



Upcoming Swedish fund applies AI to FX markets

Stockholm (HedgeNordic) - A five-person team out of Malmö looks to create the next generation hedge fund by applying machine learning algorithms to the FX market. Talking to the company's CTO, Jimmy Carlsson, HedgeNordic took a deep dive into the world of CenturyOne - the soon to be launched AI fund powered by Century Analytics.

"We have just received approval from the Swedish Financial Supervisory Authority allowing us to officially launch the fund. We are currently in discussions with various institutional investors regarding seed money and our goal is to have the fund up and running in the autumn of this year", Jimmy Carlsson, one of three founding partners of Century Analytics, explains.

Carlsson, a serial entrepreneur having 15 years of experience developing AI-applications for the military defence industry as well as machine learning systems for FX trading, met with the other two founding partners Hugo Langéen and Niklas Højman while they were working on setting up what is today Century Analytics.

Højman worked for Goldman Sachs in London but decided to head back home to work on a system for FX trading together with Langéen. Langéen and Højman had

met while Højman was finishing his university degrees in law and economics. They had a mutual passion for trading the FX market and started a collaboration to develop systematic trading strategies around it.

The career path of Langéen deserves a word on its own. Starting out as a professional bassoon player in the Malmö opera orchestra, he began playing online poker to make ends meet. By applying systematic strategies using big data and behavioural analysis, he managed to become one of the world's best high-stake poker players. Having played professionally for almost a decade, he went on to manage his now sizeable portfolio in the FX market. "We come from different backgrounds but with some obvious linkages. Højman and Langéen with a deep knowledge of currency markets and myself adding the technological backbone of machine learning systems to exploit opportunities that arise in FX markets, mainly as a result of psychological factors," Carlsson says.

Since the firm was founded, additional persons have been added to the team. One addition is the firm's CEO Hans Nelfelt, with extensive background from the finance industry as a former COO of the Swedish investment Bank Carnegie and CEO of Carnegie's Swedish Fund Management Company. "The additions are important pieces in becoming a market leader within the field", Carlsson adds.

Machine Learning Applied to FX Markets

At the core of the trading system underlying the CenturyOne fund is what the company describes as an orchestra of "agents" - many of which use machine learning to become experts on specific tasks. The agents in turn report to a supreme agent called the "conductor" who makes optimized decisions based on the information received by the agents. "The conductor is a so-called reinforcement learning system, which means that it operates within a defined set of choices. For every correct decision it takes, maximizing the expected return while controlling for risk for each trade, it gets rewarded. As a result, the system learns from its actions as it always strives to increase its reward. Over time it becomes a self-improving system," Carlsson explains. The so-called agents are looking at everything from historical extreme points to changes in volatility and price momentum. In essence, what these agents aim to do is describing the market dynamics, which in turn helps the conductor to make informed trading decisions based on psychological factors that trigger price movements.

The conductor never looks at price data but relies entirely on what is reported by the agents, resulting in a system with two levels of information. “We have found this to result in more robust investment decisions taken, being less affected by random events in the currency market,” Carlsson says. The system trades intra-day and very seldom holds a trade from one day to another. It currently trades some of the most liquid currency pairs. Answering the question on why these currency pairs were chosen, Carlsson says: “Due the low transaction cost and the vast amounts of data generated by these currency pairs, it translates into a strong capability for us to deliver an attractive risk-adjusted return.”

Multi -faceted Risk Management Approach

Century Analytics employs a fully automatic risk management system that continuously monitors the fund’s exposures, especially before and after a trade is executed. The primary focus is to limit downside risk and to avoid cluster risk. There is no discretionary override in times of extreme market moves but there is a “kill all” functionality that could get triggered should market action merit such action. “We are extremely diligent when it comes to risk management. Before entering a position, the risk-adjusted exposure and the leverage used is closely monitored in order to stay within pre-defined risk budgets. We also monitor the correlation structure between currency pairs closely to make sure we don’t overestimate diversification effects. We hold no positions over weekends in order to limit gap risk”, Carlsson explains.

Man and Machine

According to Carlsson, one of the common pitfalls in building a self-learning trading system is to not understand the foundation it is built upon. This will eventually make it very difficult to understand what market characteristics that makes the model trigger buy and sell orders, translating into an over-engineered black box strategy. In order to overcome this problem, Century Analytics guides the models to find relationships of market parameters that have a logical foundation often based on sound economic principles, an exercise that, according to Carlsson, requires extensive market experience.

These relationships are then continuously evaluated through an iterative process to make sure that the model captures the market inefficiencies it is supposed to. “It is not a question of man versus machine but rather how machines and humans

can interact in order to create a self-learning system that look at the relevant parameters. The iterative process is key when creating this system. We are continuously aware of the specific inefficiencies the trading system is targeting to generate returns.”

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Defying the Zero-sum Game

Being one of the most heavily traded markets, currencies offers ample liquidity and an extreme amount of data points, which according to Carlsson makes it a suitable market for machine learning systems. At the same time, it is one of the most efficient markets making it increasingly difficult to extract alpha from it. “We believe market psychology many times drive prices, creating inefficiencies that can be exploited systematically as there are recurring price patterns that our models are quick to detect and exploit. This has been done historically by quantitative firms.

However, as computational power has increased alongside execution speeds and access to information, the competition has become harder and is one of the reasons to the declining performance of many of the traditional quantitative firms. Our view is that new technology is needed to be able to explore the inefficiencies of today”, Carlsson says and continues: “For us, being at the forefront of technology, both in terms of model design and execution platform, it is key to remain competitive in this marketplace. The fact that we use selflearning systems that evolve over time is an important factor to stay abreast of changes in market dynamics and to potentially detect new opportunities and models as time goes by. Furthermore, by establishing external research collaboration with research institutions we can scale up our research effort.”

Encouraging Results

The Century Analytics team has traded the strategy live throughout the year, and the results are well in line with the long-term expected annual return target of 10 percent to a volatility of 8-12 percent, according to Carlsson. “There have been no

mishaps along the way so far and the models behave like we expect them to. For now, the main focus is on getting the fund started with the required seed capital.

Pictured, left to right: Hugo Langéen (CIO, Co-founder), Niklas Højman (COO, Co-founder), Hans Nelfelt (CEO), Jimmy Carlsson (CTO, Co-founder), Håkan Gullstrand (CSO)