

# Plotinus Asset Management, LLC

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## Trading with Artificial Intelligence: Method or Strategy?

It is easy to understand the development and use of artificial intelligence as a technological progression, the culmination to date of the advances in computing, data processing, and storage. In this context, it follows that it will be applied in the financial sphere as another method or tool in the toolbox, in the pursuit of investment goals. There is however a different question: Is there such a thing as an artificial-intelligence strategy?

Our answer to that question based on our experience is yes. This new application can be understood as class of strategy—a new class—which brings with it some interesting prospects that reflect the fresh and disruptive energy contained in artificial-intelligence technology.

AI allows for the creation of the unconventional, not necessarily linear, thought, which by its very nature is operating outside of the conventional channeled methods and interpretations. This does not mean disparaging older methods. It can involve their adoption, in a less restricted manner, by this new technology in the hope that this approach can offer new insight and new ways of solving problems.

## Example of an AI Strategy: Plotinus $2\pi$ Index Hunter

To explore what an AI strategy means, we can take as an example, the Plotinus  $2\pi$  Index Hunter. This is a program which trades exclusively the S&P500 Emini Futures contract. It is systematic. It trades US equities indices. It has a maximum holding period of five days. It trades both long and short positions. It is an “Index Hunter” and acts as an augmentation to passive index trackers. You can see from this outline that the strategy could be boxed or categorized in the following ways:

*It's a ...*

*Managed Futures, Systematic, Equities Indices, (Sub class) US Equities Indices, Short-Term, Trend Following, Long and Short  
...strategy.*

The point is, it is legitimately categorizable as any one of the above (even when these categories might tend towards being contradictory) and as all of the above. This is by virtue of it being a new approach. It can meet the investment objectives of an investor seeking definitions within which the strategy comfortably makes sense to them, but it also can be classified by its difference as an artificial-intelligence strategy which contains multicategory properties. In the absence of an AI tick box, it will most likely be classified by the unhelpfully vague “other” tick box.

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In our case, it is a break from the traditional approaches that have led to the development of the Plotinus  $2\pi$  Index Hunter. By identifying AI as a strategy, due the technology used, it can allow for some comparison with other strategies using AI (while acknowledging that the techniques being deployed will differ). The investor can use the traditional characteristics to identify if such a strategy is a good fit for their investment horizons, whilst being able to see if the additional AI character of the strategy can offer further benefit.

## Is It New?

There could be said to be a blurry line between quantitative, machine learning, and artificial intelligence methods. It should be remembered though that there are many who can recall when a quant was not a quant, but an analyst or a researcher. With time comes evidence and comfort around an idea that once was new. Innovators with something new tend to last and benefit substantially through the transition from novel to orthodox. The share of available capital held by the likes of Bridgewater in managed futures or Vanguard in the passive investment fields is not a coincidence.

## Building Comfort

Like all innovations AI will likely be treated with hearty degree of investor skepticism. This discipline has already had its flash in the pans, as illustrated for example by Sentient<sup>1</sup>. It is the responsibility of those like ourselves to build comfort and confidence around AI strategies.

This may perhaps be best done by a discussion on both concept and practice. AI is just as understandable and tangible as any other investment approach. We believe there is a need to demystify the hocus-pocus with nuts and bolts.

## No Rabbit, No Hat

It is best to begin by discussing AI at a conceptual level. There can be a propensity to view AI in terms of an *us versus them* scenario, the humans versus the machines. In our opinion, it is an unnecessary distraction to get into this comparison, the complexity of the human mind is not being replicated by artificial intelligence and that does not begin to touch off the complexity of the human being, of which the mind is but a part.

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<sup>1</sup> Bloomberg Sep7th 2018

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AI is what it is, artificial. Behind the process is the determination of the parameters of the artificial. This is key, as it is from this determination, regardless of how evolving, learning, autonomous the process is, that structures how it is going to be, evolve, learn etc. both from within and without of this original field of reference.

Humans are prone to attempt to do this, to frame, box in, to model, to reduce the field of vision in attempt to get the ideal, but it is humanly impossible to curtail our humanness and all the complexity it carts along with it. Machines, on the other hand, do not have this baggage and thus their use can simply generate something different. Perhaps that is where any comparison should cease. It is not better, or worse, or magic. It is just different.

