

Artificial Intelligence Gaming the Stock Market (<https://mindmatters.ai/podcast/ep106>)

Robert J. Marks:

AI can win at games from chess to Go to Texas Hold'em. But how can these AI capabilities be reduced to practice in the real world? That's the topic today on Mind Matters News.

Announcer:

Welcome to Mind Matters News, where artificial and natural intelligence meet head-on. Here's your host, Robert J. Marks.

Robert J. Marks:

Greetings. Our guest today is George Gilder. George needs no introduction, so we'll suffice it to say that George Gilder has penned a new monograph for the Bradley Center entitled *Gaming Intelligence: Why AI Can't Think but Can Transform Jobs*. Welcome, George.

George Gilder:

Great to be here.

Robert J. Marks:

Great. We were talking last time about the AI movement. In your book, and I liked this, you list six assumptions of the AI movement. Now these are not necessarily false. They're applicable sometimes, but I wanted to visit three of them. The first one was the modeling assumption. And we basically covered this, I think, in the first podcast, I don't know if you want to add anything, but it is the assumption that a computer can deterministically model a brain. Now, I mentioned that some of these were false and some of these were true sometimes and not, but this one looks to be one that is patently false. Would you agree?

George Gilder:

I do. I started with Gödel's proof. The whole computer industry seems to have forgotten the foundations of their science. Gödel really proved the incompleteness of all logical systems through imagining a kind of software system that embodied logical propositions from Boolean concepts. And he proved, using this software system that he conceived, it really was a software system, what we would call today a software system. He proved that all logical systems, including mathematics and arithmetic and Boolean algebra, philosophical logic, whatever it is, they're all dependent on propositions beyond themselves that can't be reduced to the system itself.

George Gilder:

Alan Turing, who was the giant of computer science along with John von Neumann, who really was propelled into computer science by Gödel and made Gödel famous. Gödel was a unknown 21-year-old, very nervous and a nerd at the time. And von Neumann made him famous. But Turing really is the giant. And Turing took Gödel's proof and applied it to computer science. And he really created it in his

universal Turing machine, which is the fundamental architecture of a computer to this day. And he showed that no computer system can work without an outside interpreter, essentially. Turing called it an oracle. And that's where we got Oracle computer. Turing said that every computer system has to have an oracle to interpret the world to it. And it's a repetition of Charles Peirce's insight that logic is triadic, and Gödel's insight that every logical scheme requires axioms outside itself, relies on axioms outside itself that can't be generated by the program.

George Gilder:

So this is all basic computer science, really the history of how computers were invented. And John von Neumann, Kurt Gödel. And Kurt Gödel became Einstein's greatest friend. And they walked famously every day to the Woodrow Wilson Center at Princeton discussing these baffling issues. And all this completely applies to artificial intelligence. They need oracles, they need outside axioms. The machines can learn if the data is structured and in a form that the machines can read. And so once again, you need a human mind.

Robert J. Marks:

Yeah. Gödel, by the way, I've plowed through his theorem, but it's most easily understood by looking at the work of Turing and later Gregory Chaitin, who is a guy that you mention.

George Gilder:

Yeah. Gregory Chaitin. He's another great figure who really invented algorithmic information theory with Kolmogorov. And they, once again, proved it again. This is a great tradition in computer science that many of the actual engineers building computers have almost forgotten.

Robert J. Marks:

Well, I don't know if... I think that most of the computer scientists know about Gödel, hopefully. And they definitely know about Turing and the Turing halting problem and the great things the Turing did. Are they living in a state of delusion by simply ignoring these facts and going ahead with their silly assumptions about what can be done in the future?

George Gilder:

Yeah, because they uphold the material as superstition. It's their great religious faith that somehow that if they make the computer go fast enough, it'll reach some kind of trigger point where Gödel and Turing and all the great figures... And insuperable logical aporias disappear. It's kind of a faith in a magic moment in the materialist superstition. It's the religion of atheists.

