

# Reinforcement Learning in Portfolio Management

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# Introduction

Prices:

$$S^k = (S_1^k, \dots, S_L^k)$$

Portfolio:

$$P^k = (P_0^k, P_1^k, \dots, P_L^k)$$

States:

$$State^k = (S^{k-N}, S^{k-N+1}, \dots, S^{k-1}, S^k, P^{k-1})$$

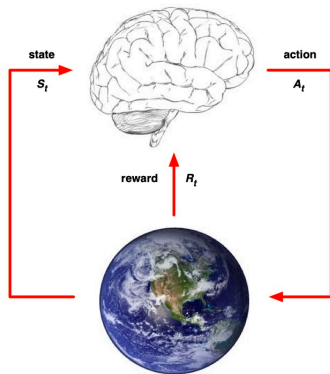
Rewards

$$R^k = R_{P^k_* S^{k+1} - P^k_* S^k} - \textit{switch\_cost}$$

# Improvement

1. State: add major indexes, add cash/riskless asset into portfolio
2. Rewards: Improve Reward function from return to return/risk
3. Frequency: Improve the price frequency means improving the sensitivity of agent

# works



- Interpretation:
  - Interpretation:
- yes sir

# Build Environment: Backtest System

## Logic of backtest system

```
initialize()
```

```
while t in time.index:
```

```
    pre_trading()
```

```
    strategy_signal()
```

```
    strategy_order()
```

```
    after_trading()
```

Github:

*[https : //github.com/marsMa/rl\\_in\\_portfolio\\_management](https://github.com/marsMa/rl_in_portfolio_management)*