## Good Old Serendipity

The key to exploiting the advantages that AI can bring is in the identification of where it can and cannot be used. Although there is much debate about the suitability of the use of AI in financial markets, we are of the opinion that it is ripe ground for exploitation. The market of itself is an artificial human construct; it is a less than perfect product of rules and strictures meeting human complexity. To pun Nietzsche, 'Where ye see ideal things (the market) I see human alas! all too human things.'<sup>2</sup> This circumstance is an opening which, if expectations are sufficiently curtailed, AI can be used (by humans) to identify and take opportunities for profit (another truly human notion). The thing is to get to know the environment. The market is a fluid system and therefore it is constantly being renewed, developed, re-invented. AI should be considered as part of this and not feared.

## Don't Be Fooled

Rather than becoming awestruck with the wonders and wonderous potential of technology, it is important not to be fooled by the prospect of data or analysis or processing *ad infinitum*.

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<sup>2</sup> Friedrich Nietzsche, *Ecce Homo*, "Human all too Human"

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## *Faire La Bise*

AI should be a friend greeted in the manner of the Parisian-style peck on each cheek.

## Keeping it Stupid, Stupid

The reduction of expectations is key to best exploiting AI. When building the machine, it is vital to keep it not only stupid but really stupid. Its worst enemy is over-complexity. There is no quick or straight-forward, repeatable, easy find in financial markets. Opportunity of that nature has to be crafted. Considering the material at-hand is financial data and that complexity will tend to spiral from it, we chose to embrace this with an approach that we refer to as “Nimble AI”—this is a task-based, using limited data. It is built organically, with a tear and repair and natural redundancy in mind. The point is not to over-reach and trip into the pitfalls of over complication and over optimization. We want to get comfortable with the non-optimized to understand the system’s limits and failings.

## Keeping it Simple, Simple

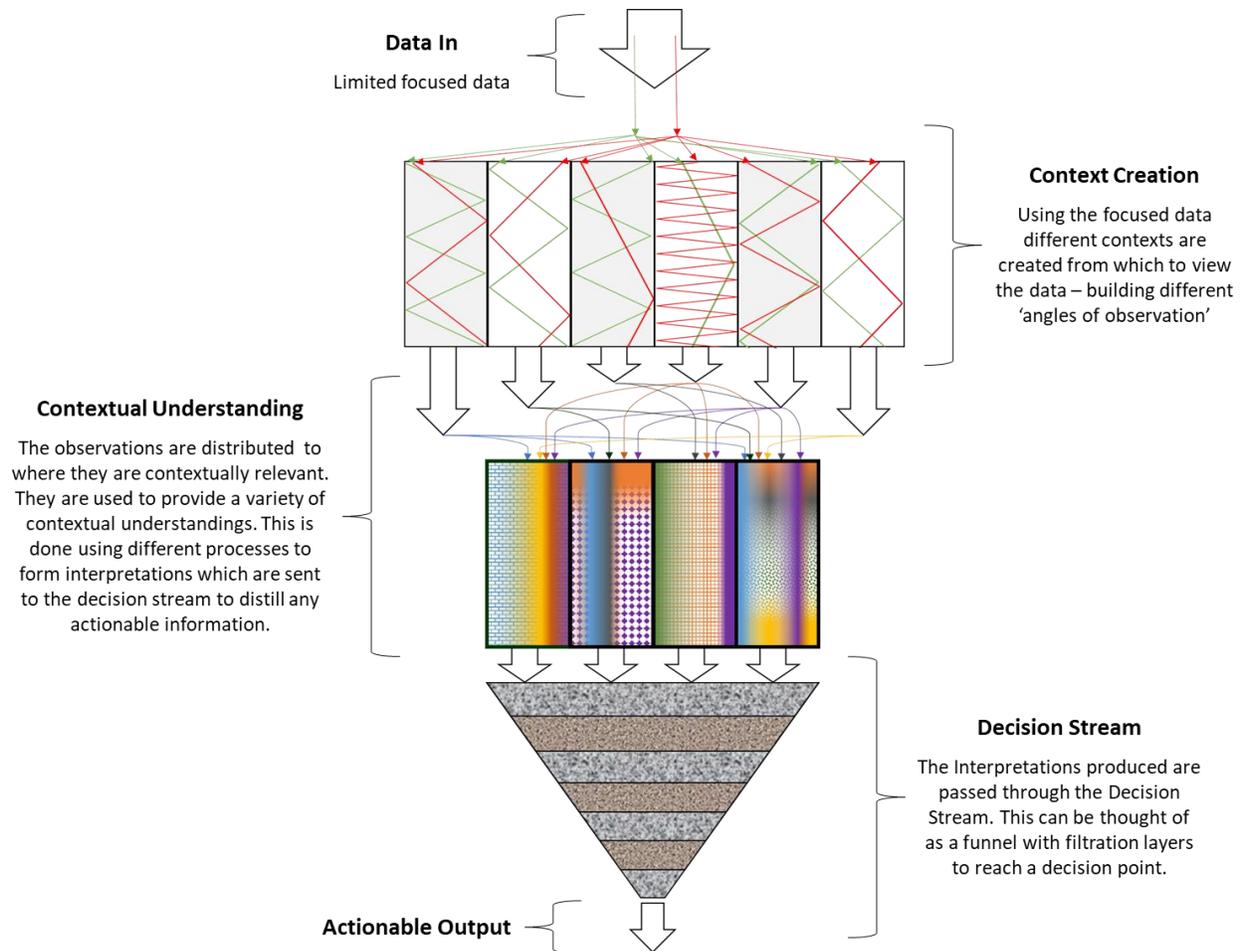
As already noted, complexity will cascade from financial-market analysis, the job of those deploying AI is to get to the simple, the really simple. The extraction of meaning from data is one thing, the meaning of the meaning is quite another. This is where the executable is determined, it is here all the action takes place. One has to have a machine that is confident enough to draw conclusions. The best thing it can do here, in true Socratic style, is to recognize its own ignorance. Rather than being tempted toward infinity, the aim should be to define in strict terms what is relevant to distill the complex to produce something simple and actionable. Things go wrong, so understanding error and being able to discern the how and why of error is much more important than something that is blazingly correct until it is not and one does not know why and cannot explain why change has occurred.

