NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Computer Science and Engineering
College of Engineering

Reinforcement Trading Framework in OpenAI Gym with Crisis Detection

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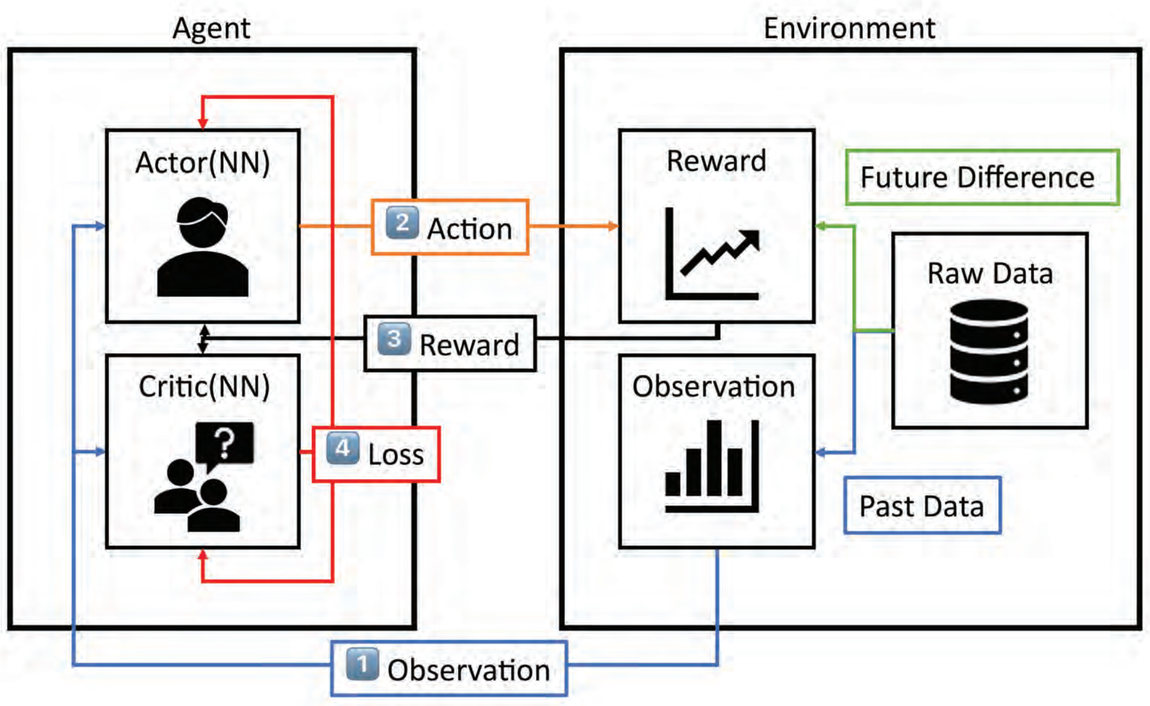
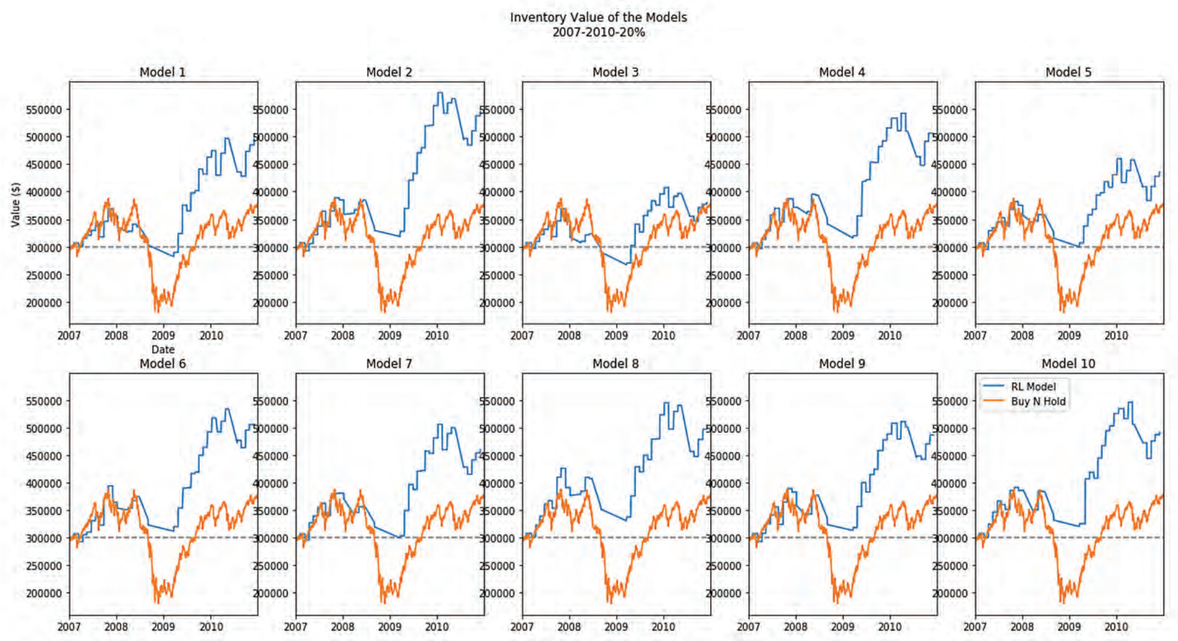


