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Portfolio Optimization

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Technology in Finance

As a technology continues to improve rapidly, every company in all sectors must learn how to adapt or otherwise face the consequences of going bankrupt. One industry in particular that is continuously innovating is finance. In finance, technology had developed into artificial intelligence.[1]

When most people think of AI, they think of futuristic technology in the future. However, AI is currently revolutionizing many sectors as it refers to the simulation of human intelligence in machines, (Investopedia), thus making better business decisions and new opportunities. AI is currently taking the financial sector over by storm as it has already created virtual currency, quantitative finance, and fintech.

Virtual currency, or more well known as cryptocurrency, is a computerized decentralized form of currency created with an algorithm by AI. Introduced in 2009, it quickly grabbed the attention of criminal enterprises as a way to make untraceable payments, thus giving it a negative reputation. However, this was reputation was later dissolved as business saw the potential in its use. In Dennis T. Law's published journal piece "The Past and Future of Bitcoins in Worldwide Commerce" in *Business Law Today,* it states, "But bitcoin is increasingly used in legitimate

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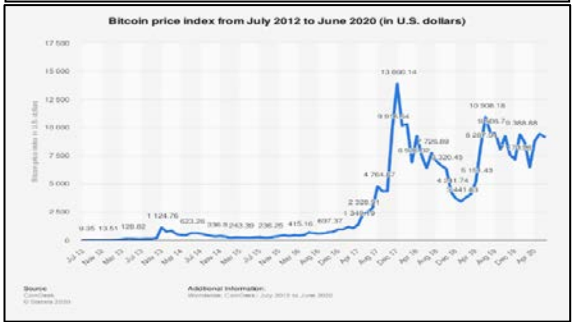
[1] Artificial Intelligence will now be referred to as AI

commerce. Thus, early this year, Coinbase, a bitcoin payment processor, reported selling $1 million in bitcoins in one month at more than $22 each. Later, venture capitalist began pouring millions into start ups that focus on bitcoins. In July 2013, the Winklevoss twins having formed an electronic traded fund called 'Winklevoss Bitcoin Trust,' filed with the U.S. Securities and Exchange Commission to sell share of the trust to the public" (Law). Coinbase making $22 million dollars in a month by just selling Bitcoin blew the door off of the hinges, setting up an emerging market. This was a major breakthrough for the crypto currency industry in inventing themselves to be the future of currency.

After taking off from venture capitalists, Bitcoin started to become a new way of payment transactions for businesses. This can be accredited to that they have a lower service fee per transaction than credit cards do. For example, Bitcoin and other crypto currency is currently accepted as a form of payment by retailers such as Starbucks, Microsoft, and AT&T. The growing list of companies accepting crypto currency as payment is likely to continue to spread amongst big retailers, as not only does it have a lower transaction fee, but it can be viewed as an investment.

In more recent years, Bitcoin has been popular in the cryptocurrency trade. Introducing a graph from Statista, it shows the historical monthly price of Bitcoin from July 2012 to June 2020.

Figure 1: Bitcoin Price from July 2012 to June 2020

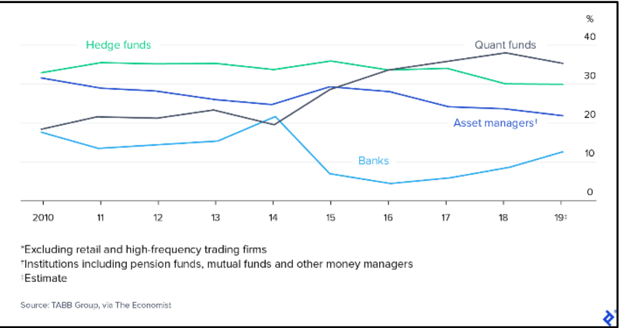


Rudden, Jennifer. “Bitcoin Price Index Monthly 2012-2020.” *Statista*, CoinDesk, 7 July

As can be shown from Figure 1, we can identify that the price of one Bitcoin spiked up dramatically from April of 2017 to December of 2017. This occurred due to a short squeeze due to speculation amongst traders that Bitcoin would be the leader within the cryptocurrency sector to revolutionize virtual payment. Shortly however, in December of 2018, the price per one Bitcoin tanked to just $3,441.03. While never returning to its peak, Bitcoin has rebounded since showing less volatility in its prices.