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## Simplified Illustration of “Nimble AI”



Source: Plotinus Asset Management.

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## Becoming a “Qualt”

The emerging quant on steroids that AI has the potential to become is not a desirable outcome. The quantitative aspect comes with the package—the additional benefits of an increase in technological development. The focus, however, should be on the qualitative. The aim is quality in process, in data, in thinking. For trading purposes, one wants AI to be a Qualt – something that offers quality results from its ability to analyze data, make decisions and execute upon that analysis.

Where you might ask does quality “thinking” fit in with keeping it really stupid? Stupid is perhaps best replaced with the term ignorant. The objective is to be ignorant of what is not relevant, to have quality thinking in a small curtailed task oriented field, in that way one can have something that makes decisions with outcomes that are more often right than wrong, but that also provides a comfortable understanding of when it is wrong.

## Achieving Quality

Quality in information is best dealt with by restricting the amount of data to be considered. Ideally, the thing one would like to be limitless, is quality understanding. The question then becomes how can one extract information from the data and how does one differentiate between useful, useless, and same information?

## Contextual Understanding

The increased ability to process, allows for the creation of different contexts (or perspectives) from which to understand the information as presented.

This process of obtaining different contextual understandings of information has been of philosophical concern since the ancients, take Plato’s *Allegory of the Cave*, in the Republic<sup>3</sup> for example. This can be thought of as the need to question: to not simply take things at face value in the pursuit of a more complete or better understanding. In our opinion, financial data, if approached correctly, lends itself well to questioning and the seeking of different contextual understandings.

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<sup>3</sup> Plato’s Republic Book VII

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The following is a basic example used for the purposes of illustrating the evolution of understanding from restricted data by developing contextual understanding.

