

## Intelligent Cloning

### The Spring 2019 edition

Carefully look at what other great investors have done.



There is a reason why there is a select group of very exceptional investment professionals. These people work harder and smarter than everyone else. They dig deeper than everyone else and have a more holistic approach towards investing. They have better emotional control and behave differently. They have superior individual networks and better access to industry veterans and CEO's that helps them to gain better and differentiated insights. And often, these investors study companies for many, many years before making the final decision. There are those amongst us, who call all this "accumulated experience".

If you think you can beat these great investment teams, I tip my hat to you. For the most of us, just following what they do is a very compelling alternative. The idea is to ride the coattails of their expertise – without having to pay for it. Not many people do so, but it's interesting. And certainly not easy. It's called "cloning".

In the previous edition on Intelligent Cloning I announced some topics of interest for this edition, but I have a much better idea. Let's have a look @ quants.

### The Perfect Quant

David Abrams, a protégé of Baupost's Seth Klarman, gave a rare public address at a conference in New York for Project Punch Card. He was critical of people who are "always looking for a short, easy solution" in investing. "I don't think there's a black box or easy answer or algorithm" for investing, he said.

Let's set the stage for some thoughts on algorithmic investing. I couldn't find a better framework than the memo of Howard Marks, entitled "Investing without People". Marks describes three ways in which the securities markets seem to be moving toward reducing the role of people:

- Index and other forms of passive investing
- Quantitative and algorithmic investing
- Artificial Intelligence and machine learning

It's important to understand the difference between the latter two. Quantitative (algorithmic) investing consists of establishing a set of rules and having a computer carry them out. Artificial Intelligence (AI) refers to the ability of machines to think, where you give machines access to data and let them learn for themselves (also known as "deep learning"). Let me assure you, I am not in the business of Artificial Intelligence. I am just scratching the surface of what is known as algorithmic investing.

Nevertheless, Artificial Intelligence (AI) is intriguing, so allow me to make some comments about it anyhow. If there is one person out there, who deserves the name of Mr. Artificial Intelligence, it is Demis Hassabis. He co-founded the company DeepMind, to build the world's most powerful Artificial Intelligence.

In 1997, after IBM's Deep Blue computer had beaten the chess grandmaster and world champion Garry Kasparov, Demis Hassabis met Masahiko Fujuwarea, a Japanese board-game master to discuss a computer program using artificial intelligence to beat the greatest human Go player. Confucius wrote about the ancient Chinese game of Go as one of the four great arts to any true scholarship master, along with poetry, calligraphy and music. In 2016, The DeepMind program, called AlphaGo defeated Ke Jie, the world's number one Go player and scored a victory in one of the most creative and complex games ever devised. The human champion, one of the most brilliant minds on the planet, no longer stood at the pinnacle of intelligence.

DeepMind also created artificial intelligence programs that play Atari games, using a combination of deep artificial neural networks and reinforcement learning. After presenting their initial results with the algorithm, Google almost immediately acquired the company for several hundred million dollars, hence the name Google DeepMind.

How does it work? An Atari Breakout player controls a bat that can be moved horizontally across the bottom of the screen, using it to bounce a ball against blocks that hover above it, destroying them on impact. The player wins when all blocks are obliterated or loses if the player misses the ball with the bat.

Like humans, the “artificial agents” learn for themselves. This learning by trial-and-error, solely from rewards or punishments, is known as “reinforcement learning”. It involves an agent, a set of states  $S$ , and a set  $A$  of actions per state. By performing an action, the agent transitions from state to state. Executing an action in a specific state provides the agent with a reward (a numerical score).

The goal of the agent is to maximize its total (future) reward. It does this by adding the maximum reward attainable from future states to the reward for achieving its current state, effectively influencing the current action by the potential future reward.

The agents must continually make value judgements so as to select good actions over bad. This knowledge is assembled in a Q-network, where the Q stands for quality. Quality in this case represents how useful a given action is in gaining some future reward. The Q-network at its simplest stores data of states, actions and rewards in tables. It estimates the total reward that an agent can expect to receive after taking a particular action. The key idea is to use deep neural networks to represent the Q-network, and to train this Q-network to predict total reward.

