

# PPO Market Bot

Mathys Vinatier

Seoul National University

November 11, 2025



# Optuna Optimization Overview

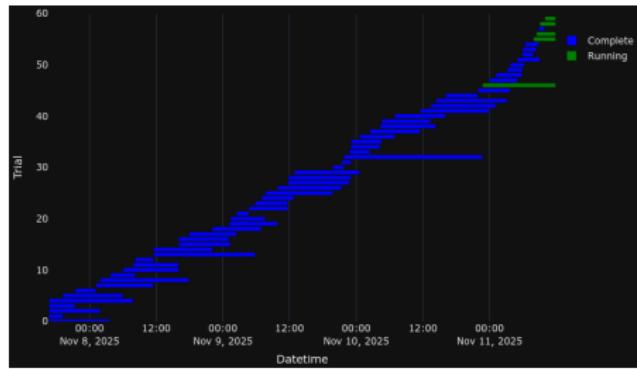


Figure 1: Duration of individual Optuna trials

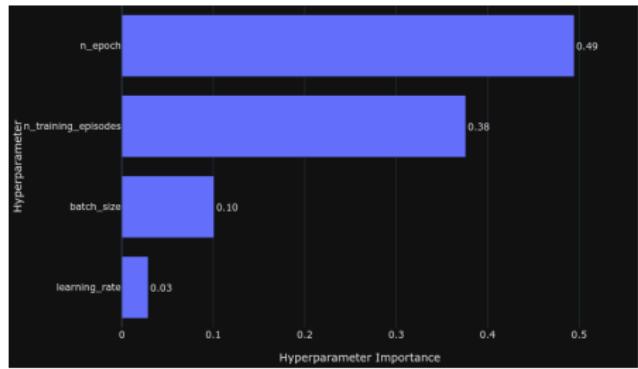


Figure 2: Relative importance of hyperparameters



# Optuna Optimization - Trial Performance

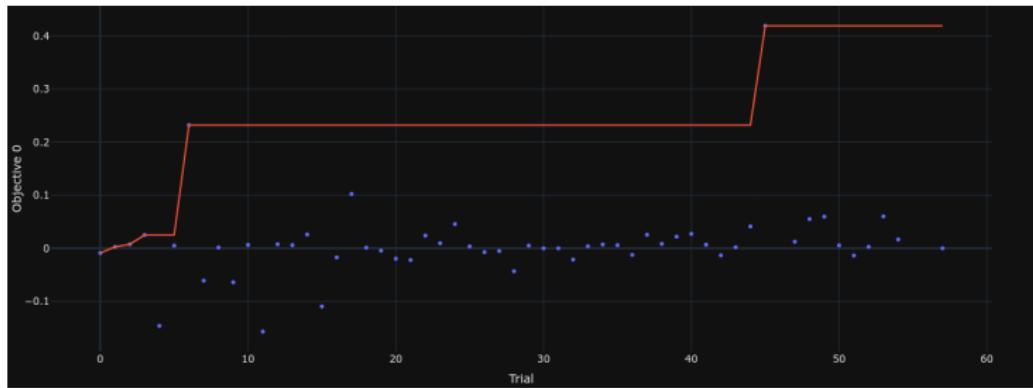


Figure 3: Overview of Optuna trial performance metrics



# Optuna Optimization - Trial #01

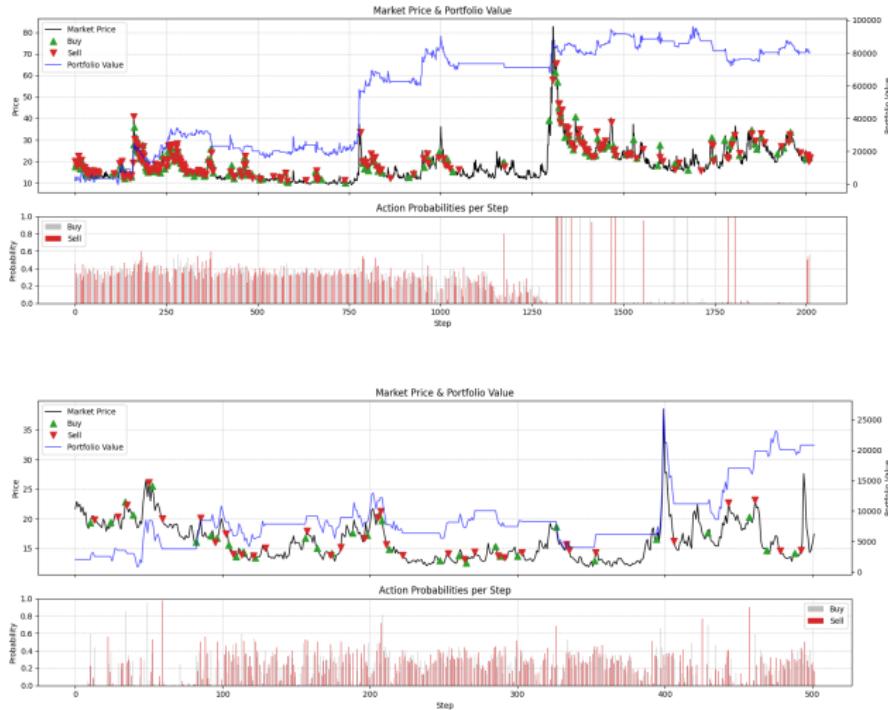


Figure 4: Trial 1 Training and Testing results



# 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

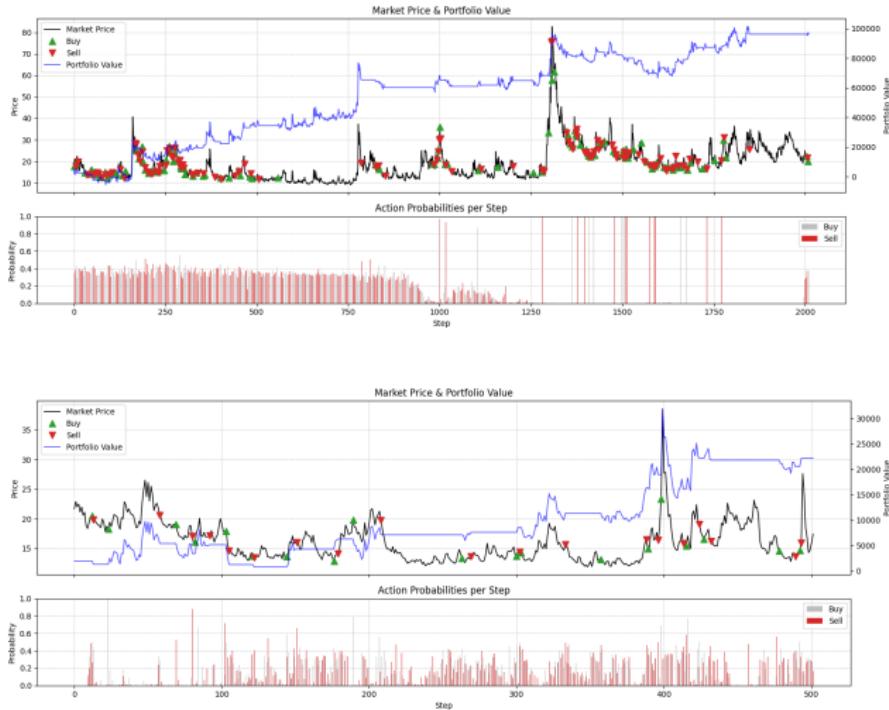


Figure 6: Trial 51 - Training and Testing Results



# 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

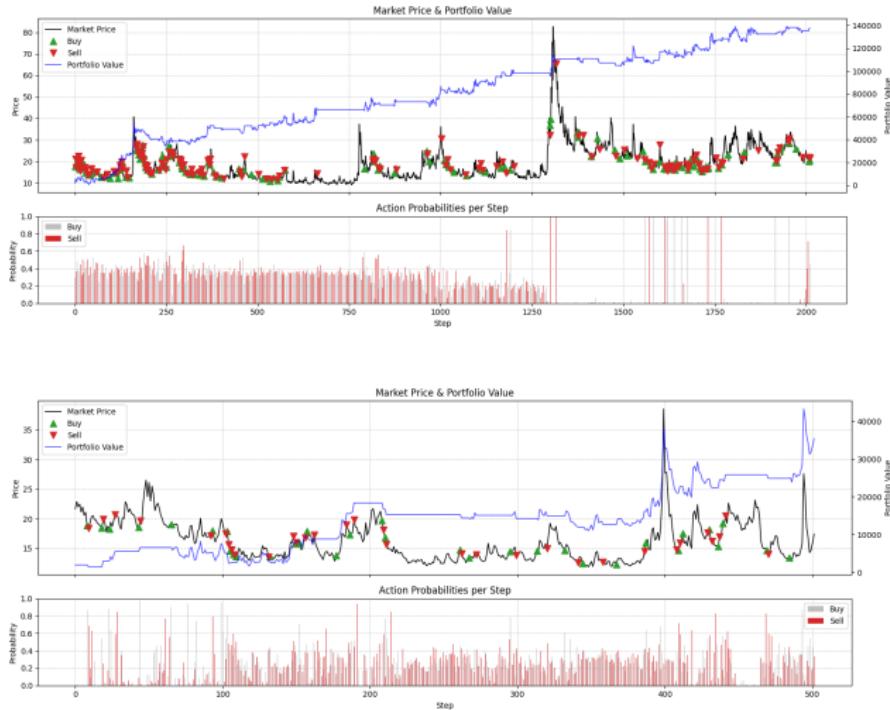


Figure 10: Trial 33 - Training and Testing Results



# Optuna Optimization - Trial #33

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



# Optuna Optimization - Trial #22

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
01	158M	0.003	2.69	0.273
14	106M	0.026	36.27	0.181
22	102M	0.024	7.68	0.792
33	65M	0.004	0.69	0.880
51	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)
01	136	23	128	0.36	\$10k
14	194	72	128	1.00	\$16k
22	199	58	128	0.96	\$20k
33	127	33	32	0.32	\$17k
51	195	25	64	0.52	\$11k

Table 2: Overview of trial hyperparameters



# Fine-Tuning the Model - Next Steps

- **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 **VIX** and the **S&P 500 index** or maybe other market



# Thank You

