
2024-09-03 00:44:59	Sell	BBL: 2530.0 BBM: 2539.5 BBU: 2548.9 SUPERT: 2545.8 SUPERTd: -1.0	2531.240	<b>33.925</b>
2024-09-03 02:14:59	Buy	BBL: 2524.9 BBM: 2535.6 BBU: 2546.2 SUPERT: 2524.3 SUPERTd: 1.0	2549.490	-
2024-09-03 03:29:59	Sell	BBL: 2517.3 BBM: 2532.7 BBU: 2548.2	2518.180	<b>-124.655</b>

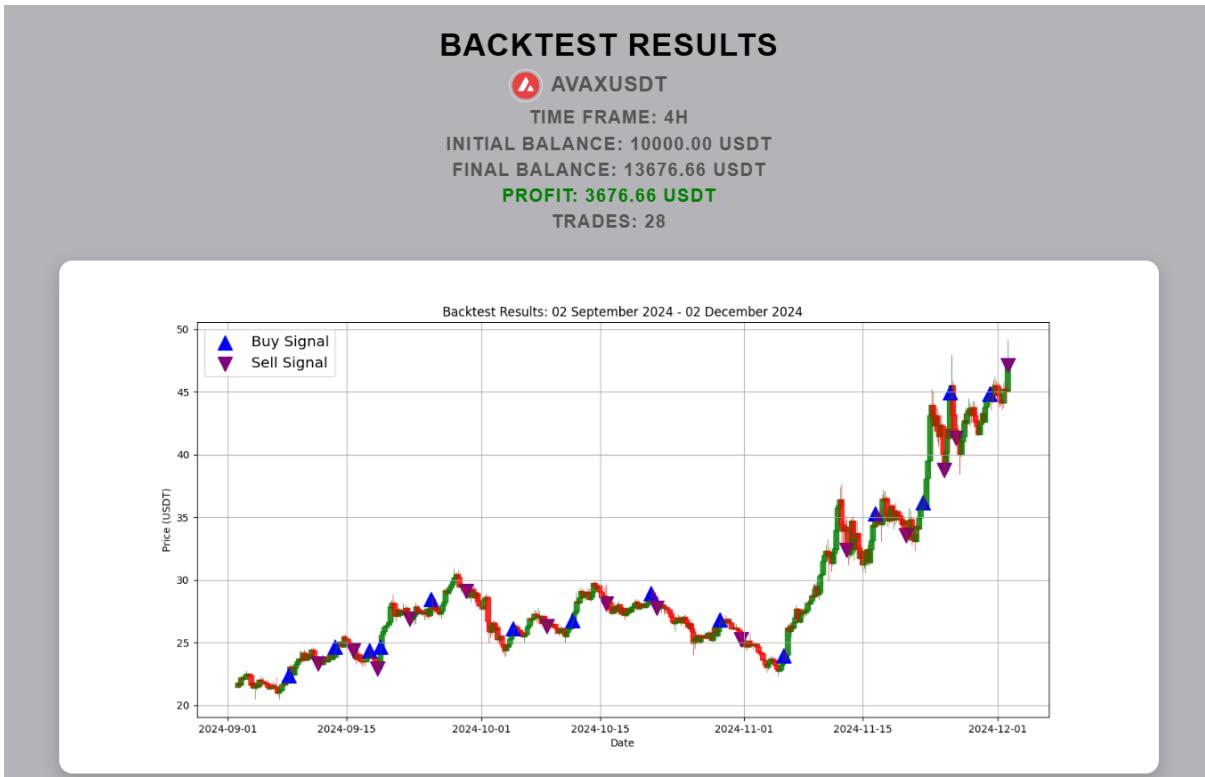
## AVAX

1 day:



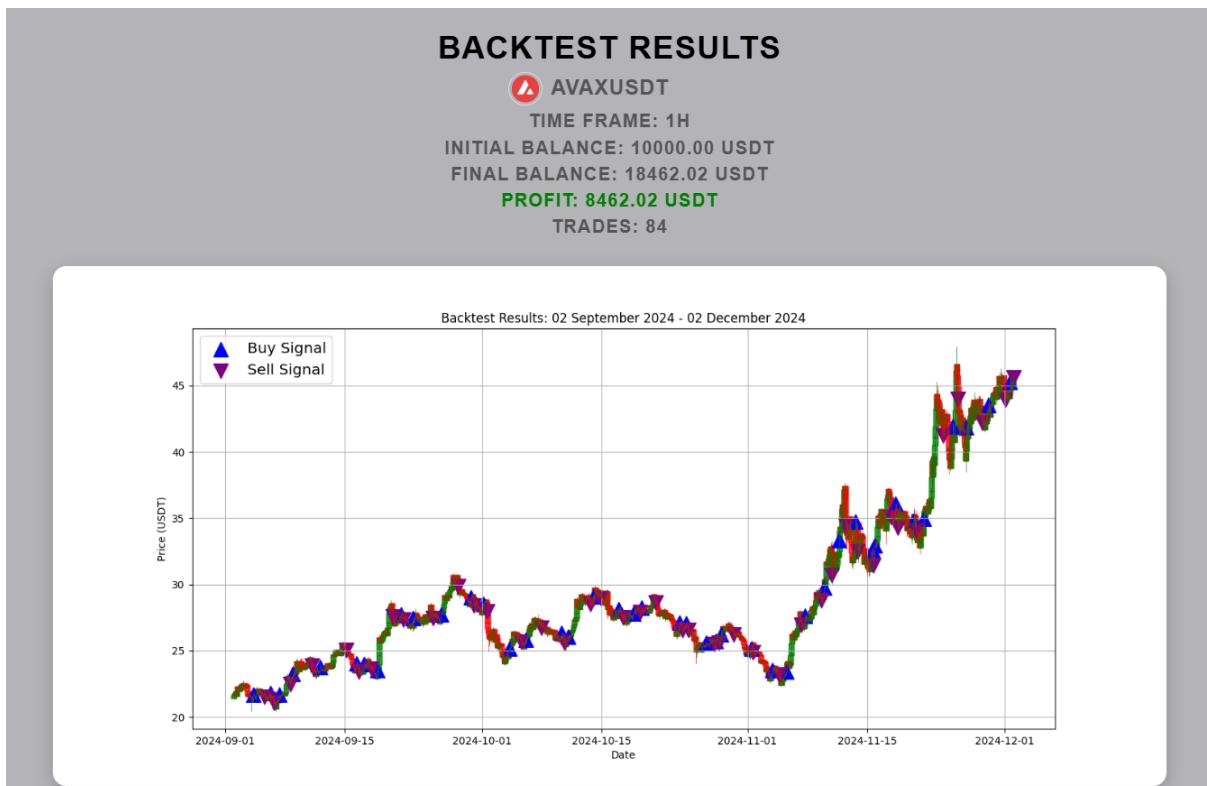
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-10-12 23:59:59	Buy	BBL: 24.3 BBM: 26.4 BBU: 28.5 SUPERT: 25.1 SUPERTd: 1.0	28.640	-
2024-10-25 23:59:59	Sell	BBL: 25.4 BBM: 27.4 BBU: 29.5 SUPERT: 28.6 SUPERTd: -1.0	24.930	<b>-1295.391</b>
2024-11-06 23:59:59	Buy	BBL: 22.2 BBM: 25.1 BBU: 27.9 SUPERT: 22.2 SUPERTd: 1.0	27.010	-
2024-12-02 23:59:59	Sell		50.630	<b>7612.102</b>