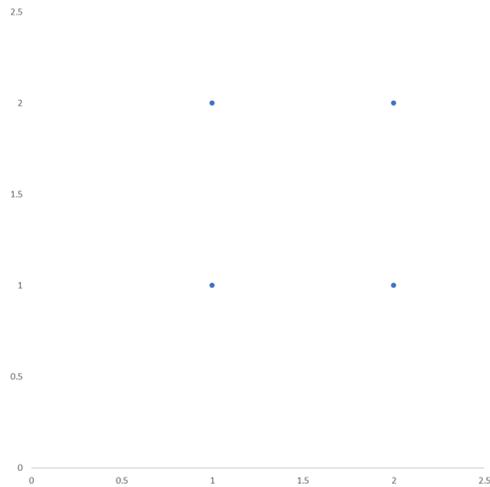


Fig 1

4 data points (x, y) co-ordinates

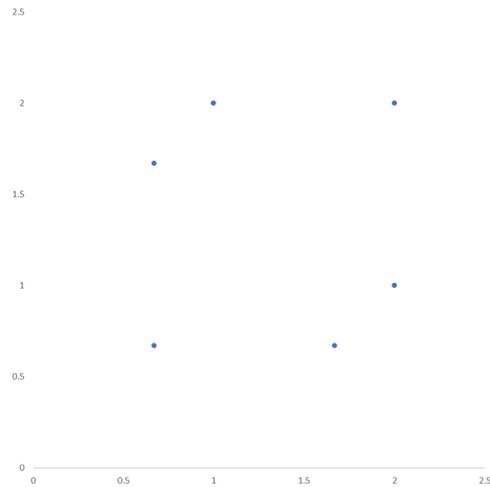


Fig 2

6 data points (x, y) co-ordinates

It begins with 4 data points presented as two dimensional (x, y) coordinates, with two further data inputs each of 2 more points. Thus giving 4, 6, and 8 data points (Fig 1 -3).

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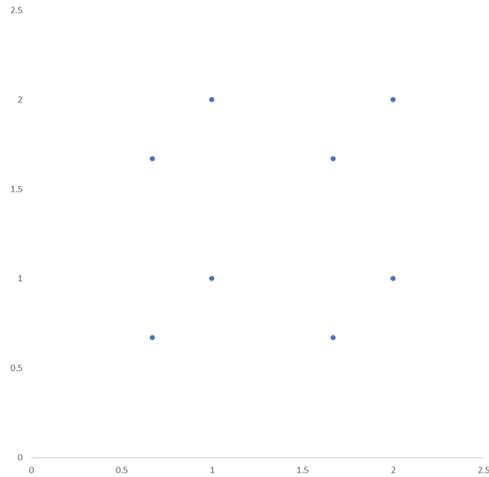


Fig 3

8 data points (x, y) co-ordinates

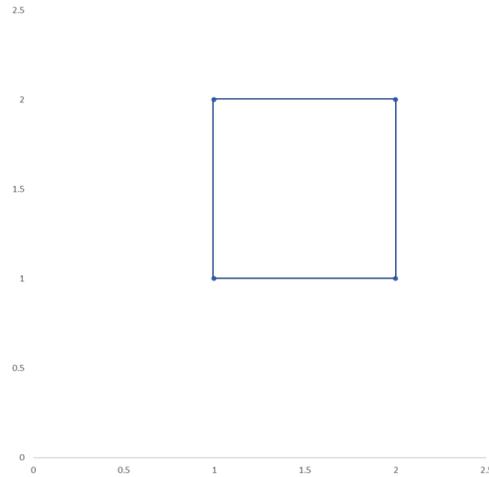


Fig 4

Geometric depiction of Fig 1

The data, treated as three sets, are then each given a geometric representation, or rather an interpretation. This illustrates the use of determinants, in this case geometry. (Fig 4-7)