Trading stocks, when brought up sounds of hollering from men in three piece suits on Wall Street is often imagined. However, the aggressive wolves of the 1980s have been transitioning into intelligent elephants as quantitative finance is taking over. Quantitative finance, when referred to investing, is the use of mathematics and programming to develop an AI to find the most optimal investment. Starting in 2016, quantitative hedge funds have outperformed their nonquantitative counterparts by 10.8%.

Figure 2: Stock Return



Chandra, Ankur. “Does Quant Fund Performance Outperform Human-Managed?” *Toptal Finance Blog*, Toptal, 4 Feb. 2020, www.toptal.com/finance/stock-market-experts/quant-fund-performance.

As quantitative hedge funds have been shown in the Figure 2 above to generate better returns than their peers, it is important to identify why AI gives them a competitive edge. When programmed correctly, AI can predict price and hedge risk properly. While sounding easy for financial wizards, it still proves to be difficult to do. This is because to properly create an effective trading AI, it is important to subject it to different market types, such as bull and bear markets, so that it can properly identify which investments will succeed. While humans were able to reproduce the process by themselves, such as hedge fund manager Ray Dalio, using the same process while removing human emotions shows to yield better returns.

Financial technology, or often referred to as fintech, is starting to change people’s day-to-day life. While people have been using credit and debit cards since last century, how we pay is about to become even more digitalized. Digital wallet apps like Venmo and Apple Pay are becoming more and more popular amongst Millennials and Generation Z, thus making companies adapt on how they accept payments. One industry that is about to completely revolutionize on how they receive payments is the legal industry. In Jason Krause’s journal article “Taking Credit: ‘Plastic Payments’ Have Their Risk and Reward” published in the *ABA Journal* it states, “If you’re a millennial, there’s a good chance you’re making payments with the digital wallet Venmo. Techies have a soft spot with bitcoins. And more than 100 million companies accept PayPal, Apple Pay or another electronic form of payment to run their business. But if you’re a lawyer, your preferred payment is probably still a paper check… Rule 1.15 of the ABA Model Rules of Professional Conduct requires that lawyers don’t commingle funds of clients and third parties with those of the lawyer” (Krause). While the ABA is withholding the legal profession from modernizing, there are some industry members changing the old ways. Pankaj Raval started his own law firm in Los Angeles and has found issues with traditional payment methods that are supposed to be used by lawyers. Raval found that many of his clients do not like to use paychecks as they find it to be last century. Since traditionally getting paid after the job is done by a paper check is proving to be difficult for Raval, he has modernized by taking digital and card payments.

As most Americans are not wealthy, getting a loan whether for a house, a car, or for school is almost guaranteed. Since almost everybody files for a loan at least once in their life, it is important to determine who deserves a loan as to not repeat another financial crisis like that of 2009. In the financial crash of 2009, banks made poor decisions on who to give loans to which ultimately led to defaults hence leading to a national recession. As it is imperative to make better loan decision and only give them out to people with trustworthy credit, it is important for banks to utilize AI.

Started in 2011, Lenddo is a start up that specializes in determining creditworthiness using AI. Since the middle class track record of credit history is slowly disappearing, they analyze through the use of AI over 12,000 variables through an applicant’s digital footstep to decided if they are suitable for a loan. Through their process, they claim to have verified over 5 million applicants to be worth of a loan for lenders, which is a 50% increase of people accepted. (EMERJ).

Technology has consistently been revolutionizing our society and is poised to continue to do so. Normal technology that humans are used to is quickly transitioning into self-teaching technology otherwise known as AI. AI is responsible for the creation of cryptocurrency, quantitative finance, and better streamed loan applications.

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