

PPO Market Bot

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Optuna Optimization Overview

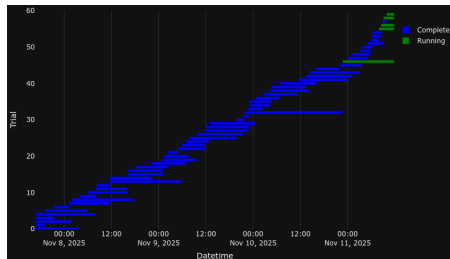


Figure 1: Duration of individual Optuna trials

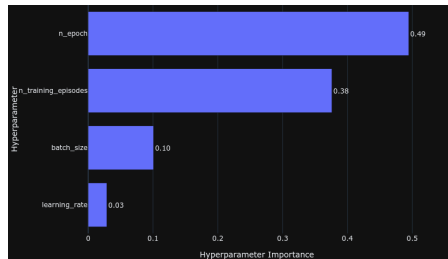


Figure 2: Relative importance of hyperparameters



Optuna Optimization - Trial Performance

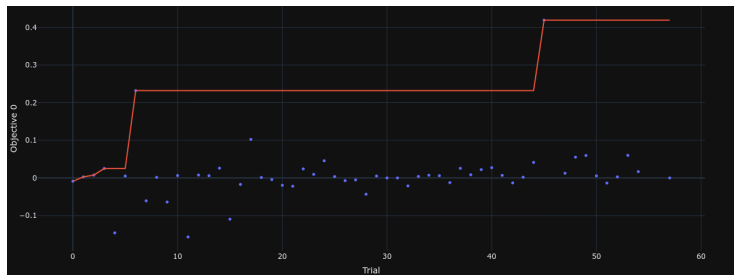


Figure 3: Overview of Optuna trial performance metrics



Optuna Optimization - Trial #01

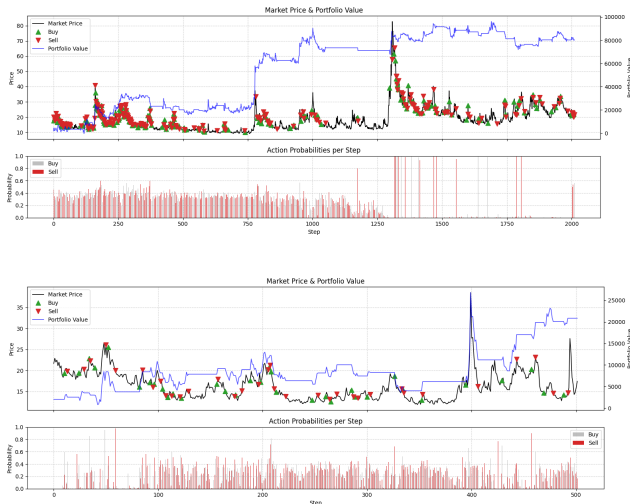


Figure 4: Trial 1 Training and Testing results



Optuna Optimization - Trial #01

Episode	Epochs	Batch size	Learning rate
136	23	128	0.36

Average profit (/year)	Average return	Annual return	Sharpe ratio
\$10,000	0.003	2.69	0.273

Figure 5: Overview of Trial 1 parameters and results



Optuna Optimization - Trial #51

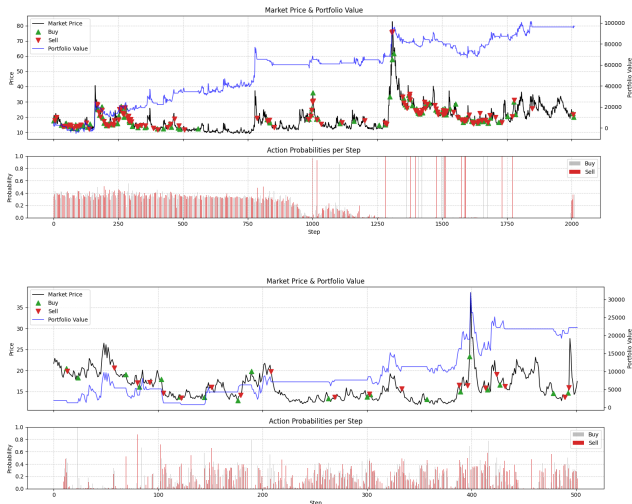


Figure 6: Trial 51 - Training and Testing Results



Optuna Optimization - Trial #51

Episode	Epochs	Batch Size	Learning Rate
195	25	64	0.52

Average Profit (/year)	Average Return	Annual Return	Sharpe Ratio
\$11,000	-0.014	0.62	-0.339