4 hours:



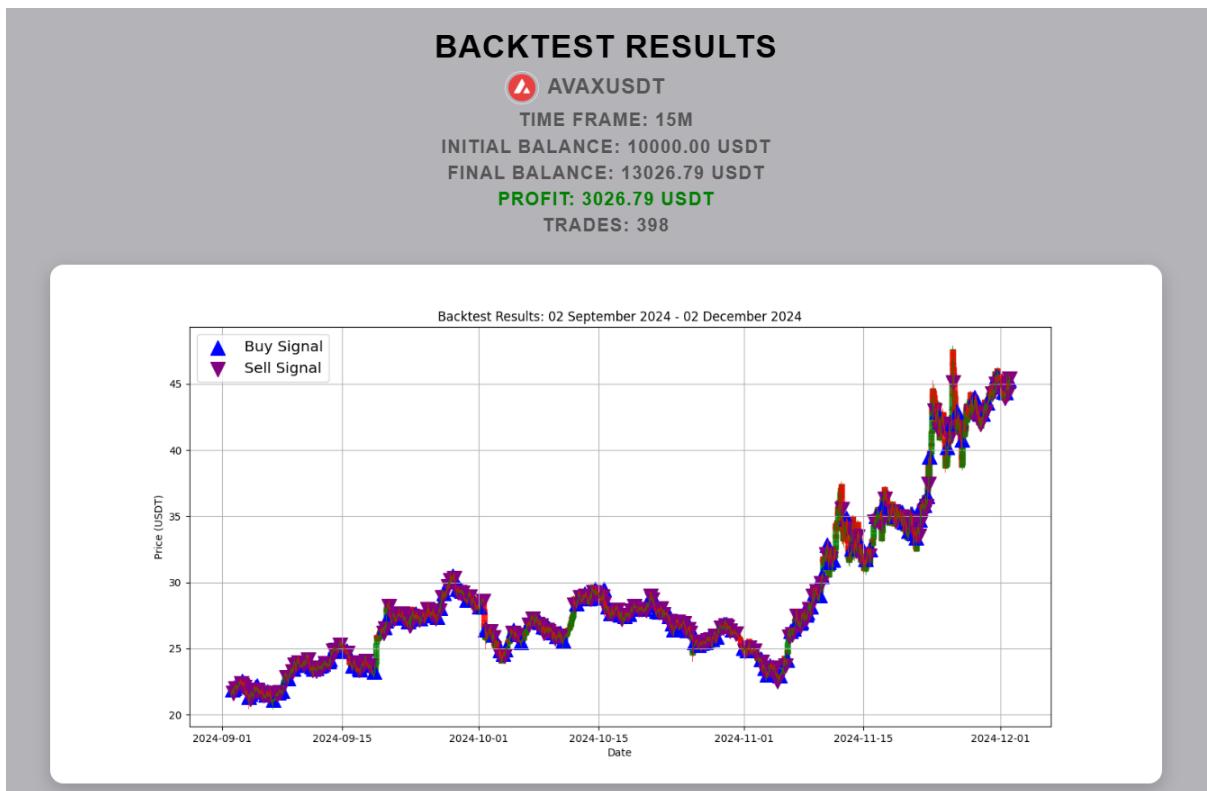
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-08 03:59:59	Buy	BBL: 20.8 BBM: 21.6 BBU: 22.4 SUPERT: 21.1 SUPERTd: 1.0	22.380	-
2024-09-11 15:59:59	Sell	BBL: 23.2 BBM: 23.8 BBU: 24.5 SUPERT: 24.5 SUPERTd: -1.0	23.330	<b>424.486</b>
2024-09-13 15:59:59	Buy	BBL: 23.2 BBM: 23.8 BBU: 24.5 SUPERT: 23.1 SUPERTd: 1.0	24.690	-
2024-09-15 19:59:59	Sell	BBL: 24.3 BBM: 24.9 BBU: 25.6 SUPERT: 25.4 SUPERTd: -1.0	24.370	<b>-135.109</b>
2024-09-17 15:59:59	Buy	BBL: 23.2 BBM: 23.8 BBU: 24.3 SUPERT: 23.0 SUPERTd: 1.0	24.400	-
2024-09-18 15:59:59	Sell	BBL: 22.9 BBM: 23.7 BBU: 24.4	22.820	<b>-624.440</b>

1 hours:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-04 07:59:59	Buy	BBL: 21.1 BBM: 21.4 BBU: 21.7 SUPERT: 21.0 SUPERTd: 1.0	21.680	-
2024-09-05 14:59:59	Sell	BBL: 21.5 BBM: 21.7 BBU: 21.9 SUPERT: 22.3 SUPERTd: -1.0	21.520	<b>-73.801</b>
2024-09-06 06:59:59	Buy	BBL: 21.3 BBM: 21.5 BBU: 21.8 SUPERT: 21.2 SUPERTd: 1.0	21.810	-
2024-09-06 16:59:59	Sell	BBL: 21.1 BBM: 21.5 BBU: 21.9 SUPERT: 21.9 SUPERTd: -1.0	21.050	<b>-345.892</b>
2024-09-07 07:59:59	Buy	BBL: 20.9 BBM: 21.3 BBU: 21.7 SUPERT: 21.1 SUPERTd: 1.0	21.680	-
2024-09-08 15:59:59	Sell	BBL: 22.4 BBM: 22.8 BBU: 23.2	22.460	<b>344.679</b>

15 minutes:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-02 05:44:59	Buy	BBL: 21.6 BBM: 21.8 BBU: 21.9 SUPERT: 21.5 SUPERTd: 1.0	21.900	-
2024-09-02 07:29:59	Sell	BBL: 21.6 BBM: 21.8 BBU: 22.0 SUPERT: 22.0 SUPERTd: -1.0	21.650	<b>-114.155</b>
2024-09-02 08:29:59	Buy	BBL: 21.5 BBM: 21.8 BBU: 22.0 SUPERT: 21.5 SUPERTd: 1.0	22.030	-
2024-09-02 13:59:59	Sell	BBL: 21.9 BBM: 22.1 BBU: 22.3 SUPERT: 22.2 SUPERTd: -1.0	21.950	<b>-35.900</b>
2024-09-02 14:59:59	Buy	BBL: 21.9 BBM: 22.0 BBU: 22.2 SUPERT: 21.9 SUPERTd: 1.0	22.200	-
		BBL: 22.4 BBM: 22.5		