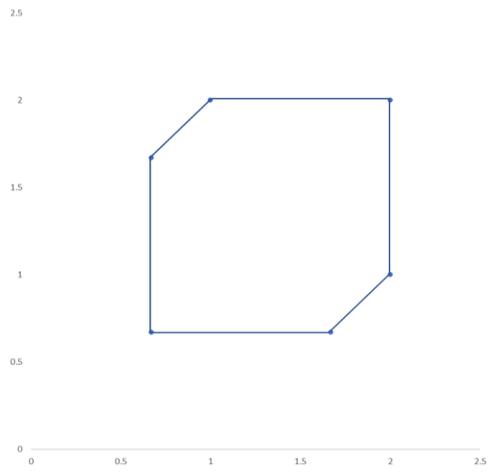


Fig 5

Geometric depiction of Fig 2

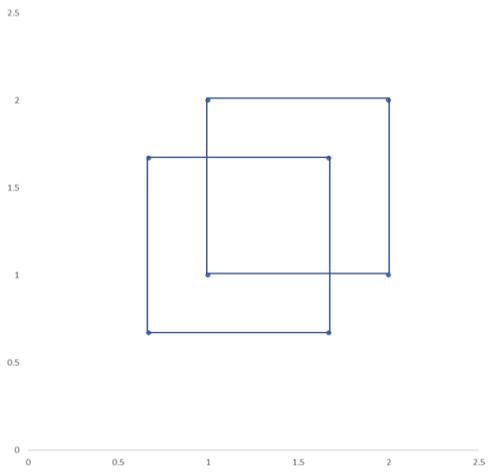


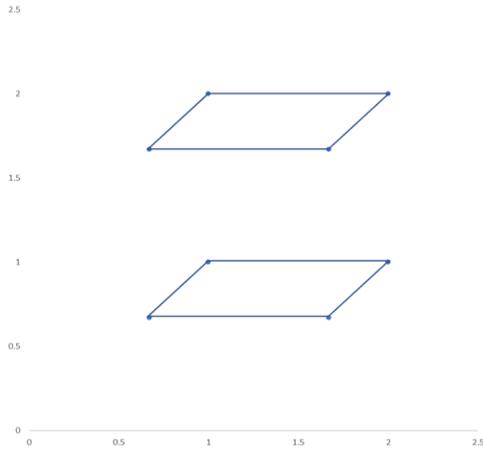
Fig 6

One interpretation of a Geometric depiction of Fig 3

The choice of determinants is a defining feature as it will influence the manner in which the information will be perceived at a given point, which will in turn have further influence at future stages. It is also worth noting that an interpretation is open to query. Determining geometry, for instance, does not prevent “many views” from occurring and one interpretation (Fig 6) is open to reinterpretation (Fig 7).

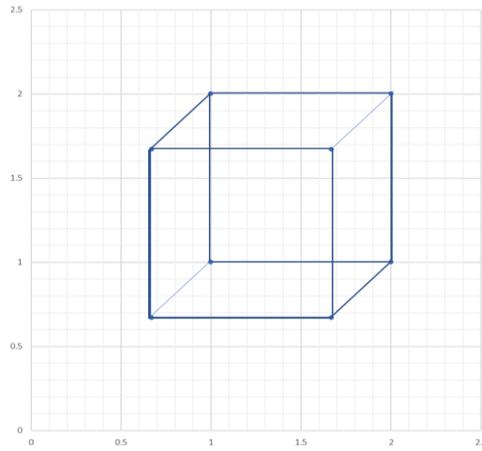
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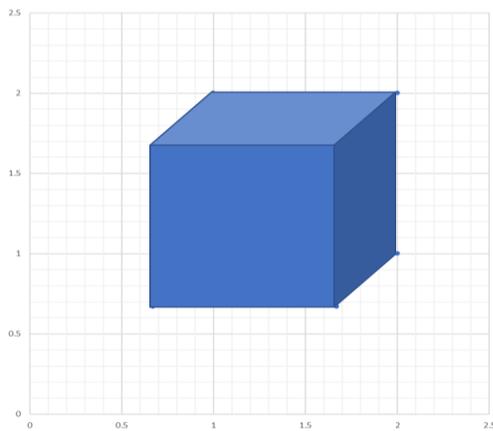
*Fig 7*