Robert J. Marks:

Very good. You made six statements about assumptions of the AI movement. And we started with the modeling assumption. A second one was the big data assumption, that the bigger the data set, the better. There's no diminishing returns as data set gets larger and larger. Why is this an assumption? I don't think this is true. I think you're going to get into problems. But what's your take on why this is a problem? Why this is an assumption of the AI movement?

George Gilder:

Well, the AI movement explicitly believes that part of this process of AI achieving a singularity is that it has so much data that the data essentially becomes consonant with the world sufficient to completely, and in detail, model the world and the universe. And it's the assumption that the more data you have, the smarter this AI is going to grow. And I think that assumption is just wrong. All the data has to be structured. It has to be presented to the machine. It all comes a cropper because of the basic problem of symbols and objects that I spoke of before. Symbols and objects aren't the same. And the relationship between the symbols and the objects is not fixed. It changes. You have a cat as a definition, and the boundary conditions for cats. Where do they become bobcats? Where do they become lions? Where does the cat realm begin and end? Cartoon cats?

George Gilder:

AI began with the promise of telling cats from dogs, and they can sort of do that now. AI is now conducted on what are called neural networks, which leads to some of the delusional ideas that now we've broken beyond the Turing machine. And we're now creating neural machines that somehow simulate human brains.

Robert J. Marks:

This hype has been around for a long time. I'm old enough to have lived through other so-called AI revolutions. And I don't know, the hype is just repeating. People don't understand history, which is a point you make in your book, in your monograph.

George Gilder:

And also in my other book. Life After Google is my current book that also addresses a lot of these subjects from a different point of view.

Robert J. Marks:

Okay. Great. By the way, in the podcast notes, we will make links to George's book. The fourth area of the assumptions of the AI movement, the third one I want to talk about, is the ergodicity assumption. I got to tell you, George, I love the term ergodicity. I think that nerds are familiar with the concept of ergodicity from studying things like time series and stochastic processes, but applying it to AI was really... I think it was just spot on. It identifies a limitation. And I think I told you in my email, that we are working here at Baylor University with a PhD student now trying to quantify the concept of ergodicity for artificial intelligence. Unpack ergodicity for us a little bit.

George Gilder:

Well, it means that the same inputs produce the same outputs for each process, roughly. I mean, there are lots of refinements of the concept, but that in essence is what it says. And if the relationship between inputs and outputs changes frequently, as the real world shows, then your AI system will be wrong a lot of the time. It's right for one relationship of inputs and outputs, but it can't overcome the ergodicity problem that inputs and outputs in the real world are continually evolving and changing and transmuting.

Robert J. Marks:

It's very clear there's lots of things out there that are non-ergodic. One is probably forecasting the market from tick data. I had a friend Jack Marshall, who was a professor of financial engineering that was approached all the time by people that says, "I have beat the market by artificial intelligence.:" And

of course doing so would have required ergodicity. Jack said he didn't even have to look at the program or the results. He simply asked the person who made the claim what kind of car they drove. And if their program had indeed worked, they would be driving a very nice car, but most of these were poor students that had never reduced it to practice. So I think that's the classic non-ergodic process, or one of them, is attempting to apply AI to tick data from the market in order to forecast it.

George Gilder:

Yeah. You can calculate various probabilities, and using probabilities does result in very massive, fast, parallel processing. You can trade the market very successfully... As one of the chapters of my book *Life After Google*, one of the chapters tells the story of Renaissance, which is the most successful investment fund in the world, and really in history. And they accomplished something like 40% or more growth for 20 years and profits for 20 years. And they did accomplish it by using computers to very rapidly trade in the market. And what they were doing was essentially front running. They would gauge what participants in the market were doing, and before they could complete their trades, the computer would accomplish the trade, thus they'd front run and scored tremendous, earth-shaking, historic gains. And I believe this kind of computation should not be legal in stock markets, but-

Robert J. Marks:

Really?

