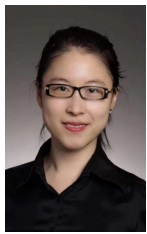


Weekly Discovery

We SHARE to inspire and ignite ideas!

29 Jan – 2 Feb 2024

AI Chats With AI Shift Attitudes on Climate Change, Black Lives Matter



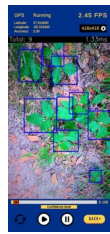
"People who were more skeptical of human-caused climate change or the Black Lives Matter movement who took part in conversation with a popular AI chatbot were disappointed with the experience but left the conversation more supportive of the scientific consensus on climate change or BLM. This is according to researchers studying how these chatbots handle interactions from people with different cultural backgrounds.

Savvy humans can adjust to their conversation partners' political leanings and cultural expectations to make sure they're understood, but more and more often, humans find themselves in conversation with computer programs, called large language models, meant to mimic the way people communicate.

Researchers at the University of Wisconsin-Madison studying AI wanted to understand how one complex large language model, GPT-3, would perform across a culturally diverse group of users in complex discussions. The model is a precursor to one that powers the high-profile ChatGPT. The researchers recruited more than 3,000 people in late 2021 and early 2022 to have real-time conversations with GPT-3 about climate change and BLM."

Source: [WISC](#) (25 Jan 2024)

AI AI-Powered App Can Detect Poison Ivy



"Poison ivy ranks among the most medically problematic plants. Up to 50 million people worldwide suffer annually from rashes caused by contact with the plant, a climbing, woody vine native to the United States, Canada, Mexico, Bermuda, the Western Bahamas and several areas in Asia.

It's found on farms, in woods, landscapes, fields, hiking trails and other open spaces. So, if you go to those places, you're susceptible to irritation caused by poison ivy, which can lead to reactions that require medical attention. Worse, most people don't know poison ivy when they see it.

To find poison ivy before it finds you, University of Florida scientists published a new study in which they use artificial intelligence to confirm that an app can identify poison ivy."

Source: [EurekAlert!](#) (30 Jan 2024)

ARCHITECTURE Sculpting Facades: Using New Technology to Create a More Textural and Expressive Architecture



"Advancements in 3D printing technology are progressing at an unprecedented pace, accompanied by a parallel surge in computational power for manipulating and creating intricate geometries. This synergy has the potential to offer architects an unprecedented level of artistic freedom in regards to the complex textures they can generate, thanks to the technology's remarkable high resolution and rapid manufacturing capabilities. If the question of production was out of the way, and architects could now sculpt virtually anything into a facade effectively and efficiently, what would they sculpt?"

Although we have seen development in the high-resolution 3D printing field in the form of prototypes, in the past year, we have witnessed the materialization of architectural projects using the technology at the facade level. Studio RAP in Amsterdam has effectively manufactured 3D-printed modularized systems that use algorithmically generated geometries. Just last year, they wrapped up "Ceramic House," a boutique store in Amsterdam, constructed by using individually 3D printing ceramic tiles mounted on a laser-cut stainless steel frame, employing algorithmic design inspired by the art of weaving."

Source: [Archdaily](#) (10 Jan 2024)

COMMUNICATION How To Elicit an Authentic 'Yes'



"When making a request of someone, would you like them to answer honestly? Try giving them a script.

That is one recommendation from researchers at the ILR School and University of Michigan, who developed strategies to evoke authentic responses from people – even if it's a hard "no" – instead of acquiescence motivated by awkwardness or guilt."

Source: [Cornell](#) (25 Jan 2024)

DESIGN "We Need to Design for Human Behaviour If We're Ever to Get Rid of Single-Use Plastics"

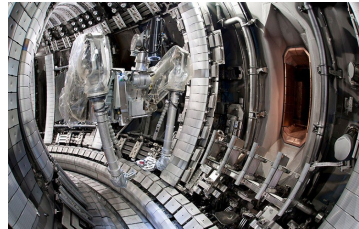


"Packaging designs aimed at boosting recycling rates and reducing the prevalence of single-use plastics are destined to fail unless they help to change people's behaviour, writes Matt Millington.

It's not that we don't care: research suggests consumer motivation towards environmentally positive behaviour is high. It's that as a society we have developed an expectation of convenience: to have what we want, when we want it, without any consequences."

Source: [Dezeen](#) (24 Jan 2024)

ENERGY Pioneering Nuclear-Fusion Reactor Shuts Down: What Scientists Will Learn



"Scientists have begun to decommission one of the world's foremost nuclear-fusion reactors, 40 years after it began operations. Researchers will study the 17-year process of dismantling the Joint European Torus (JET) near Oxford, UK, in unprecedented detail — and use the knowledge to make sure future fusion power plants are safe and financially viable.

