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Evotrader: Bitcoin Trading Using Evolutionary Algorithms on Technical Analysis and Social Sentiment Data

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Abstract : Due to the rise in popularity of Bitcoin and other crypto assets as a store of wealth and speculative investment, there is an ever-growing demand for automated trading tools, such as bots, in order to gain an advantage over the market. Traditionally, trading in the stock market was done by professionals with years of training who understood patterns and exploited market opportunities in order to gain a profit. However, nowadays a larger portion of market participants are at minimum aided by market-data processing bots, which can generally generate more stable signals than the average human trader. The rise in trading bot usage can be accredited to the inherent advantages that bots have over humans in terms of processing large amounts of data, lack of emotions of fear or greed, and predicting market prices using past data and artificial intelligence, hence a growing number of approaches have been brought forward to tackle this task. However, the general limitation of these approaches can still be broken down to the fact that limited historical data doesn't always determine the future, and that a lot of market participants are still human emotion-driven traders. Moreover, developing markets such as those of the cryptocurrency space have even less historical data to interpret than most other well-established markets. Due to this, some human traders have gone back to the tried-and-tested traditional technical analysis tools for exploiting market patterns and simplifying the broader spectrum of data that is involved in making market predictions. This paper proposes a method which uses neuro evolution techniques on both sentimental data and, the more traditionally human-consumed, technical analysis data in order to gain a more accurate forecast of future market behavior and account for the way both automated bots and human traders affect the market prices of Bitcoin and other cryptocurrencies. This study's approach uses evolutionary algorithms to automatically develop increasingly improved populations of bots which, by using the latest inflows of market analysis and sentimental data, evolve to efficiently predict future market price movements. The effectiveness of the approach is validated by testing the system in a simulated historical trading scenario, a real Bitcoin market live trading scenario, and testing its robustness in other cryptocurrency and stock market scenarios. Experimental results during a 30-day period show that this method outperformed the buy and hold strategy by over 260% in terms of net profits, even when taking into consideration standard trading fees.

Keywords : neuro-evolution, Bitcoin, trading bots, artificial neural networks, technical analysis, evolutionary algorithms
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