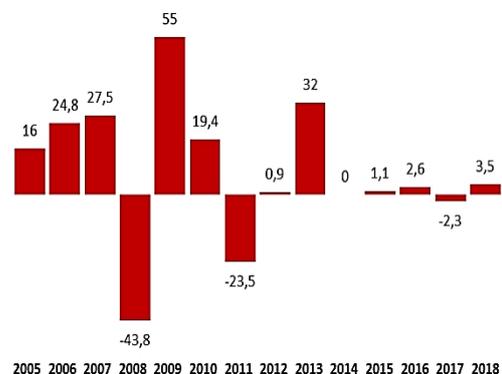
Here are two video tutorials by Siray Raval, [V1](#) and [V2](#). “So easy, a liberal art major could do it.”

The model they used for the Atari’s Breakout videogame is a convolutional neural network, trained with a variant of Q-learning, whose input is raw pixels and whose output is a value function estimating future rewards.

Without human instruction, DeepMind’s program not only learned to play the game but also worked out how to cannon the ball into the space behind the blocks, taking advantage of rebounds to break even more blocks. It’s interesting to read e.g. “[DeepMind and Google: the battle to control artificial intelligence](#)” by Hal Hodsonis.

Once again, I am not in the business of Artificial Intelligence. I am just scratching the surface of what is known as algorithmic investing.

Quants still have a long way to go. Joel Greenblatt published his “magic formula” in *The Little Book That Beats The Market* in 2005, in which he described a very simple stock selection system that in backtests showed 24% annual returns between 1994 and 2004 (page 153). But how has it fared since the book was published in 2005? InvestorsEdge ran some research, just to find out. The polite answer is “not that great”.



The strategy would have returned just 5.3%. The culprit is the last four years where returns have barely broken even.

In comes Mohnish Pabrai. His “Free Lunch” Portfolio combines the power of Uber Cannibals, Shameless Cloning and Spinoffs. The Free Lunch Portfolio is a 15-stock, 12-month “set it and forget it” approach that, according to the 17 year backtest results, “beats the pants off the S&P 500”.

The Free Lunch Portfolio was down 17% in 2018 and the more conservative version of the Free Lunch Portfolio was down 9.7% in 2018.

Conservative Free Lunch Portfolio.				-9,7%
Sleep Number	37,7	31,7		-15,9%
The Hackett Group	15,7	16,0	0,34	3,9%
Micron Technology	41,5	31,7		-23,6%
Synchrony Financial	38,8	23,5	0,72	-37,7%
GCP Applied Technologies	32,1	24,6		-23,4%
CSRA	29,9	41,3	0,20	38,6%

Let's see if we can improve this approach in hindsight. What I especially like about the Free Lunch Portfolio is the rationale behind it. The idea of a portfolio of Uber Cannibals, Shameless Cloning and Spinoffs is actually based upon Charlie Munger's 3 Rules on How to Become a Successful Investor.

- Munger's first rule is to carefully look at what the other great investors have done. The "cloneables" or "shameless cloning".
- The second rule is to pay close attention to "cannibals". These are businesses that are buying back huge amounts of their stock.
- And the last rule is to focus on "spinoffs". Successful investing is about finding situations of mispricing, or companies selling below their true worth. Spinoffs is the place to be.

Let's have a closer look at the backtest results. The "spinoffs" returned 13.4% on average over a 17 year period, the "cloneables" 16.1% and the "cannibals" 20.0%. If I had to manage a company with 3 business lines generating these returns respectively, and if my Board insisted on even better results, I would seriously consider spinning off the first business line. So let's spinoff "the spinoffs".

As a result, the conservative version of the Mohnish Pabrai Free Lunch Portfolio would consist of only 3 companies: Sleep Number, The Hackett Group and Micron Technology.

The next step is to carefully study how these stocks performed in 2018. And that led me to an insight I already knew for many years. It's a Seth Klarman insight: you should sell the stocks when the birds are chirping.

Were the birds chirping in 2018? Yes. The birds were chirping in 2018. Both The Hackett Group and Micron Technology were up more than 40% during the year. If you added a conditional sell order for all these three companies at the beginning of the year @ 40%, this is what the results would look like:

<b>Conservative Free Lunch.</b>				<b>21,7%</b>
<b>No spinoffs. Sell @40%.</b>				
Sleep Number	37,7	31,7		-15,9%
The Hackett Group	15,7	22,0	0,17	41,1%
Micron Technology	41,5	58,1		40,0%

Can we improve even further? Now we need a wizard! Let's forget about Mr Potter and let's turn to Mrs Hermione Granger for some Intelligent Magic. She noticed the impact of the conditional sell order on the performance at the end of the year and suggested to

look for the more volatile stocks in order to increase the chances that one or more stocks would actually be sold during the year @ 40%. "Just stick to high quality small cap stocks, trading @ attractive prices", she said.



