RBC launches its first AI stock trading program

MARK RENDELL CAPITAL MARKETS REPORTER

Royal Bank of Canada announced the launch of its first artificially intelligent computer program for trading stocks on Wednesday, bringing the bank's expanding focus on AI to a key part of its capital markets operation.

The technology, called Aiden, was developed by RBC Capital Markets and Borealis AI, an artificial intelligence-focused research centre founded by RBC in 2016. Aiden is designed to improve the performance of stock-trading computer programs, known as algorithms, by helping the programs learn from their own successes and mistakes trading stocks in real time.

RBC has invested significant resources into AI and machine learning in recent years, largely through Borealis, which runs four labs across the country and pursues both theoretical and applied research. Banks are inherently data-focused businesses, and RBC is betting that intelligent computer programs that are able to learn at the same time they process data could improve everything from fraud detection to portfolio management.

Other Canadian banks are following suit. Toronto-Dominion Bank, for instance, paid more than US$100-million for AI company Layer 6 in 2018.

For professional traders, and the trading algorithms they use, the goal is always to execute trades on behalf of a client at the best possible price. Traditional trading algorithms try to accomplish this based on precoded rules, which tell the computer to buy or sell based on data it receives from the market.

RBC's new AI trading program is designed to improve order execution by allowing the algorithm to adjust its own set of rules in response to what is happening in the market. To do this, it uses an AI technology called deep reinforcement learning.

"It will buy, it will sell, it will find the right time to do that," said Foteini Agrafioti, RBC's chief science officer and head of Borealis AI. "If it makes a good decision ... we reward it. We tell it, 'you did a good job, do more of that.' And if it makes a bad decision, we penalize it.

"All this science has been inspired by behavioural psychology from humans. We learn because our parents tell us, do more of that, don't do that again," she said.

The initial Aiden algorithm is focused on a volume-weighted average price (VWAP) trading strategy, which tries to execute trades near the daily moving VWAP for a given stock. The goal of the Aiden algorithm is to reduce "slippage" from the VWAP, which happens when an order is executed at a different price from what is anticipated.

RBC Capital Markets has been testing the Aiden VWAP algorithm for the past year with select clients, and is now ready to offer it to a broader set of institutional money managers, such as pension plans and hedge funds, that trade through RBC.

Shary Mudassir, co-head of global equities execution at RBC Capital Markets, said that the extreme market volatility, especially during the early months of the pandemic, has been a great proving ground for the first Aiden algorithm.

"What we noticed is the technology and the platform was able to recognize the suddenness of changes in the market, and adapt to them and preserve performance on the trading," Mr. Mudassir said.

"A traditional algo would only be as good as the historical data that it's seen. It wouldn't be able to adapt – unless somebody went in and coded into it what it needed to do differently – in a very dramatically different market."

Mr. Mudassir said that the VWAP algorithm, announced Wednesday, is just the start, and his team expects to introduce other Aiden trading algorithms in the coming years.

Borealis AI is also working on other uses of artificial intelligence for RBC. These include software such as NOMI, which advises personal banking clients on ways to save money based on their own spending habits, and natural language processing tools meant to quickly identify news that could move markets.

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