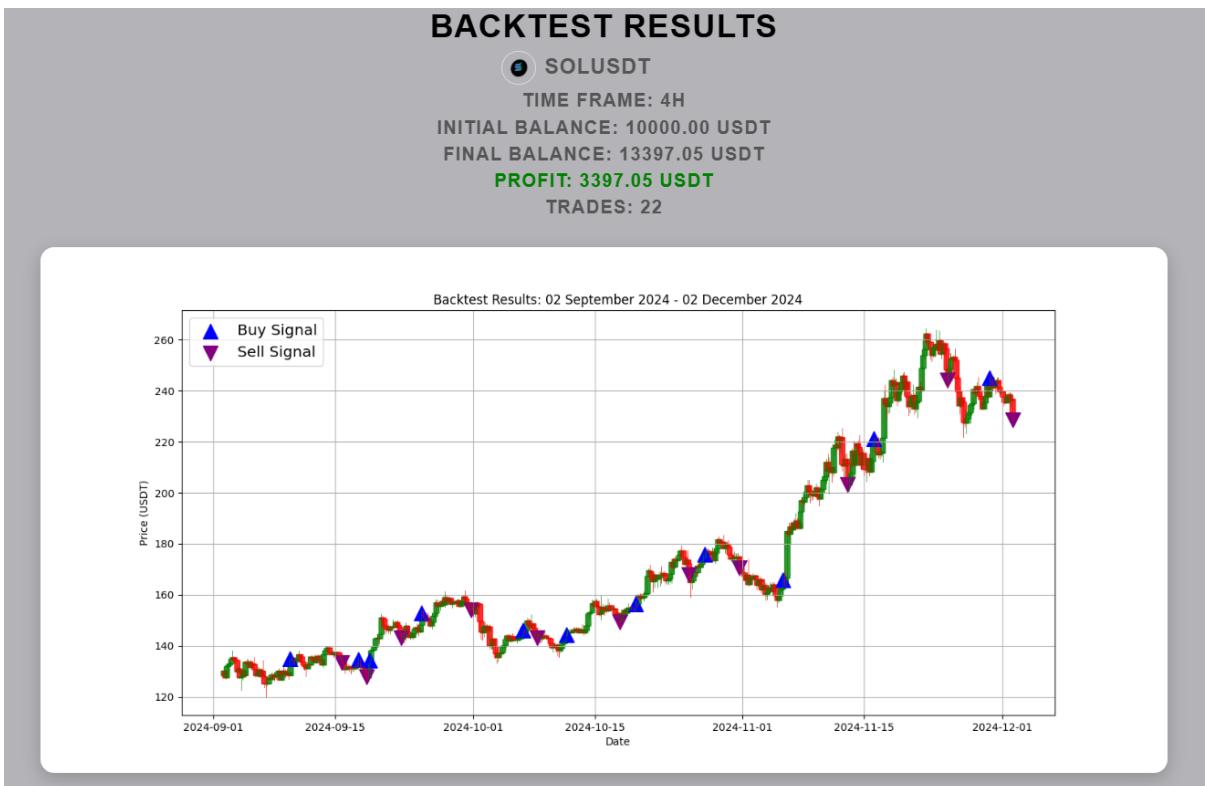
## SOLANA

1 day:



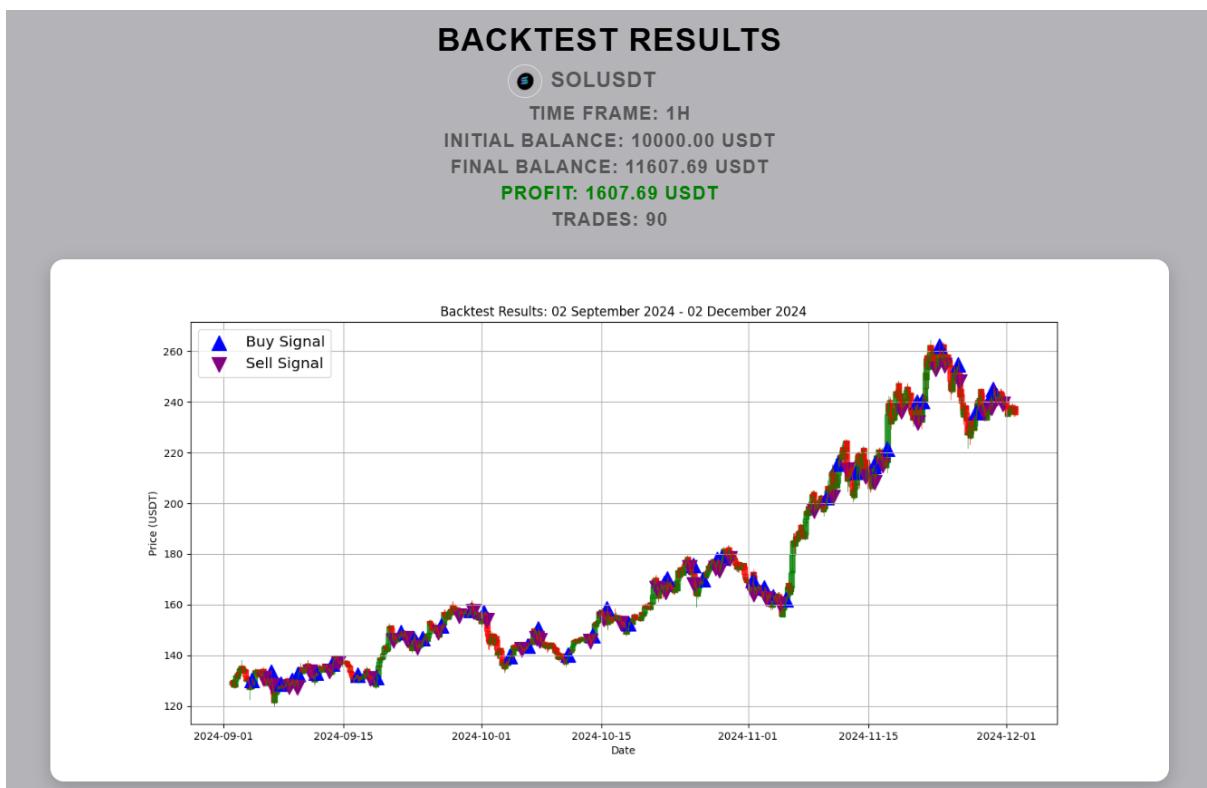
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-10-14 23:59:59	Buy	BBL: 135.3 BBM: 145.2 BBU: 155.2 SUPERT: 138.6 SUPERTd: 1.0	157.590	-
2024-11-04 23:59:59	Sell	BBL: 156.6 BBM: 170.2 BBU: 183.7 SUPERT: 178.0 SUPERTd: -1.0	157.950	<b>22.844</b>
2024-11-06 23:59:59	Buy	BBL: 154.0 BBM: 170.7 BBU: 187.4 SUPERT: 155.3 SUPERTd: 1.0	186.590	-
2024-12-02 23:59:59	Sell	BBL: 221.5 BBM: 239.4 BBU: 257.2 SUPERT: 257.3 SUPERTd: -1.0	223.930	<b>2005.751</b>

4 hours:



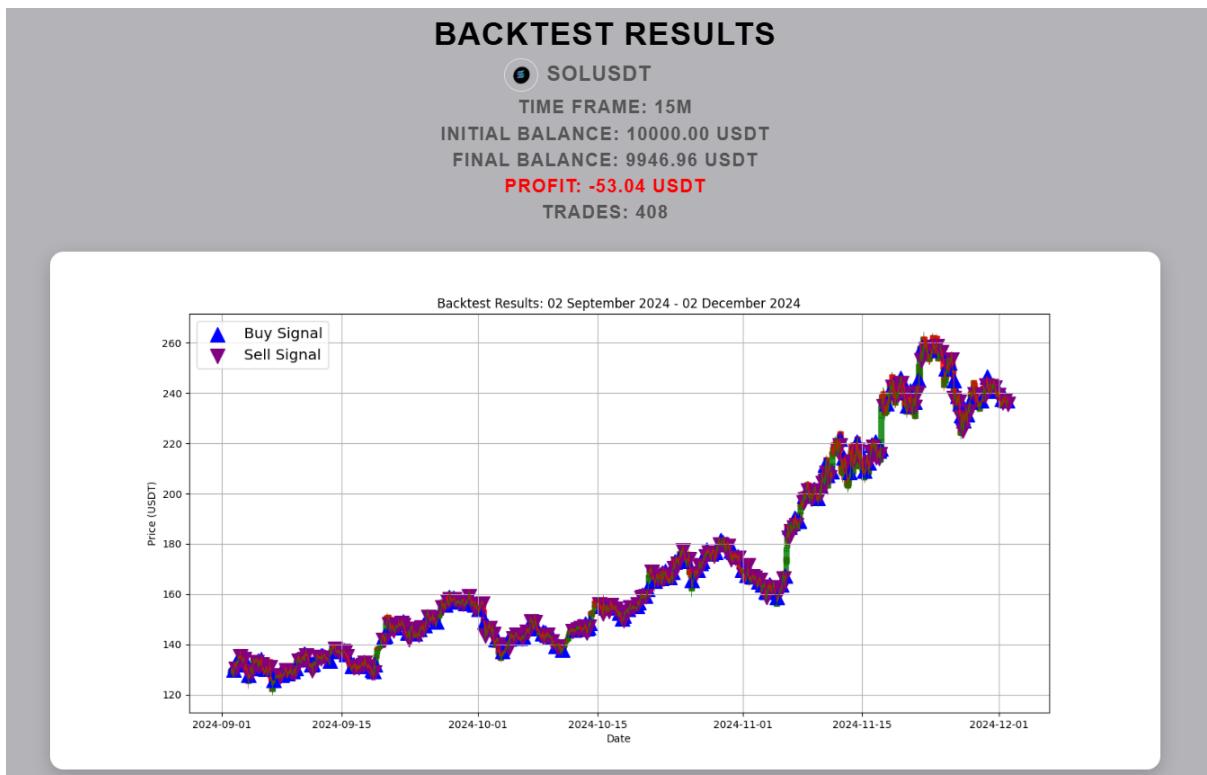
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-09 19:59:59	Buy	BBL: 125.6 BBM: 129.6 BBU: 133.6 SUPERT: 125.1 SUPERTd: 1.0	134.980	-
2024-09-15 19:59:59	Sell	BBL: 134.1 BBM: 136.5 BBU: 138.9 SUPERT: 138.1 SUPERTd: -1.0	133.460	<b>-112.609</b>
2024-09-17 15:59:59	Buy	BBL: 129.7 BBM: 131.8 BBU: 133.9 SUPERT: 128.5 SUPERTd: 1.0	134.670	-
2024-09-18 15:59:59	Sell	BBL: 127.9 BBM: 131.4 BBU: 134.9 SUPERT: 133.7 SUPERTd: -1.0	127.670	<b>-513.936</b>
2024-09-18 23:59:59	Buy	BBL: 127.3 BBM: 131.4 BBU: 135.5 SUPERT: 124.7 SUPERTd: 1.0	134.340	-
		BBL: 143.5 BBM: 146.8		

1 hours:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-04 07:59:59	Buy	BBL: 125.6 BBM: 127.9 BBU: 130.1 SUPERT: 125.8 SUPERTd: 1.0	130.300	-
2024-09-05 15:59:59	Sell	BBL: 130.6 BBM: 132.6 BBU: 134.5 SUPERT: 135.1 SUPERTd: -1.0	130.610	<b>23.791</b>
2024-09-06 12:59:59	Buy	BBL: 127.4 BBM: 130.2 BBU: 133.0 SUPERT: 128.2 SUPERTd: 1.0	133.550	-
2024-09-06 15:59:59	Sell	BBL: 126.8 BBM: 129.9 BBU: 133.0 SUPERT: 133.0 SUPERTd: -1.0	128.090	<b>-409.808</b>
2024-09-07 15:59:59	Buy	BBL: 126.4 BBM: 127.5 BBU: 128.6 SUPERT: 126.4 SUPERTd: 1.0	128.840	-
2024-09-08 14:59:59	Buy	BBL: 127.3 BBM: 129.1 BBU: 131.0	127.000	<b>-80.854</b>

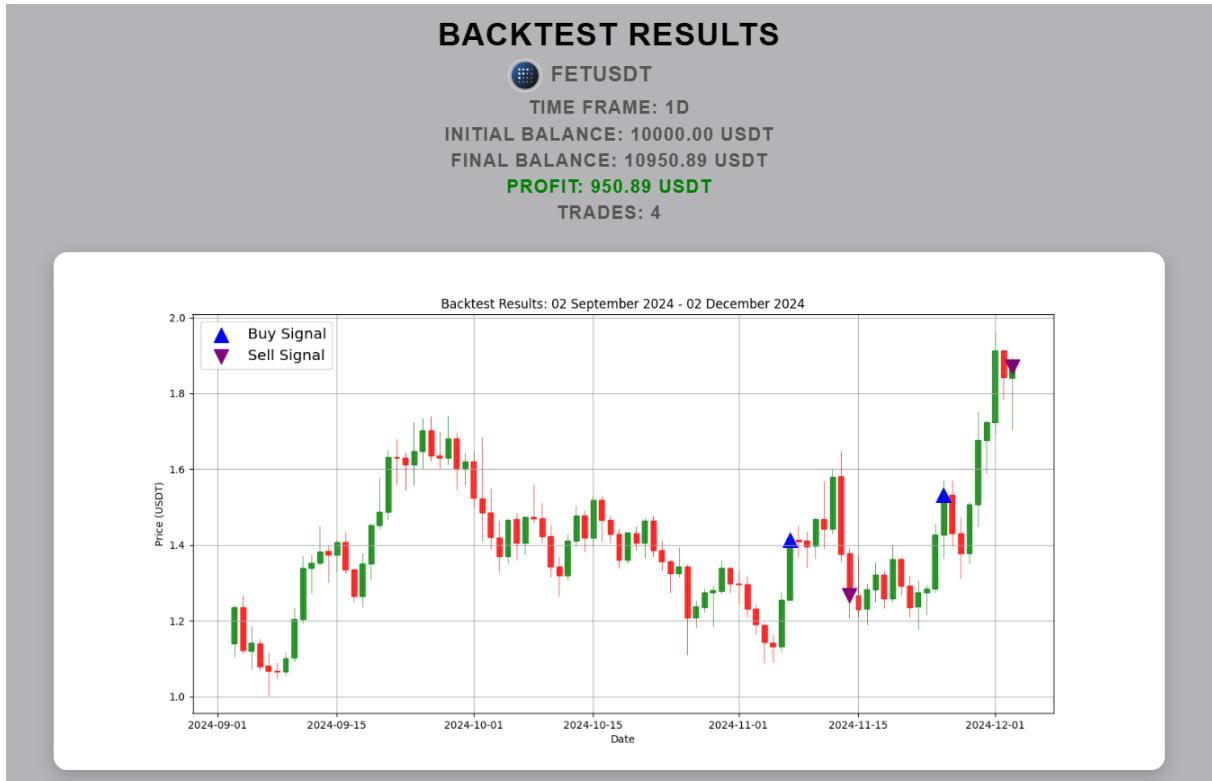
15 minutes:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-02 08:29:59	Buy	BBL: 127.2 BBM: 128.6 BBU: 130.0 SUPERT: 127.0 SUPERTd: 1.0	129.990	-
2024-09-02 14:14:59	Sell	BBL: 130.3 BBM: 131.5 BBU: 132.7 SUPERT: 132.3 SUPERTd: -1.0	130.210	<b>16.924</b>
2024-09-02 14:44:59	Buy	BBL: 130.2 BBM: 131.5 BBU: 132.8 SUPERT: 130.2 SUPERTd: 1.0	132.560	-
2024-09-03 04:14:59	Sell	BBL: 134.8 BBM: 135.9 BBU: 137.0 SUPERT: 137.0 SUPERTd: -1.0	135.190	<b>198.737</b>
2024-09-03 12:14:59	Buy	BBL: 133.4 BBM: 134.1 BBU: 134.8 SUPERT: 133.6 SUPERTd: 1.0	134.810	-
2024-09-03 13:00:59	Sell	BBL: 133.7 BBM: 134.5 BBU: 135.0	134.610	<b>-60.600</b>

