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## Ex-Credit Suisse quants embrace machine learning

Founders of XAI Asset Management grapple with unsupervised learning and the problems of explainability



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It's been three years since Credit Suisse's head of data science Aric Whitewood and chief global strategist, Jonathan Wilmot left to co-found XAI Asset Management, their artificial intelligence-infused shop. The hedge fund's core machine learning system has been trading real money in a variety of asset allocation strategies for 18 months.

As well as a proprietary macro trading business, the firm creates and sells machine learning-based predictions and analysis to other asset management firms seduced by the allure of AI. One chief risk officer at a \$500 billion US investment manager says XAI Asset Management has become his go-to resource for novel, yet explainable machine learning models.

Operating outside a big investment bank brings its own advantages. "It is really hard in a big company to do anything new," Whitewood says. "You have particular constraints, and it takes a long time to get infrastructure set

up in-house. Now we are pretty much unconstrained. Any particular computer processes we need are easily available, so it really frees us up to do fundamental research.”

XAI is one of a number of firms looking to benefit from a growing curiosity among investment houses to explore machine learning techniques to help super-charge returns by unearthing hidden patterns in data, or for more prosaic purposes such as [trade automation](#), improved [execution](#) or risk management. To meet this need, established firms are staffing up new teams of data scientists, or leaning on specialist providers such as XAI.

Whitewood describes XAI's investment approach as an AI variant of a global macro systematic fund that dynamically allocates risk between assets, optimising, for example, for Sharpe or information ratio. He likens it to relatively high-speed tactical asset allocation, where new decisions are potentially made on a daily basis.

On the analysis side, the firm applies machine learning models to financial data to try and determine two things. Firstly, what state the market is in and then, what is likely to happen next. Applications range from the simple: for example, in a regime where interest rates are rising, predicting which sectors are likely to outperform. However, XAI's focus is on using machines to deal with more complex regimes with a greater number of variables and a mixture of shorter-term and longer-term trends.

“One of the benefits of these [machine learning] techniques is that you're not just using a linear regression and trying to fit some model to what's going on. You're looking at what the data is telling you, but you're not losing sight of economic fundamentals and macro information,” Whitewood says.



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# powerful sub-fields within machine learning, but also one of the hardest

Aric Whitewood, XAI Asset Management

XAI, which was known as WilmotML until a year ago, is working on a number of specific problems and projects. First, how to combine datasets that are different from each other; a market timing tool that looks for particular periods of risk; and an associated set of asset allocation strategies where machine learning helps identify complex, non-linear behaviours in the market.

Whitewood declines to divulge exact techniques being used as they are proprietary to XAI. However, in the above applications, he says: “We are taking a mixed approach, with a key component being an unsupervised learning stage which is where you don’t have labels in the data, you just learn what the relationships are. Unsupervised – which is closest to how most animal and human learning seems to work – is one of the most powerful sub-fields within machine learning, but also one of the hardest.”

The danger with complex AI is that it is difficult, if not impossible, to explain its inner workings to potential clients or regulators. Some fund managers, among them [BlackRock](#), have had to shelve certain techniques on this basis, or [limit](#) their use. XAI says there are creative ways around the problem. The firm focuses on explainability for its predictions, including visualising the driving regimes in its models. Some of this is taken from other domains such as image recognition.

“Effectively you can create charts and visualisations where you can see what regimes have been learnt by the machine and how they relate to each other,” Whitewood says. “You can also look at the sub-features that make up the regimes, these could be spikes in particular time series or other interesting events.”

The process can be challenging, as variable sets driving the predictions can change quite often – although larger changes in the strategy portfolio allocations change less frequently. So on top of this, XAI has looked at taking the input datasets that are most important, and grouping them

together for comparison; the goal is to collapse down all the input data into a smaller number of groups.

Whitewood, in keeping with his academic interest as an honorary lecturer at London's UCL, has a wider eye on developments in the theoretical field. He is cautious of overselling the benefits of deep learning, the branch of machine learning that aims to mimic the workings of the human brain.

"It's interesting to note that the conversation is now changing – where current deep learning architectures were once viewed as the answer to most problems, I think more recently researchers are re-evaluating that view. That's not to say that current deep learning architectures are not useful, they certainly are, but probably have to evolve," he says.

*Editing by Alex Krohn*

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