The Revolution of Drug Discovery

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Artificial Intelligence's Impact on Drug Development

Artificial Intelligence has far reaching implications for Health Care,

but one of the most important ways it is impacting the sector is in drug development. Gone are the days of drugs being derived from some obscure plant found in a dark corner of the rainforest. Today, computational biology allows scientists to effectively design and simulate different properties of potential drugs or reasonably predict how a new drug will interact with other molecules. In a very real sense, the cutting edge of drug development today is not drug discovery but drug design.

The simulation and prediction associated with computational biology is heavily reliant on a deep understanding of chemistry and quantum physics coupled with massive amounts of calculation; calculations that can choke a supercomputer. Still, simulation is helpful in drug development by testing which drugs are worth spending hundreds of millions of dollars on development and approval. Identifying potential drug candidates is the proverbial needle in a haystack, so the sooner you can figure out that you are holding a piece of hay and move on, the better.

Traditional pharmaceutical approaches to drug discovery can only generate about 1,000 new drug candidates a year. The process of identifying new drug candidates that are worth pursuing requires time, effort, and money. To say nothing about the years of research and money spent pushing these new candidates through safety testing, development, and FDA approval. Eventually a fraction of a fraction of these drugs will enter the market as new treatments. It is literally a billion to one shot that any compound could become something viable and approved by the FDA.

Given all the effort that goes into getting a new drug to market, any technology that reduces development times or improves drug effectiveness is a game changer. Artificial Intelligence is exactly that. Artificial intelligence is revolutionizing the speed and process companies use to identify which drug candidates to spend their capital and effort on.

Three specific ways are below:

1: Artificial Intelligence and machine learning can quickly evaluate potential drug candidates. As we said before, full simulation of drug interactions can swamp a supercomputer so it is important to know which drugs are most likely to be successful. Scientists may identify as many as 20 criteria for a potential drug candidate to meet. Using machine learning to identify these key drug properties allows researchers evaluate hundreds of millions of potential drug candidates in a week. Compared to traditional processes of testing and identification, AI allows orders of magnitude more drugs to be evaluated.

2: Machine Learning allows researchers to use AI to quickly explore potentially novel avenues for drug discovery. Again, testing within criteria defined by scientists to evaluate potential candidates while ensuring that candidates are synthetically feasible to produce.

3: Artificial Intelligence can be used to optimize drugs for further development. Factors such as potency, selectivity and bioavailability can be improved and optimized meaning that the best version of drug candidates are identified before further development costs are incurred.

Overall, Artificial Intelligence provides a faster and more robust drug development process resulting in not only in more drug candidates, but significantly better candidates to develop further.

This Artificial Intelligence revolution in drug development means biotech companies can drastically reduce the time drugs spend in the development phase while spending time, money, and effort brining better potential drug to market. One of our holdings in the TrueShares Technology, AI and Deep Learning ETF (LRNZ) is doing exactly this in the drug development space. Schrodinger (SDGR) is a leader in developing the kind of AI integration into computational Biology that is changing the way biotechnology companies develop new drugs.

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Artificial Intelligence, Machine Learning and Deep Learning Investment Risk. Companies across a wide variety of industries, primarily in the technology sector, are exploring the possible applications of artificial intelligence, machine learning and other deep learning technologies. The extent of such technologies' versatility has not yet been fully explored. Consequently, the Fund's holdings may include equity securities of operating companies that focus on or have exposure to a wide variety of activities in addition to their AI, machine learning and deep learning activities, and the economic fortunes of such companies may be tied to such other activities. Currently, there are few public companies for which artificial intelligence, machine learning and deep learning technologies represent an attributable and significant revenue or profit stream, and such technologies may not ultimately have a material effect on the economic returns of companies in which the Fund invests. Companies that do have a focus on such technologies may rely on a combination of patents, copyrights, trademarks and trade secret laws to establish and protect their proprietary rights in their products and technologies. These companies also tend to engage in significant amounts of spending on research and development, and there is no guarantee that these products or services will be successful. The securities of such companies, especially smaller, start-up companies, are also typically more volatile than those of companies that do not rely heavily on technology.