DEEP PORTFOLIO MANAGEMENT

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RECAP PREVIOUS DISCUSSION

- Data Sourcing
- Run original implementation and verify results.
- Implement EIIE topology with CNN, RNN, and LSTM, as well as PVM, OSBL, and a fully exploiting and explicit reward function.
- Incorporating better transaction cost models.
- Replicate the paper as is before looking to extend the algorithm to other asset classes beyond cryptocurrency.

PROGRESS

- Resolved Data Issue: Publicly available data from Poloniex.
- Ran back test for CNN for different time periods.
- Studied back test results for tuned and raw hyperparameters.

PRELIMINARY RESULTS: UNTUNED HYPERPARAMETERS

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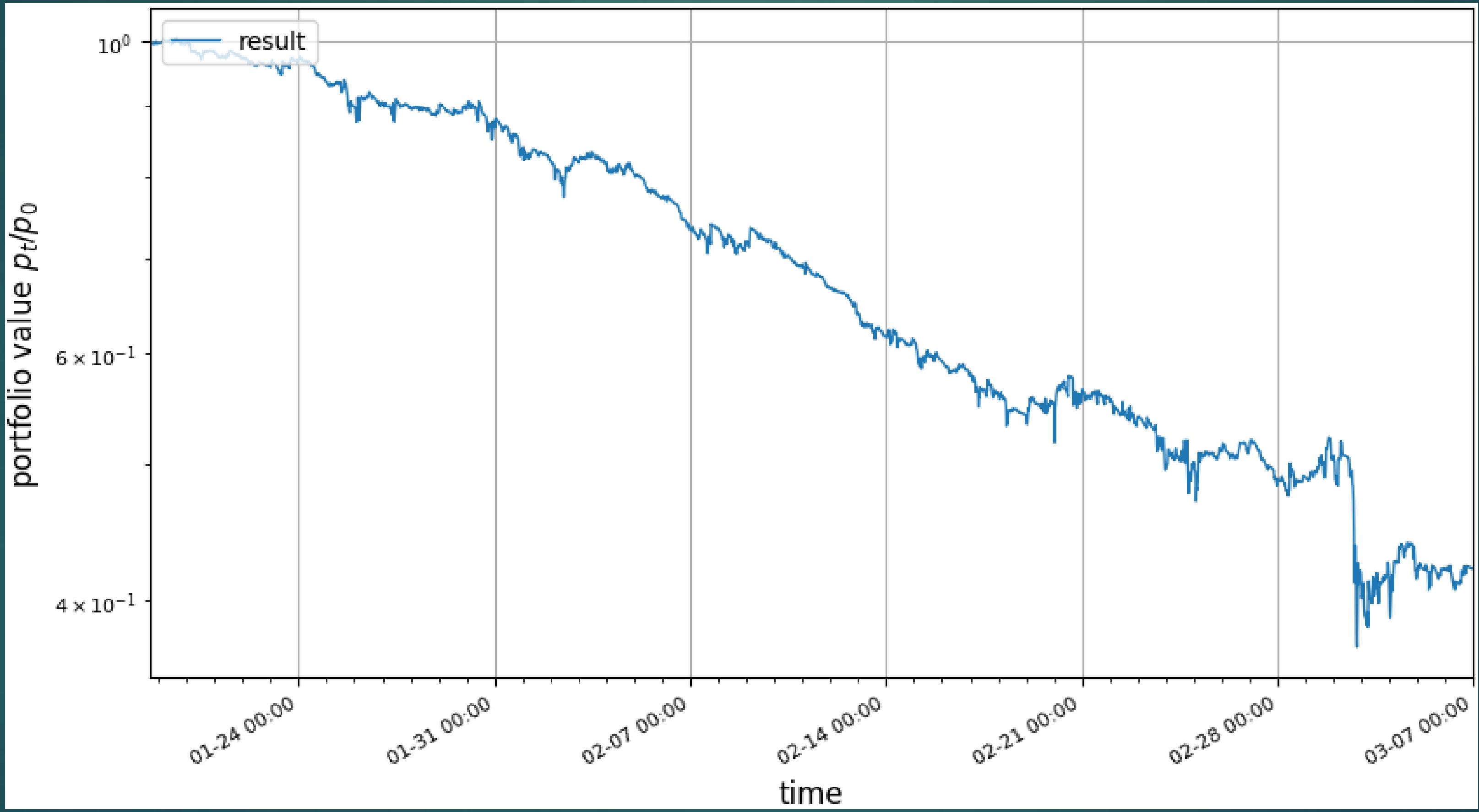
PRELIMINARY RESULTS: UNTUNED HYPERPARAMETERS



