MODULE 6 UNIT 2
Video 1 Transcript

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NIR VULKAN: Today, we have Anthony Ledford from Man AHL, back again with us, to talk to you about the future of AI and machine learning in algorithmic trading. He will discuss the current role of AI and machine learning in the industry as well as the future impact of this technology on algo trading.

Where do you see new developments that you think will likely be useful for algorithmic trading?

ANTHONY LEDFORD: So all the new tools that are becoming available, I think they can be broadly divided into just a few key areas.

The first is non-linear signal combination. So the industry has been focusing on linear combinations of well-known signals for decades. Can you take those same group of signals and discover new structure in them by actually looking at non-linear combinations? That's certainly an area of growth.

Another area of growth is where you have a very large number of weak predictors. Typically in the past, people have tried to work out which is the best predictor to use, and you know, if they're all really, really mediocre, that isn't a particularly useful direction to go in. So, there's a group of models that are about combining very large numbers of weak predictors. That's certainly an area of growth.

The other thing is, well, can we discover factors we don't know about? Now techniques like deep learning offer promise to be able to do this. It's very challenging to actually get them to work on financial data because it's so noisy, but being able to discover new factors that you don't already know about – that is a key area. So this is on the trading model side.

Another area where there's certainly exciting work being done is in trade execution. So can you actually develop algorithms that are very good at placing trades into financial markets, balancing the transaction costs you incur with the time horizon they operate over, and minimising the risk of the price moving away?

That's the sort of thing that people have engineered and designed by hand in the past. Can you actually develop strategies that are very good at that using machine learning? The other way that machine learning and new techniques offer a lot of potential in execution is when you have multiple different algorithms available to you. How do you decide which to choose? And there's a branch of exciting work going on in that called multi-armed bandits, which actually is about selecting the most favourable or most likely algorithm for you. So I think those are really exciting areas for development.

What do you think about the potential of machine learning and AI to improve algorithmic models?

LEDFORD: So there is a lot of potential there, but it is actually really hard. And I think that people need to understand this, because it's not the message that's often portrayed. The idea that you apply machine learning to some set of data and some sort of useful magic happens, and useful things emerge, it's just total fantasy. It doesn't work like that.

There is promise, but there are some very significant hurdles you have to overcome. And the main hurdles are very low signal-to-noise ratio – we've already covered that. Non-stationarity. This is a big issue. Most AI, machine learning systems, models, algorithms, whatever you want to call them, are all based on the idea that you have an environment that you're learning from that isn't changing. Well, financial markets are changing all the time. Sometimes the correlation between bonds and stocks is positive. Sometimes it's negative. We all know this.

There's a big extra step that has to be put in before you have something that goes from working in a stationary environment to being suitable for working in the financial data environment where you don't have stationarity and you also have low signal-to-noise ratio as well. That is something that's very hard to overcome.

So, let's just actually think what machine learning is. Machine learning is about learning from data. You need vast amounts of data to be able to learn structure, useful structure, from that data. And these effects are subtle, and they're transitory, and they're changing in time as well.

So, you need gargantuan amounts of data, potentially, to be able to extract these things to a high degree of fidelity. And if you have only got three years or five years of data, you haven't really got the raw materials to do the machine learning on. That's such a basic point. But, you know, if you haven't got the data you haven't got anything. Machine learning is not going to get you out of that cul-de-sac. You have to have large amounts of good-quality data before you can do anything.

Based on your experience, do you think the quality of the algorithms or the expectations of investors will change?

LEDFORD: The algorithms will be as good as the markets let them be. If something is very, very, good, you know, fantastically good at predicting tomorrow's return, it'll disappear very quickly. This is the power of arbitrage. So, necessarily, you're left trying to capture things that almost don't work.

Because if they work too well, they will just get arbitraged away, they disappear too quickly. So, it's the stuff that only just works and is on the borderline of working to not working, that's the only stuff that's going to be persistent. You know, I've been around long enough, that I've seen that. So don't expect magic, would be what I say.

Do investors understand that? Certainly, experienced investors do. That's a very basic lesson, but it's a lesson people have to learn from themselves. And unfortunately, a lot of people that have too much faith in their models. They think they're in… believe their own greatness a little bit too much. They put too much risk on it, and they go out of business.

These are lessons. It's nothing to do with machine learning. I've seen this for at least the last 10 years. Experienced investors have also seen the coming and going of a lot of these things. The techniques offered by machine learning and AI, they offer some new directions, but they're just the latest piece of that progression, and it's just bringing in new techniques to enable you to do the same thing as you've always wanted to do, which is predict markets, work out sensible policies based on things you can observe, be able to trade leanly and efficiently, and get your risk under control.

Those are the building blocks that have been there for at least 30 years, and I don't see them materially changing. It's just a different tool set to do that with.

Where do you see the industry in five to ten years?

LEDFORD: I think it's got a healthy future. We're seeing it grow. We're seeing the amount of capital that's being managed within the sector growing.

There's a potential if it becomes overly successful, that flood of capital into it might have some frictional effect on the performance. That's not been the case up until now. When you look at the amount of capital that is managed by the industry as a whole, compared to the size of the underlying markets, one has grown. But so has the other one. So the ratio kind of stays the same. I think that providing that persists, as it has done through my experience of working in the industry, then there is a very strong and buoyant future ahead for it.

The other thing that… I haven't been doing this for a long time. Things that were considered to be cutting-edge and rocket science 10 or 15 years ago, they're the plain vanilla, bread-and-butter stuff now. So that will happen for a lot of the machine learning tools we're talking about. In 10 years' time, they will just be totally commonplace. That doesn't mean that, you know, we won't have things to do, because I have every faith that they will be replaced by the next new thing, and some of those new things are probably in the in the labs around the world now.

Part of my job is trying to find out what those new things are going to be. Some of them will prove to be useful. At the moment, I don't know what they are. But it's a continual progression. Things that were tremendously exciting 10 years ago are now commonplace. The machine learning that we're pushing at the moment has demonstrable value, but over time, that will just become commonplace, and it will be replaced by something else. I don't know what that something else is, but I'm looking.

VULKAN: Did you understand all the concepts in this video? If you would like to review any of the questions, click on the corresponding button.