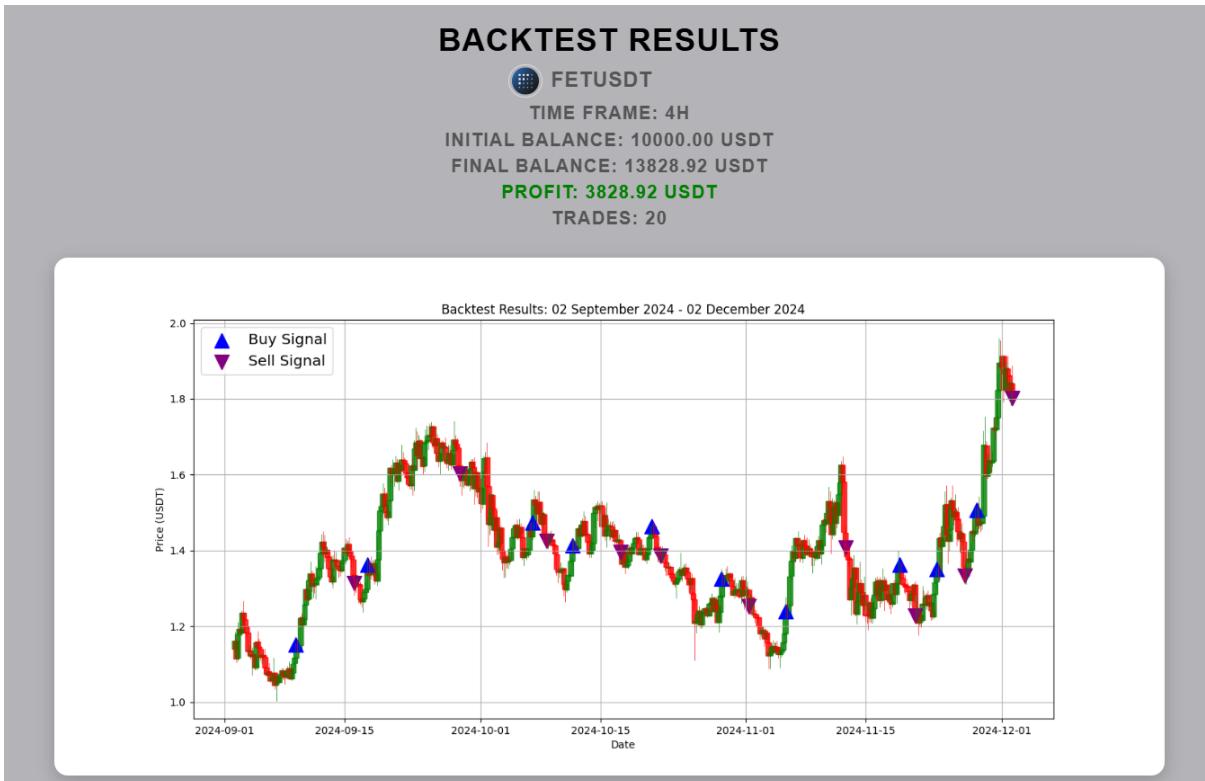
## FETCH AI

1 day:



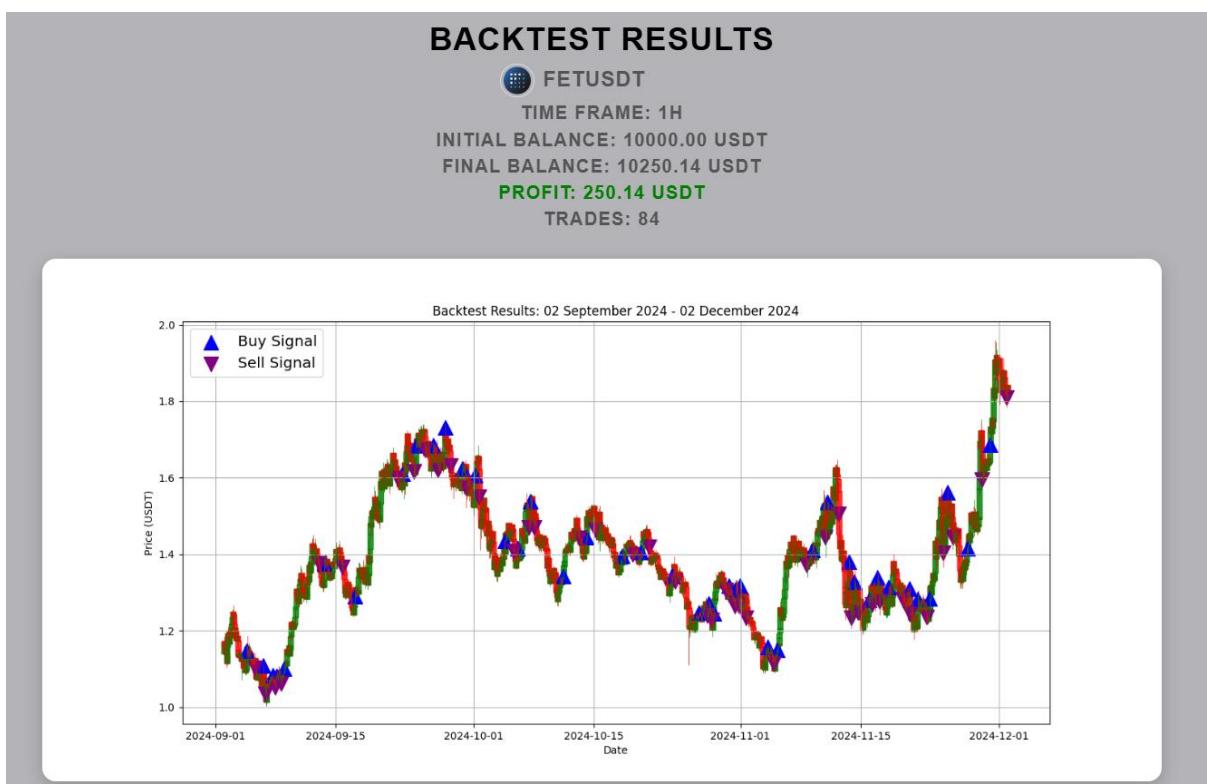
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-11-06 23:59:59	Buy	BBL: 1.1 BBM: 1.3 BBU: 1.4 SUPERT: 1.1 SUPERTd: 1.0	1.413	-
2024-11-13 23:59:59	Sell	BBL: 1.1 BBM: 1.4 BBU: 1.6 SUPERT: 1.6 SUPERTd: -1.0	1.267	<b>-1033.263</b>
2024-11-24 23:59:59	Buy	BBL: 1.2 BBM: 1.3 BBU: 1.5 SUPERT: 1.2 SUPERTd: 1.0	1.532	-
2024-12-02 23:59:59	Sell		1.871	<b>1984.154</b>