PRELIMINARY RESULTS: TUNED HYPERPARAMETERS

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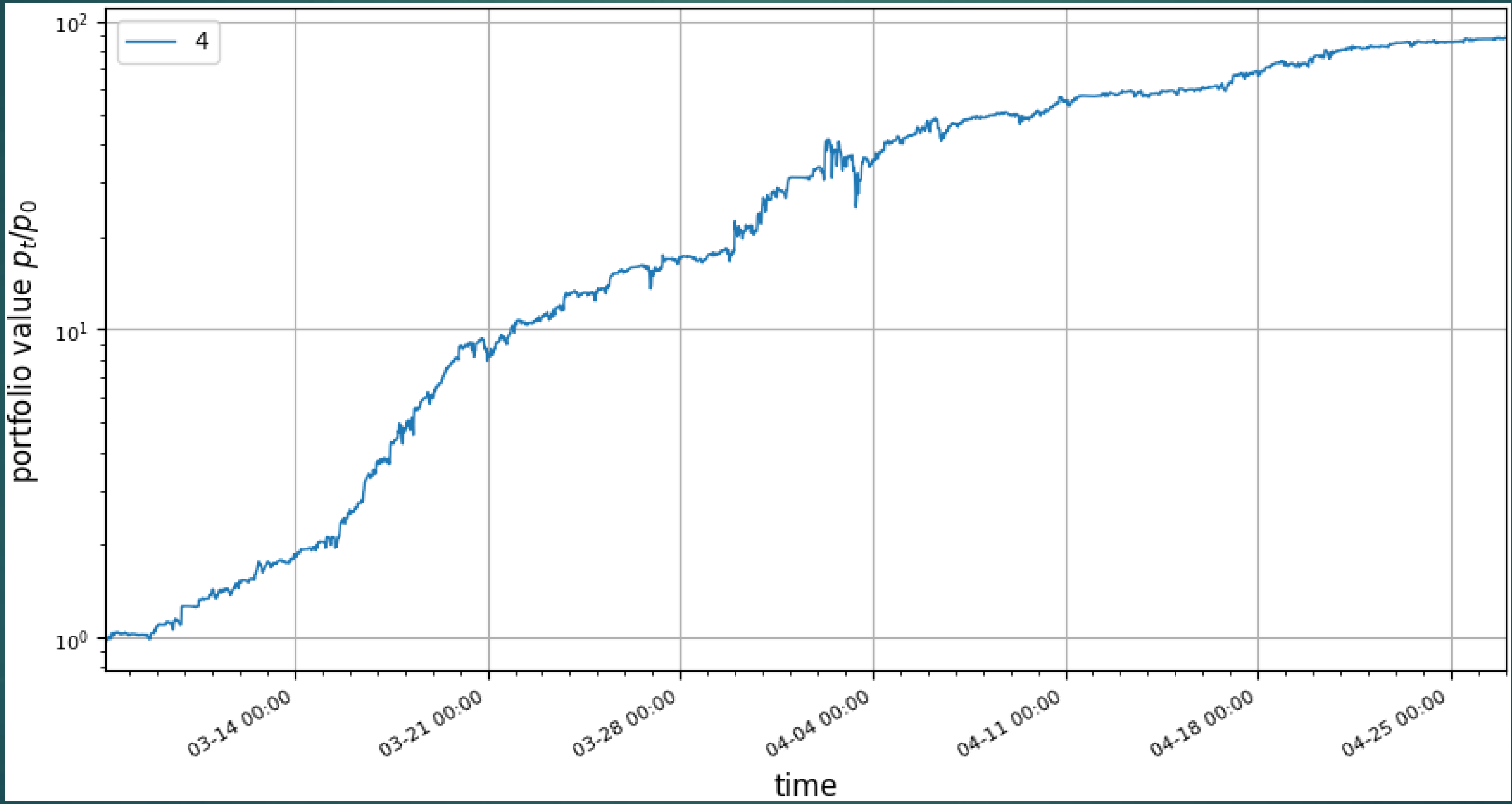
Appendix B. Hyper-Parameters

hyper-parameters	value	description
batch size	50	Size of mini-batch during training. (Section 3.1)
window size	50	Number of the columns (number of the trading periods) in each input price matrix. (Section 3.2)
number of assets	12	Total number of preselected assets (including the cash, Bitcoin). (Section 3.1)
trading period (second)	1800	Time interval between two portfolio redistributions. (Section 2.1)
total steps	2×10^6	Total number of steps for pre-training in the training set.
regularization coefficient	10^{-8}	The L2 regularization coefficient applied to network training.
learning rate	3×10^{-5}	Parameter α (i.e. the step size) of the Adam optimization (Kingma and Ba, 2014).
volume observation (day)	30	The length of time during which trading volumes are used to preselect the portfolio assets. (Section 3.1)
commission rate	0.25%	Rate of commission fee applied to each transaction. (Section 2.3)
rolling steps	30	Number of online training steps for each period during cross-validation and back-tests.
sample bias	5×10^{-5}	Parameter of geometric distribution when selecting online training sample batches. (The β in Equation 26 of Section 5.3)

Table B.1: Hyper-parameters of the reinforcement-learning framework. They are chosen based on the networks' scores in the cross-validation set described in Table 1 of Section 6.1. Although these are the values used in the experiments of the paper, they are all adjustable in the framework.

PRELIMINARY RESULTS: TUNED HYPERPARAMETERS



PRELIMINARY RESULTS

Algo	average	max drawdown	negative day	negative periods	negative week	portfolio value	positive periods	postive day	postive week	sharpe ratio	Start Date	End Date
Tuned	1.002083846	0.398292303	254	1206	13	88.41524298	1186	2138	2379	0.101456213	5-May-15	27-Apr-17
Untuned	0.999645482	0.631358362	1678	1406	2199	0.42176774	812	543	22	-0.042953953	5-May-15	27-Apr-17