*A different interpretation of a Geometric depiction of Fig 3*



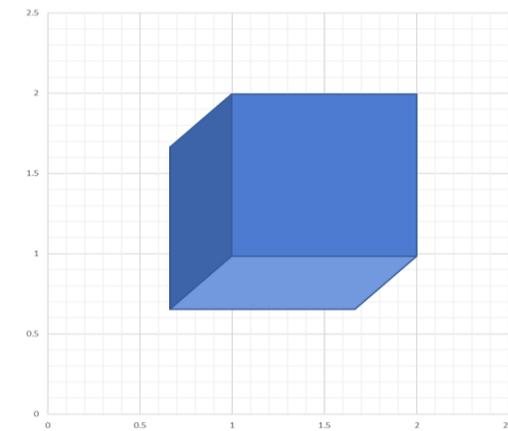
*Fig 8*

*Combining the interpretations (Fig 6 & Fig 7)*



*Fig 9*

*Adding Color to the Interpretation (Fig 8)*



*Fig 10*

*An alternate view of the interpretation (Fig 8)*

At the stage, where interpretations can be combined and layered (Fig 8) to extract possible understandings, like the cube (Fig 9), it is important to recognize that this is only one conclusion from a given standpoint. An alternative standpoint can produce a different view, thus a differing conclusion (Fig 10). This is where decision streams are important in helping recognize the relevant standpoint based on the aims and objectives of the particular stream.

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You can see from this process that although the data to be observed in each case remains two-dimensional coordinates, other useful information exists. That information can be extracted by creating a different context from which to view the data. In doing so, we are creating different angles of observation, enabling other questions to be asked.

## Contextual Dimensionality

The above example is a basic illustration which parallels the methodology behind the AI process we use. It seeks to garner understanding as a result of developing different perspectives, from which to ask the questions and observe the result and so on. The questions themselves stem from the analysis of the data. Hence, you can see how this process can be come subject to a further analysis, leading to further questions, leading to a distillation in order to extract quality, i.e. relevant information. This could be described as a thought process.

This information is put into decision streams which draw out the meaning of the information and how it should be executed upon. At Plotinus, our system has three separate decision streams each seeking different outcomes with each searching for information using different sets of contexts on which to base those decisions.

Another characteristic of “Nimble AI” is its ability to be adaptive. By not overburdening it and limiting the field of operation means that it has an agility to respond to changes within the field. We build things to enable heuristic decision making, an approach that is more responsive to changes in circumstances.

Similar to the *Allegory of the Cave* there is a distinction to be drawn between the knowledge obtained from different angles of observation. New angles of observation provide further depth of knowledge, but also insight, the ability to distinguish between the quality of that knowledge. It also illustrates intelligibility, the ability to discern knowledge by inference from what one has previously observed without direct observation.

As the example shows, the appreciation that there may be a rotational relationship between the data evolves from what initially was, in data terms, points with two-dimensional coordinates. This appreciation then offers insight into what information the data may contain and thus provides us a way of examining it. We may be simply looking at a two-dimensional hexagon, but not necessarily. By conjecture, for example, the addition of different coloration to certain areas of the data suddenly gives the instant visual recognition of the presence of a cube. This does not mean there is in actuality a three-dimensional representation (as it remains exclusively two-dimensional data), but it provides the depth of understanding which can help us extract potentially useful meaning.

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So too, with our “Nimble AI” approach with its emphasis in seeking to identify context, we dig for deeper understanding, whilst remaining light on initial data. We aim for more comprehension of error. Thus, if correctly harnessed, financial data, when restricted to, for example the field of technical analysis, can yield different understandings when AI is deployed, than when using previously-established methods of analysis.

## Don’t Call Me a Robo-Advisor

We counter the conclusions of the recent paper released by AQR Capital Management ‘Can Machines Learn Finance’<sup>4</sup> that machine learning is exciting only in the area of portfolio optimization. In our view, this is a rather myopic and convenient conclusion, given that the paper was produced by AQR’s Portfolio Solutions Group which, “aims to help AQR clients achieve better portfolio outcomes and provide unique insights to the broader investment community”<sup>5</sup> Hence, the conclusion rings of, ‘well you would find that wouldn’t you...’ This finding illustrates a broader issue that arises when a new technology emerges: There are going to be competing agendas looking to claim the domain. A downside of this kind of idea-based turf war is that there can be a tendency for unhelpful labelling and associations to occur. One example of this is AI in finance being understood as the ‘robo-advisor’. This is a scenario we commonly encounter, as a CTA deploying AI. It is often assumed, incorrectly, that this means portfolio construction using some form of machine learning—as per the AQR conclusions—a robot with a laptop cleverly building portfolios. This kind of misperception is exactly why the question ‘Are there AI strategies?’ needs to be asked and needs to be answered in the affirmative.

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<sup>4</sup> AQR – Portfolio Solutions Group “Can Machines Learn Finance”

<sup>5</sup> ibid