4 hours:



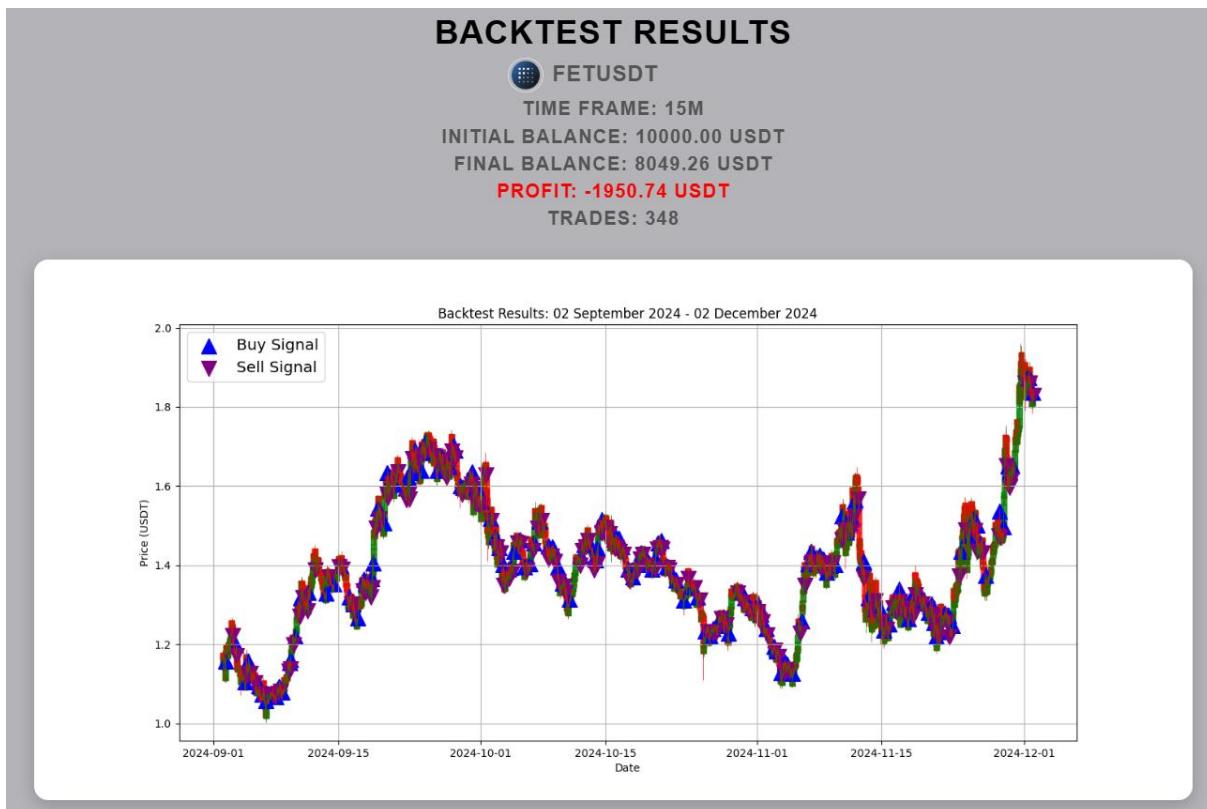
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-09 07:59:59	Buy	BBL: 1.0 BBM: 1.1 BBU: 1.1 SUPERT: 1.1 SUPERTd: 1.0	1.151	-
2024-09-16 03:59:59	Sell	BBL: 1.3 BBM: 1.4 BBU: 1.4 SUPERT: 1.4 SUPERTd: -1.0	1.313	<b>1407.472</b>
2024-09-17 15:59:59	Buy	BBL: 1.2 BBM: 1.3 BBU: 1.4 SUPERT: 1.2 SUPERTd: 1.0	1.363	-
2024-09-28 11:59:59	Sell	BBL: 1.6 BBM: 1.7 BBU: 1.7 SUPERT: 1.7 SUPERTd: -1.0	1.603	<b>2008.652</b>
2024-10-06 23:59:59	Buy	BBL: 1.4 BBM: 1.4 BBU: 1.5 SUPERT: 1.4 SUPERTd: 1.0	1.474	-
		BBL: 1.4 BBM: 1.5		

1 hours:



DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-04 14:59:59	Buy	BBL: 1.1 BBM: 1.1 BBU: 1.1 SUPERT: 1.1 SUPERTd: 1.0	1.147	-
2024-09-05 14:59:59	Sell	BBL: 1.1 BBM: 1.1 BBU: 1.1 SUPERT: 1.2 SUPERTd: -1.0	1.102	<b>-392.328</b>
2024-09-06 12:59:59	Buy	BBL: 1.0 BBM: 1.1 BBU: 1.1 SUPERT: 1.0 SUPERTd: 1.0	1.109	-
2024-09-06 18:59:59	Sell	BBL: 1.0 BBM: 1.1 BBU: 1.1 SUPERT: 1.1 SUPERTd: -1.0	1.034	<b>-649.752</b>
2024-09-07 15:59:59	Buy	BBL: 1.1 BBM: 1.1 BBU: 1.1 SUPERT: 1.1 SUPERTd: 1.0	1.083	-
2024-09-07 22:59:59	Call	BBL: 1.1 BBM: 1.1 BBU: 1.1	1.051	<b>-264.805</b>

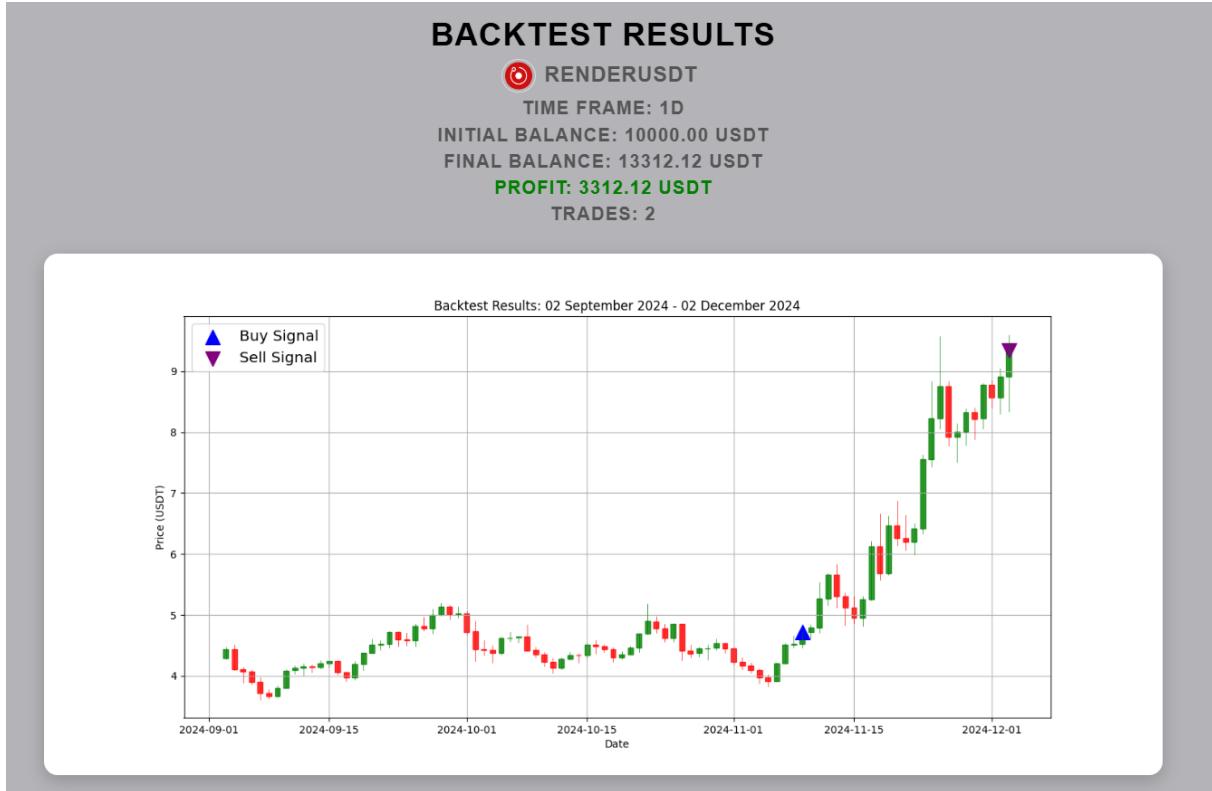
15 minutes:



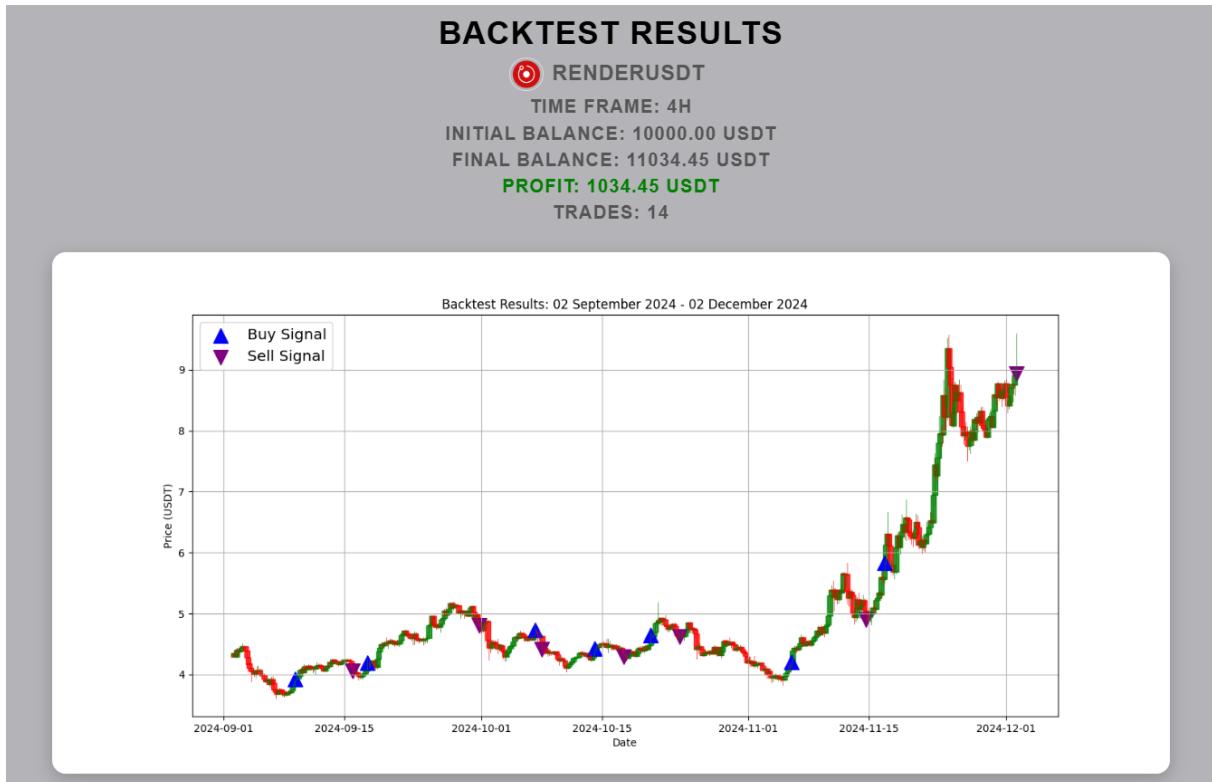
DATE	TYPE	INDICATORS	PRICE	PROFIT
2024-09-02 08:29:59	Buy	BBL: 1.1 BBM: 1.1 BBU: 1.2 SUPERT: 1.1 SUPERTd: 1.0	1.158	-
2024-09-03 02:59:59	Sell	BBL: 1.2 BBM: 1.2 BBU: 1.3 SUPERT: 1.3 SUPERTd: -1.0	1.222	<b>552.677</b>
2024-09-03 12:29:59	Buy	BBL: 1.2 BBM: 1.2 BBU: 1.2 SUPERT: 1.2 SUPERTd: 1.0	1.199	-
2024-09-03 13:44:59	Sell	BBL: 1.2 BBM: 1.2 BBU: 1.2 SUPERT: 1.2 SUPERTd: -1.0	1.171	<b>-246.434</b>
2024-09-04 12:44:59	Buy	BBL: 1.1 BBM: 1.1 BBU: 1.1 SUPERT: 1.1 SUPERTd: 1.0	1.105	-
		BBL: 1.1		

## RENDER

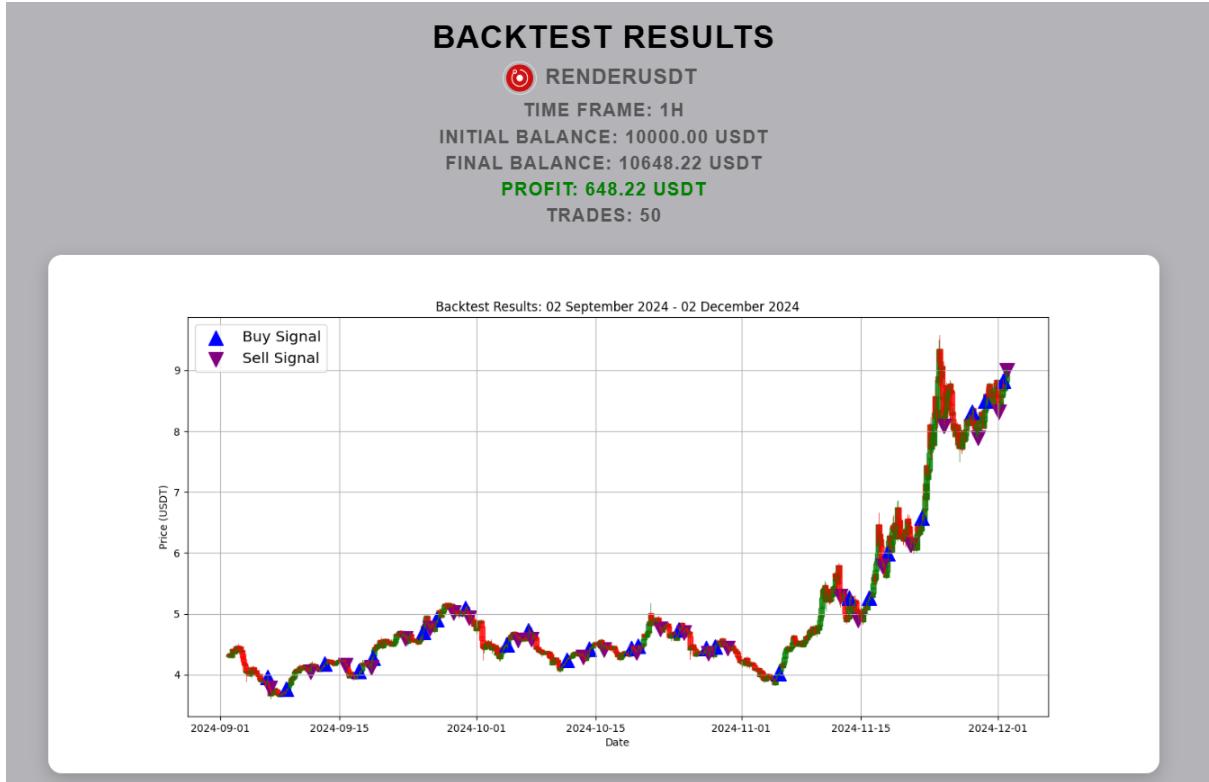
1 day:



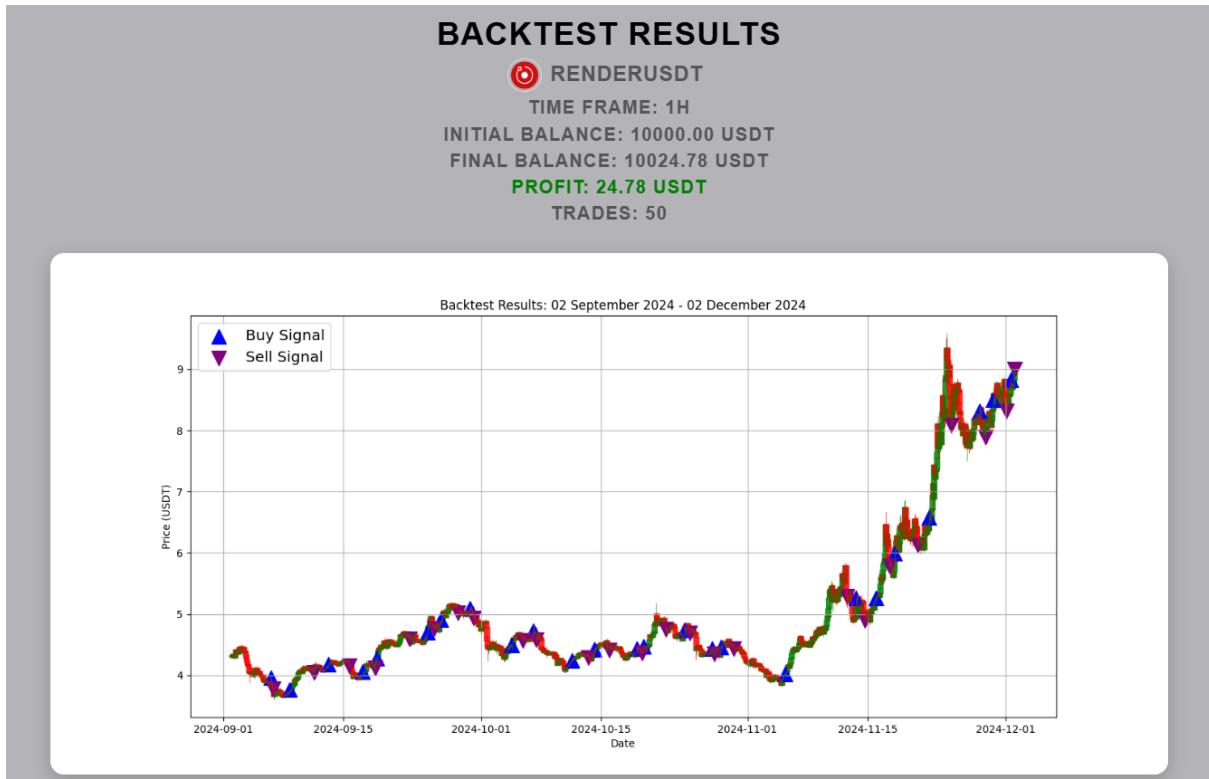
4 hours:



1 hours:



15 minutes:

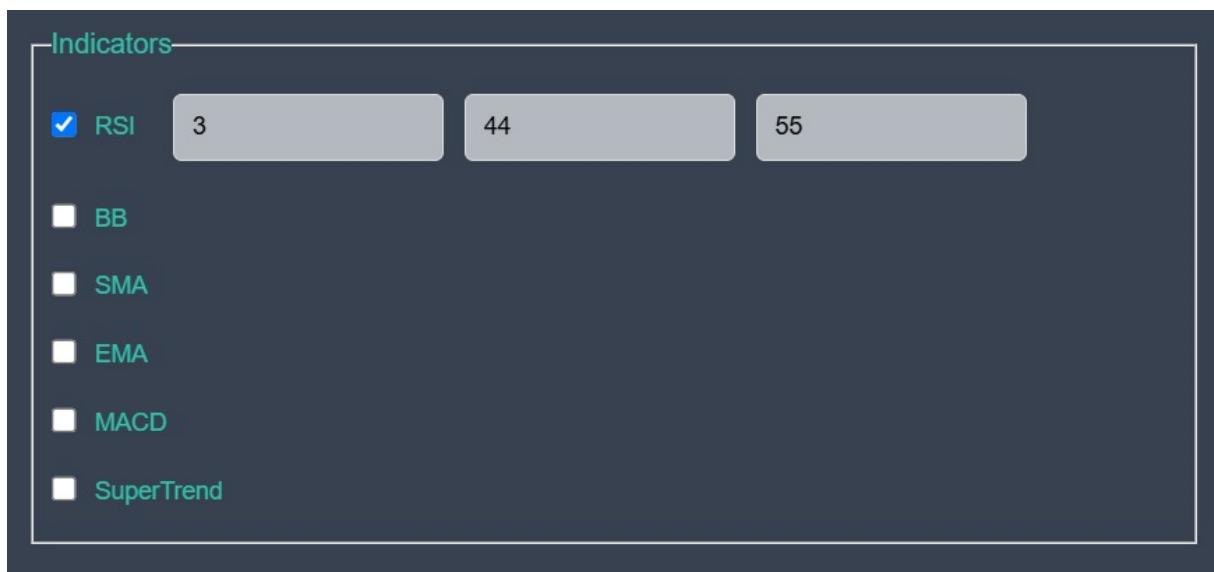


## LIVE TRADING RESULTS

\*The entire application works as multithread. That is, we can perform live-trading operations simultaneously with different parameters for multiple coins at the same time. We can also do backtesting while this is happening.

### Our Strategy and Indicator Parameters:

**RSI:** Period = 3, Buy Threshold = 44, Sell Threshold = 55



### AVAX

## LIVE TRADING RESULTS



TIME FRAME: 1M

INITIAL BALANCE: 10000.00 USDT

FINAL BALANCE: 9998.05 USDT

PROFIT: -1.95 USDT

TIME	TYPE	PRICE	PROFIT
2024-12-02 23:25:36	Buy	51.5	-
2024-12-02 23:27:37	Sell	51.53	<b>5.825</b>
2024-12-02 23:28:37	Buy	51.47	-
No new trade	-	-	-
2024-12-02 23:30:37	Sell	51.42	<b>-7.649</b>