AI:10

GET INSIGHTS ON AI UNDER 10 MINUTES

WHAT'S HOT

SIX WAYS QUANTUM COMPUTING IS GOING TO CHANGE THE WORLD

HEADLINE NEWS IN A FLASH

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- AI May Be Better Than Humans at Designing Microchips
- AI can now complete your kid's mathematics homework
- Using AI, team maps N_2O emission hotspots—and pinpoints surprisingly feasible solutions
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SECURITY AI IS THE NEXT BIG THING

QUANTUM COMPUTERS

SIX WAYS QUANTUM COMPUTING IS GOING TO CHANGE THE WORLD

The world's biggest companies are now launching quantum computing programs, and governments are pouring money into quantum research. From simulating new and more efficient materials to predicting how the stock market will change with greater precision, the ramifications for businesses are potentially huge. Here are six quantum use cases that leading organisations are exploring right now, which could radically change the game across entire industries.

1. DISCOVERING NEW DRUGS

Quantum computers, have the potential to one day resolve the molecular simulation problem in minutes. The systems are designed to be able to carry out many calculations at the same time, meaning that they could seamlessly simulate all of the most complex interactions between particles that make up molecules, enabling scientists to rapidly identify candidates for successful drugs. This would mean that life-saving drugs, which currently take an average 10 years to reach the market, could be designed faster -- and much more cost-efficiently. Pharmaceutical companies are paying attention: earlier this year, healthcare giant Roche announced a partnership with Cambridge Quantum Computing (CQC) to support efforts in research tackling Alzheimer's disease.

2 CREATING BETTER BATTERIES

Similar to drug design, therefore, battery design is another data-heavy job that's better suited to a quantum computer than a classical device. This is why German car manufacturer Daimler has now partnered with IBM to assess how quantum computers could help simulate the behaviour of sulphur molecules in different environments, with the end-goal of building lithium-sulphur batteries that are better-performing, longer-lasting and less expensive that today's lithium-ion ones.

3. PREDICTING THE WEATHER

There are countless ways that a weather event might manifest itself, and classical devices are incapable of ingesting all of the data required for a precise prediction. On the other hand, just as quantum computers could simulate all of the particle interactions going on within a molecule at the same time to predict its behaviour, so could they model how innumerable environmental factors all come together to create a major storm, a hurricane or a heatwave.

4. PICKING STOCKS

JP Morgan, Goldman Sachs and Wells Fargo are all actively investigating the potential of quantum computers to improve the efficiency of banking operations -- a use case often put forward as one that could come with big financial rewards. There are several ways that the technology could support the activities of banks, but one that's already showing promise is the application of quantum computing to a procedure known as Monte Carlo simulation. Quantum computers' unprecedented computation abilities could speed up Monte Carlo calculations by up to 1,000 times, according to research carried out by Goldman Sachs together with quantum computing company QC Ware.

5. PROCESSING LANGUAGE

Even state-of-the-art natural language processing (NLP) classical algorithms can still struggle to understand the meaning of basic sentences. But researchers are investigating whether quantum computers might be better suited to representing language as a network -- and, therefore, to processing it in a more intuitive way. The field is known as quantum natural language processing (QNLP), and is a key focus of Cambridge Quantum Computing (CQC). The company has already experimentally shown that sentences can be parameterised on quantum circuits, where word meanings can be embedded according to the grammatical structure of the sentence. More recently, CQC released lambeq, a software toolkit for QNLP that can convert sentences into a quantum circuit.

6. HELPING TO SOLVE THE TRAVELLING SALESMAN PROBLEM

Energy giant ExxonMobil, for example, has been trying to optimise the daily routing of merchant ships crossing the oceans -- that is, more than 50,000 ships carrying up to 200,000 containers each, to move goods with a total value of $14 trillion. Some classical algorithms exist already to tackle the challenge. But given the huge number of possible routes to explore, the models inevitably have to resort to simplifications and approximations. ExxonMobil, therefore, teamed up with IBM to find out if quantum algorithms could do a better job. Quantum computers' ability to take on several calculations at once means that they could run through all of the different routes in tandem, allowing them to discover the most optimal solution much faster than a classical computer, which would have to evaluate each option sequentially./

Source: zdnet
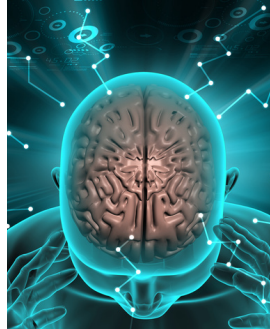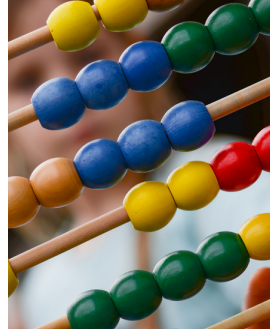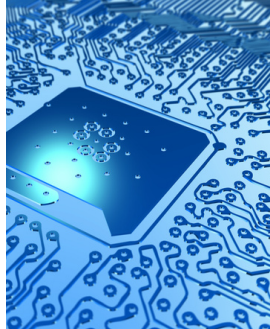
HEALDLINE NEWS IN A FLASH

