RBC Capital Markets built an in-house AI platform to give its clients more control over their trading and the next big test is the 2020 presidential election

Joe Williams

• The finance industry has long-relied on artificial intelligence in operations, but RBC Capital Markets is now trying to take it a step further.

• Last month, the investment bank launched an AI-backed platform called Aiden that aims to reduce "slippage" for clients – an industry term that refers to the difference between the expected price of a trade and the actual price once it is executed.

• It's all part of Royal Bank of Canada CEO David McKay's heavy focus on AI.

• Aiden relies on deep reinforcement learning, a branch of AI that compines reinforcement learning with deep learning.

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Royal Bank of Canada CEO David McKay has made AI a focus for the financial institution.

For over a decade, the finance industry has relied on algorithms to conduct most of the stock market trades that occur on a daily basis. Now, RBC Capital Markets is looking to take it a step-further by deploying even more advanced technology that can largely function independently of any human interaction to help clients save money.

Last month, the investment bank that sits under the Royal Bank of Canada launched Aiden: An AI-backed trading platform that helps minimize what industry insiders call "slippage," or the difference between the expected price of a trade and the actual price once it is executed. By providing more concise information around the total cost of a trade, RBC gives its clients more control over the amount of money they are spending.

Using an evaluation method that is commonly tapped to eliminate bias in clinical trials, Aiden was shown to "significantly reduce slippage," according to RBC Capital Markets

head of global equities execution Shary Mudassir.

The introduction of the platform is part of RBC CEO David McKay's heavy focus on AI, a technology the former computer programmer has called "transformational" for the finance industry. Among other initiatives, the company runs its own AI research center, a setup that is more akin to the Silicon Valley tech giants than Wall Street firms.

Aiden has been available to RBC's Canadian clients for over a year and the company was beta-testing the tool with a dozen US clients since the start of 2020. The pandemic tested the resiliency of the model, and it managed to remain accurate despite the volatility in the equity markets as the COVID-19 crisis spread globally.

Aiden "has shown an ability to navigate the challenges of a fluid and dynamic market in real time, without the need for continuous recoding like traditional algorithms
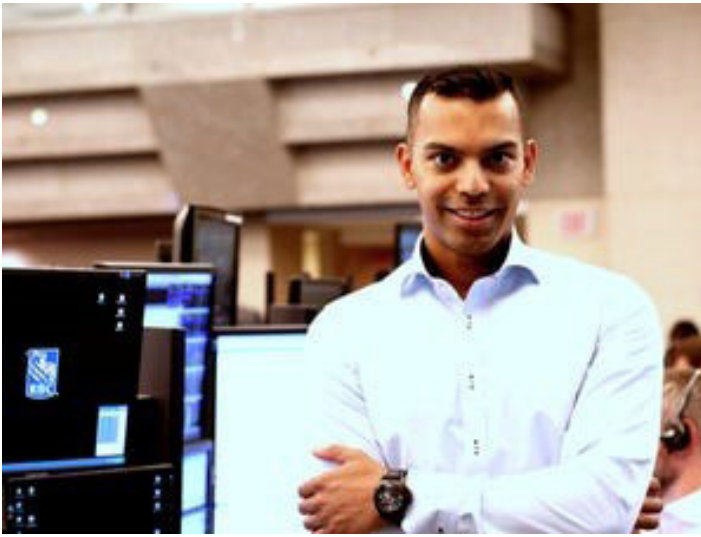
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Shary Mudassir is the head of global equities execution at RBC Capital Markets.

"You could see light bulbs going off around the room," said Agrafioti.

Deep reinforcement learning quickly emerged as the "technology of choice" and the team went to work building the platform, per Mudassir. The subsection of AI relies on both reinforcement learning – or training done via trial and error tests – and deep learning, a technique that effectively aims to empower a machine to think like a human brain.

But as the cohorts began to actually build Aiden and create the models that would support it, they knew that explainability – the concept of being able to outline how a model came to a specific conclusion – would also be key given the need to earn client's trust in the system.

"We had a dual problem," she added. "The biggest challenge was narrowing it into the use case. And that's why the partnership of scientists, and traders, and technologists works brilliantly well."

And after the success of Aiden, the teams are talking to clients to figure out what to tackle next – including looking at whether deep reinforcement learning can be deployed

would need," Mudassir said. "That's because of its ability to learn and adapt through hundreds of data inputs that it's analyzing in real time, tens of millions of decisions that it makes over the course of that order, and then taking actions and learning."

Now, its next test is Tuesday's presidential election, when the markets could once again go haywire.

'You could see light bulbs going off around the room'

The journey to launch Aiden began in 2016 with the creation of Borealis AI – an AI research center that operates as separate from RBC Capital Markets but underneath the umbrella of the Royal Bank of Canada – to figure out the role technology could play in improving results for clients.

The structure enables the financial institution to build its own intellectual property portfolio to gain a "more sustainable competitive advantage in the long run," according to Borealis AI head Foteini Agrafioti.

One of the biggest challenges for RBC Capital Markets and Borealis AI was to figure how to infuse the demands of customers into the development of new tech offerings.

At the beginning of the discussions, Borealis AI was a much smaller group than the 100-plus team of scientists and PhDs it currently has. During initial conversations about what a product could look like, experts on RBC's capital markets team helped educate the very academic-focused Borealis group on how trading worked.

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Foteini Agrafioti is the head of Borealis AI.

in other operations like digital banking, as well as the potential with other tech like natural language processing.

"It sets the stage for now us working with them to figure out what would be the next right solution," said Mudassir. "The ability to deliver AI as a very complimentary technology that helps with the day-to-day efforts of our clients ... is something that we're finding is gaining a lot of traction."