George Gilder:

Yeah. I mean, if front running isn't legal for humans, it shouldn't be legal for computers. It's using the speed of computation to game the markets, just as AI tries to game all these other dimensions of reality, like driving a car, it's also trying to game the markets. And the fact that they can conduct thousands of transactions while a human being is just reaching for the keyboard means that they can out trade human beings. And I don't think that's a legitimate technique. It has nothing to do with investment. I mean, now half of all the trades are determined by computers. More than half the trades in the stock markets are determined by computers. And they're fast trades, and they don't have anything to do with investment. There's no knowledge about specific technologies and companies and competitive environments and future possibilities. It's all just identifying trading patterns before they happen. And I don't think... That's an abuse of artificial intelligence.

Robert J. Marks:

That's fascinating. Jack Marshall, the person I talked to you before, was not a believer in forecasting the market. I can understand short-term forecasting.

George Gilder:

Yeah. It's all very short term. It's thousands of transactions a second or a minute or whatever. I mean, it's something far beyond what any human trader can dream of accomplishing. So the calculation was that they could do four months of transactions in a second. So they're not legitimate players in the market. They're outperforming humans simply by the speed of operations.

Robert J. Marks:

I've heard that some trading companies have laid fiber between them and the market in order to get faster transactions, to get a heads up on these sort of trades that you're talking about.

George Gilder:

Isn't it absurd?

Robert J. Marks:

Well, that is absurd.

George Gilder:

I mean, this has nothing to do with investment. Investment is learning. It's the growth of knowledge. Wealth is knowledge. Growth is learning. It's registered in all the learning curves that are the most thoroughly documented phenomenon in economics. And these computers are just learning about transitory patterns in the froth of trading. That has nothing to do with the learning processes that propel capitalist investment.

Robert J. Marks:

Jack Marshall said he used tick data to forecast futures. And I said, "Jack, I thought you said you didn't believe in that." He says, "Well, in this case it worked." He said, "Everybody else in the futures market was using tick data and these indicators like stochastics and trend lines and things of that sort." And he said, "Everybody was using. My job was just figuring out a little bit earlier than the other people, what exactly they were going to buy and sell." So he was-

George Gilder:

Front running.

Robert J. Marks:

Yeah. That is an early example of front running, I guess. But that was before the computers. Didn't this front running cause the flash crash that we saw a few years ago?

George Gilder:

It's believed to have. Yeah. I mean, it causes a lot of volatility in the market. And I believe the cause of it is what I call the outsider trading scandal. Because the SEC regulates inside trading, and prosecutors like Preet Bharara in New York, very aggressively prosecute insider trades of any sort. That poor woman got sent to jail for two years for some phone call where she... What was her name? The famous... Martha Stewart. But Preet Bharara has never indicted a computer. So the result is that now half of all trades are computation, and you've got all these exchange-traded funds, which are ETFs, which are all computer contrivances. And none of them contribute any information valuable to a long-term investment process. They're all just gaming the market like AI games go or chess by performing projecting moves millions of times a second.

Robert J. Marks:

I'd never thought of that. The market is kind of like a big chess game, trying to anticipate moves.

George Gilder:

Not if people are actually investing for long-term gains. I don't think short-term trading is investment. They claim it affords liquidity, but there's plenty of liquidity.

Robert J. Marks:

Okay. Excellent. Well, I'm going to talk to you about, in the next podcast, about the impact of artificial intelligence on our economy and your claim that we're have an Indian summer for AI. But we'll talk about that next. So thank you, George.

Robert J. Marks:

We've been talking to George Gilder whose fascinating monograph entitled *Gaming Intelligence: Why AI Can't Think but Can Transform Jobs* is available at [amazon.com](https://www.amazon.com), like everything else in the world. And so until next time on Mind Matters News, be of good cheer.

Announcer:

This has been Mind Matters News with your host Robert J. Marks. Explore more at mindmatters.ai, that's mindmatters.ai. Mind Matters News is directed and edited by Austin Egbert. The opinions expressed on this program are solely those of the speakers. Mind Matters News is produced and copyrighted by the Walter Bradley Center for Natural and Artificial Intelligence at Discovery Institute.