MARK ZUCKERBERG SAYS A NEW SKIN-LIKE MATERIAL COULD SUPPORT METAVERSE AMBITIONS

Facebook co-founder Mark Zuckerberg, now CEO of Meta, said Monday that a new touch sensor and a plastic material could work to together to potentially support the development of a so-called metaverse. Together with scientists from Carnegie Mellon University, artificial intelligence researchers at Meta created a deformable plastic "skin" less than 3 millimeters thick. The relatively cheap material, known as ReSkin, has magnetic particles inside that produce a magnetic field. When the skin comes into contact with another surface, the magnetic field from the embedded particles changes. The sensor records the change in magnetic flux, before feeding the data to some AI software, which attempts to understand the force or touch that has been applied./

Source: CNBC

AI MAY BE BETTER THAN HUMANS AT DESIGNING MICROCHIPS

The process of designing the physical layout of a chip's parts, known as floor planning, is key to a device's ultimate performance. This complex task often requires months of intense efforts from experts, and despite five decades of research, no automated floorplanning technique has reached human-level performance until now. In the new study, the researchers had AI software treat floorplanning as a game, said study co-lead author Azalia Mirhoseini, a computer scientist at Google Research's Brain Team in Mountain View, California. In this approach, the chip's computation cores, memory controllers and other elements are the pieces, the canvas on which they sit is the board, and a winning result is optimal performance according to a range of values such as chip size and power usage./

Source: Inside Science

AI CAN NOW COMPLETE YOUR KID'S MATHEMATICS HOMEWORK

Researchers have successfully developed an AI system capable of completing mathematics problems at a grade school level, a new report asserts. Traditionally, while AI models are proficient at manipulating language to formulate sentences, the multi-step reasoning required to solve math problems has been a step too far. However, researchers at OpenAI (the company behind language model GPT-3) say they have trained a model to recognize its own mistakes, which means it can repeatedly reassess until it discovers a workable solution. In testing, the AI system was able to solve almost as many problems as a sample of children between the ages of nine and twelve. The children scored 60% on a test drawn down from the OpenAI database, while the AI system scored 55%./

Source: Techradar

USING AI, TEAM MAPS N_2O EMISSION HOTSPOTS—AND PINPOINTS SURPRISINGLY FEASIBLE SOLUTIONS

Soil may be one of the best tools we have to tackle climate change, if we can curtail the vast amounts of greenhouse gas it emits into the atmosphere, suggest a group of researchers writing in Nature Food. They've created a comprehensive map that identifies dozens of global hotspots where we could do that, to bring agriculture in line with climate targets. Intriguingly, they find that cutting emissions across just 20% of global cropland where fertilizers are prevalent could achieve the majority of reductions we need to reach that goal—while leaving food production unchanged./

Source: Alarabiya News

BOOSTING HUMAN MENTAL FUNCTION WITH BRAIN STIMULATION

In a pilot human study, researchers from the University of Minnesota Medical School and Massachusetts General Hospital show it is possible to improve specific human brain functions related to self-control and mental flexibility by merging artificial intelligence with targeted electrical brain stimulation. The findings come from a human study conducted at Massachusetts General Hospital in Boston among 12 patients undergoing brain surgery for epilepsy — a procedure that places hundreds of tiny electrodes throughout the brain to record its activity and identify where seizures originate. Researchers identified a brain region — the internal capsule — that improved patients' mental function when stimulated with small amounts of electrical energy. That part of the brain is responsible for cognitive control — the process of shifting from one thought pattern or behavior to another, which is impaired in most mental illnesses./

Source: neurosciencenews

TEACHING STUDENTS TO MAKE GOOD CHOICES IN AN ALGORITHM-DRIVEN WORLD

In January, Colby College announced the formation of the Davis Institute for Artificial Intelligence, calling it the "first cross-disciplinary institute for artificial intelligence at a liberal arts college." There's a clue in a statement from the Davis Institute's first director, natural language processing expert Amanda Stent. "AI will continue to have broad and profound societal impact, which means that the whole of society should have a say in what we do with it. For that to happen, each of us needs to have a foundational understanding of the nature of this technology," she said. Most liberal arts colleges are disadvantaged./

Source: Edsurge

SECURITY AI IS THE NEXT BIG THING

> **In the world of cybersecurity, speed kills. In less than 20 minutes, a skilled adversary can break into an organization's network and start exfiltrating critical data assets, and as the volume of data modern companies produce increases, it's becoming ever more difficult for human analysts to spot malicious activity until it's too late. This is where cybersecurity AI can come to the rescue.**

Given the complexity of modern attacks, "there is absolutely no way that human defenders can keep up with it, so we must have artificial intelligence capabilities in the technologies and solutions we're providing," said Ann Johnson, corporate vice president of security, compliance, and identity at Microsoft. For modern organizations, AI is now vital for keeping up with the fast-moving threat landscape and offers a variety of use cases that enterprises can leverage to improve their security posture.