Figure 7: Overview of Trial 51 Parameters and Results



Optuna Optimization - Trial #14

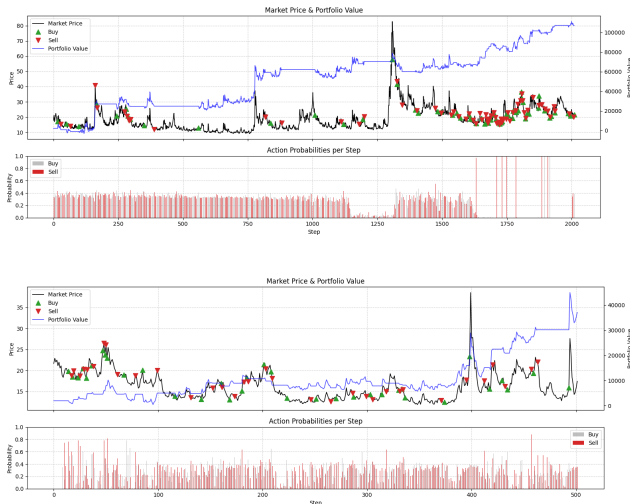


Figure 8: Trial 14 - Training and Testing Results



Optuna Optimization - Trial #14

Episode	Epochs	Batch Size	Learning Rate
194	72	128	1.00

Average Profit (/year)	Average Return	Annual Return	Sharpe Ratio
\$16,000	0.026	36.27	0.181

Figure 9: Overview of Trial 14 Parameters and Results



Optuna Optimization - Trial #33

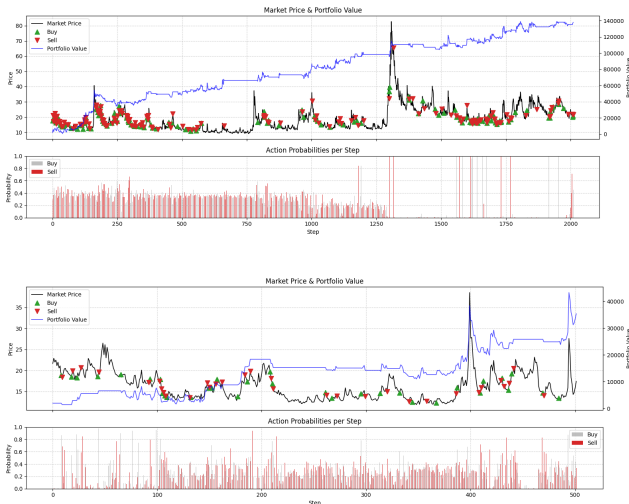


Figure 10: Trial 33 - Training and Testing Results



Episode	Epochs	Batch Size	Learning Rate
127	33	32	0.32

Average Profit (/year)	Average Return	Annual Return	Sharpe Ratio
\$17,000	0.004	0.69	0.880

Figure 11: Overview of Trial 33 Parameters and Results



Optuna Optimization - Trial #22

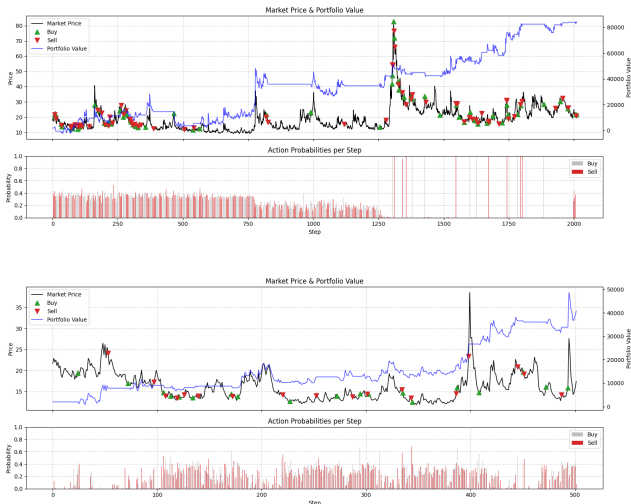


Figure 12: Trial 22 - Training and Testing Results



Episode	Epochs	Batch Size	Learning Rate
199	58	128	0.96

Average Profit (/year)	Average Return	Annual Return	Sharpe Ratio
\$20,000	0.024	7.68	0.792

Figure 13: Overview of Trial 22 Parameters and Results



Optuna Results Overview - Performance Metrics

Trial	Reward	Average Return	Annual Return	Sharpe Ratio
<i>01</i>	158M	0.003	2.69	0.273
<i>14</i>	106M	0.026	36.27	0.181
<i>22</i>	102M	0.024	7.68	0.792
<i>33</i>	65M	0.004	0.69	0.880
<i>51</i>	107M	-0.014	0.62	-0.339

Table 1: Overview of each trial's performance



Optuna Results Overview - Model Parameters

Trial	Episode	Epochs	Batch Size	Learning Rate	Average Profit (\$/year)
<i>01</i>	136	23	128	0.36	\$10k
<i>14</i>	194	72	128	1.00	\$16k
<i>22</i>	199	58	128	0.96	\$20k
<i>33</i>	127	33	32	0.32	\$17k
<i>51</i>	195	25	64	0.52	\$11k

Table 2: Overview of trial hyperparameters



- **Optimization Objective** : Redefine Optuna's objective to use the **Sharpe ratio**
- **Tick Interval Adjustment** : Modify the tick interval to a **5-minute timeframe**
- **Additional Input Features** : Introduce new input variables such as the **VVIX** and the **S&P 500 index** or maybe other market



Thank You