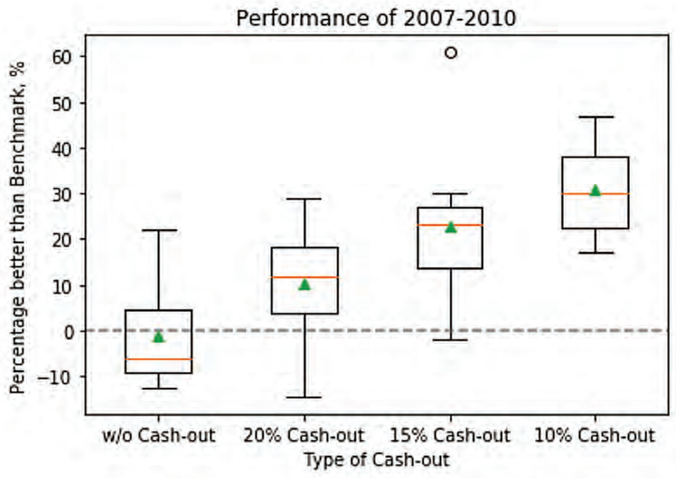
Introduction

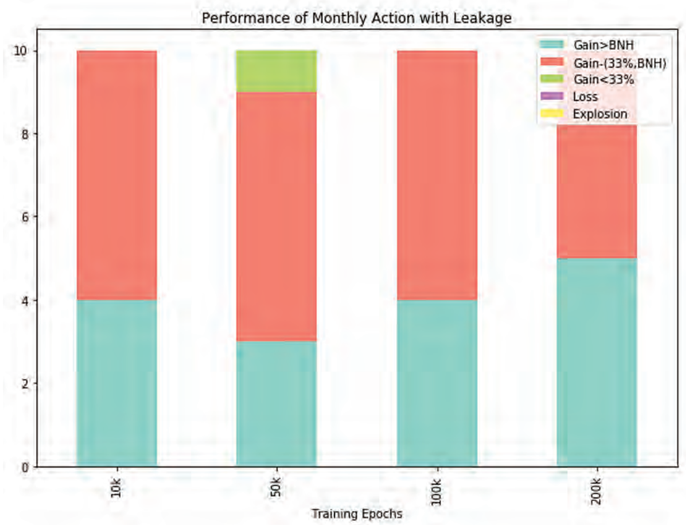
This project focused on building a microservice to automate the scanning of repositories across multiple SCA tools on the market. A list of repositories was scanned using the microservice and the results were compared to determine the similarities among the results of the Software Composition Analysis tools.

Implementation

The framework uses daily tick data from Brazil, Taiwan and NASDAQ market representing the Geographical Diversification of the portfolio.The Reinforcement Learning Agent uses the Actor-Critic Model and is optimized by the Proximal Policy Optimization Algorithm. The benchmark is a Buy-and-Hold Portfolio holding all assets evenly.







Result

The framework uses EMA, MACD, RSI, Currency Leakage and Trend Reverse indicators to describe the market situation instead of the raw price. The batch of vanilla models with 20k epochs training performs as equally good as the benchmark and obtains 100% gain. The adjusted models with crisis detection receives a best batch performance with averagely 130.7%, and a best model with over 160.8%, of the benchmark gain during the testing in the 2008 financial crisis.