Stick to the high quality small cap stocks. In the long run, from 1990 until now, the S&P 600 Small Cap Index, although more volatile, outperforms the S&P 500 Large Cap Index.

"Wingardium Leviosa!" And here are the results: AMAG Pharmaceuticals, Cardtronics and American Public Education. These stocks were up during the year more than 75%. A conditional sell order at the beginning of the year anywhere between 40% and 75%, would actually define your result for the year.

Many great investors indeed doubt if there ever will be a successful algorithm for investing. I am quite sure that if there is one (and I have my doubts as well), it will only be found by disciplined trial-and-error reinforcement learning. And if you don't mind, I will just stick to my own limited human convolutional neural network.

"Wingardium Leviosa!" Here are the 2019 constituents: Xperi Corp, DXP Enterprises and Vera Bradley. So the algorithm for picking three stocks for the Hermione Granger Portfolio is up and running, and yes, I will publish each years constituents upfront.

Here we have "the 6 quants under surveillance" for the upcoming 10 years:

- Q1. The Mohnish Pabrai Free Lunch Portfolio (FLP).
- Q2. The conservative version of the FLP.
- Q3. The conservative FLP, no spinoffs. Sell @ 40%.
- Q4. The Hermione Granger Portfolio. Sell @ 40%.
- Q5. The Hermione Granger Portfolio. Sell @ 50%.
- Q6. The Hermione Granger Portfolio. Sell @ 60%.

In my write-up of 9 april 2019, I added Express Inc as a constituent, but that was a "mistake of execution". By the way, I do expect that the final result will be quite satisfactory with Express Inc. as constituent as well.

	Q1	Q2	Q3	Q4	Q5	Q6
2018	-17,0%	-9,7%	21,7%	40,0%	50,0%	60,0%
2019						
2020						
2021						
2022						
2023						
2024						
2025						
2026						
2027						

Let me add some common sense to these results. It is very well possible that we will not see another 2018 any time soon. We saw a 20% decline from its 52 week high, with a devastating effect on Q1 and Q2. And we saw exceptional outcomes of the concentrated quants Q4, Q5 and Q6, as a result of the conditional selling orders.

Don't get too excited about Q4, Q5 and Q6. These results might be just as well the outcome of a statistical coincidence, rather than the conclusion of a smart algorithm. But it surely helps. The best performer of last year might turn out to be the worst performer of this year and vice versa. Every quant will have its fair share of good years and bad years. And hopefully more ups than downs. With the exception of Q1, there are no backtest results for these quants.

When I left Hogwarts, Professor Albus Percival Wulfric Brian Dumbledore handed me a special gift, not to be opened. "Great! What's in it?" I asked. "Q7", he said, with this mysterious Hogwarts smile on his face. "It's fully backtested, 2008 included, and the results are exceptional indeed. But don't reveal it. It's a secret."

That's it for this Edition on Intelligent Cloning. And if, after 10 years, it happens to be that all of these quants utterly failed... Well, then The Value Firm® just might invoke article 50.

Cordially,

**Peter**

Peter Coenen  
Founder & CEO of The Value Firm®  
28 April 2019

Postscript. Annual rebalancing and conditional selling do not belong to my normal investment routine. I am a notoriously long-term investor, and I like to hold on to stocks preferably for decades. And I won't change that. I was lured into this idea of rebalancing by the Free Lunch Portfolio, and also by the work of Joel Greenblatt. Anyhow, it was nice to do some thinking on this subject.

The final question obviously is, if Artificial Intelligence will be able to disrupt the long-term (value) investing industry. The AI believers contend that human intelligence is limited by the size of the skull that houses the brain and its power is restricted by the puny amount of energy that the body is able to provide.

I am skeptical though. Even the great Joel Greenblatt track record wasn't able to stand the test of time. If I look at some of my latest investments, Seritage Growth Properties, Veritiv and StoneCo, they all were found by exceptional business insights that were almost impossible to derive from available data. But I am perfectly ready to be proven wrong. And there are definitely interesting companies successfully pioneering Artificial Intelligence in Investing.

The flagship investment vehicles of Renaissance Technology, Two Sigma, Citadel and DE Shaw notched up hefty gains in 2018, where most money managers experienced their worst year since the financial crisis. But then again you could question if these companies really used "deep learning artificial intelligence algorithms" or "just computerized strategies". To be continued...

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