SHUTTING DOWN ATTACKS EARLY WITH IR

Perhaps the most compelling use case for AI in cybersecurity is incident response. AI enables organizations to automatically detect anomalous behavior within their environments and conduct automated responses to contain intrusions as quickly as possible.

One of the most high-profile uses of AI this year occurred at the Olympic Games in Tokyo, when Darktrace AI identified a malicious Raspberry Pi IoT device that an intruder had planted into the office of a national sporting body directly involved in the Olympics. The solution detected the device port scanning nearby devices, blocked the connections, and supplied human analysts with insights into the scanning activity so they could investigate further.

"Darktrace was able to weed out that there was something new in the environment that was displaying interesting behavior," Darktrace's chief information security officer (CISO) Mike Beck said. Beck noted there was a distinct change in behavior in terms of the communication profiles that exist inside that environment.

When considering the amount of data the national body was processing in the run-up to the Olympics, it would have been impossible for a human analyst to spot such an attack at the same speed as the AI, Beck said.

"In 2021, and going forward, there is too much digital data. That is the raw reality," Beck said. "You have to be using intelligent AI to find these attacks, and if you don't, there's going to be a long period of dwell time, and those attackers are going to have free rein."

CHARTING AND LABELING PROTECTED DATA

Keeping up with the latest threats isn't the only compelling use case that AI has within cybersecurity. AI also offers the ability to automatically process and categorize protected data so that organizations can have complete transparency over how they process this data; it also ensures that they remain compliant with data privacy regulations within an ever-more-complex regulatory landscape.

"Our regulatory department tells me we evaluate 250 new regulations daily across the world to see what we need to be in compliance, so then take all of that and think about all the different laws that are being passed in different countries around data; you need machine-learning capabilities," Johnson said.

In practice, Johnson said, that means "using a lot of artificial intelligence and machine learning to understand what the data actually is and to make sure we have the commonality of labeling, to make sure we understand where the data is transiting," a task too monumental for even the largest team of security analysts.

"It's up to AI to decide: Is this a U.S. Social Security number, or just [nine] characters that are something else?" Johnson said. By categorizing and labeling sensitive data, AI makes it easier for an organization to take inventory of what protected information is transiting where, so admins can accurately report to regulators on how that data is handled and prevent exposure to unauthorized individuals.

BUILDING ZERO-TRUST ARCHITECTURES

At the same time, the ability to build automated zero-trust architectures and to ensure that only authorized users and devices have access to privileged information is emerging as one of the most novel use cases of AI. AI-driven authentication can ensure that nobody except authorized users has access to sensitive information.

As Ann Cleaveland, executive director of the Center for Long-Term Cybersecurity at UC Berkeley, explained, "One of the most powerful emerging use cases is the implementation of so-called zero-trust architectures and continuous or just-in-time authentication of users on the system and verification of devices."

Zero-trust AI systems leverage a range of data points to identify and authenticate authorized users at machine speed accurately. "These systems are underpinned by machine-learning models that take time, location, behavior data, and other factors to assign a risk score that is used to grant or deny access," Cleaveland said.

When utilized correctly, these solutions can detect when unauthorized individual attempts to access privileged information and block the connection. Cleaveland said that these capabilities are becoming more important following the mass shift to remote or hybrid work environments that have taken place throughout the COVID-19 pandemic.

BRIDGING THE SKILLS GAP WITH AUTOMATION

One of the main drivers of adoption for some organizations is AI's ability to bridge the IT skills gap by enabling in-house security teams to do more with less through the use of automation. AI can automatically complete tedious manual tasks, such as processing false-positive alerts so that analysts have a more manageable workload and additional time to focus on more productive and rewarding high-level tasks.

"We've been able to automate 97% of routine tasks that occupied a defender's time just a few years ago, and we can help them respond 50 percent faster," Johnson said. "And the reason is that we can do a lot of automated threat hunting across all of the platforms in a much quicker way than a human could actually do them."

"This isn't a takeover by AI," Beck said. "AI is there to be a force multiplier for security teams. It's doing a whole load of digital work behind the scenes now to present to human teams genuine decisions that they have to make so that we have a point where those human teams can decide how to take action."

Ultimately, humans have control over the types of tasks they automate, choosing what tasks are automated and how they use AI solutions. While AI is essential to cybersecurity for modern organizations, so are human analysts, and guess what? They're not going away anytime soon./

Source: VentureBeat

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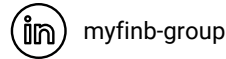
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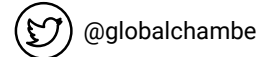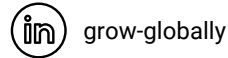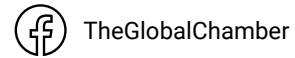
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