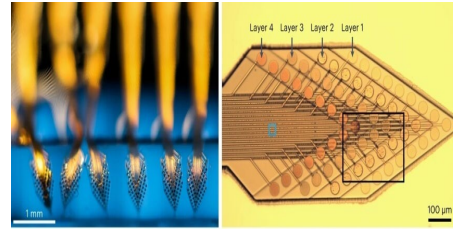
"We are starting to think seriously about a fusion power plant," says Rob Buckingham, who leads on decommissioning for the UK Atomic Energy Authority (UKAEA), which oversees JET. "This means thinking about the whole plant life cycle."

Harnessing the fusion of atoms — the process that powers the Sun — could provide humans with a near-limitless source of clean energy. Creating the conditions for fusion in power plants and exploiting the resulting energy will require complex engineering that hasn't yet been proved, meaning that commercial fusion power is still many decades away.

But researchers are pushing ahead with designs for the first commercial reactors as excitement about fusion grows. In 2022, JET smashed the record for the amount of energy created through fusion. And the US National Ignition Facility (NIF) in Livermore, California — the flagship US fusion facility — now routinely generates more energy from a fusion reaction than was put in. The NIF calculations do not include the entire energy requirements of running the facility, which fusion plants would need to exceed to truly 'break even', but physicists have celebrated the milestones."

Source: [Nature](#) (22 Jan 2024)

HEALTH TECH A Long-Lasting Neural Probe



"Recording the activity of large populations of single neurons in the brain over long periods of time is crucial to further our understanding of neural circuits, to enable novel medical device-based therapies and, in the future, for brain-computer interfaces requiring high-resolution electrophysiological information.

But today there is a tradeoff between how much high-resolution information an implanted device can measure and how long it can maintain recording or stimulation performances. Rigid, silicon implants with many sensors, can collect a lot of information but can't stay in the body for very long. Flexible, smaller devices are less intrusive and can last longer in the brain but only provide a fraction of the available neural information.

Recently, an interdisciplinary team of researchers from the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS), in collaboration with The University of Texas at Austin, MIT and Axoft, Inc., developed a soft implantable device with dozens of sensors that can record single-neuron activity in the brain stably for months.

The research was published in *Nature Nanotechnology*."

Source: [HARVARD](#) (26 Jan 2024)

ROBOTICS Amazon's Acquisition of iRobot Falls Through: iRobot Is Laying Off 31 Percent of Its Staff and Suspending Its Non-Floorcare R&D



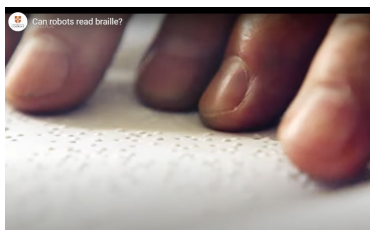
"Citing "no path to regulatory approval in the European Union," Amazon and iRobot have announced the termination of an acquisition deal first announced in August of 2022 that would have made iRobot a part of Amazon and valued the robotics company at US \$1.4 billion.

The European Commission released a statement today that explained some of its concerns, which to be fair, seem like reasonable things to be concerned about:

Our in-depth investigation preliminarily showed that the acquisition of iRobot would have enabled Amazon to foreclose iRobot's rivals by restricting or degrading access to the Amazon Stores.... We also preliminarily found that Amazon would have had the incentive to foreclose iRobot's rivals because it would have been economically profitable to do so. All such foreclosure strategies could have restricted competition in the market for robot vacuum cleaners, leading to higher prices, lower quality, and less innovation for consumers."

Source: [IEEE Spectrum](#) (29 Jan 2024)

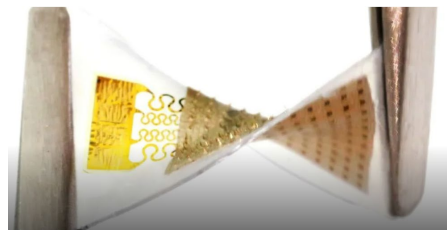
ROBOTICS Robot Trained to Read Braille at Twice the Speed of Humans



"The research team, from the University of Cambridge, used machine learning algorithms to teach a robotic sensor to quickly slide over lines of braille text. The robot was able to read the braille at 315 words per minute at close to 90% accuracy.

Although the robot braille reader was not developed as an assistive technology, the researchers say the high sensitivity required to read braille makes it an ideal test in the development of robot hands or prosthetics with comparable sensitivity to human fingertips. The

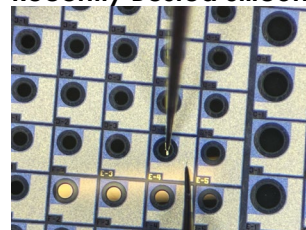
ROBOTICS Engineers Unveil New Patch to Help People Control Robotic Exoskeletons



"Hey superhero fans, meet the researchers making real life Iron Man technology possible. In a new study, engineers from Korea and the United States have developed a wearable, stretchy patch that could help to bridge the divide between people and machines—and with benefits for the health of humans around the world.

The patch, about the size of a BandAid, sticks to your skin and picks up tiny signals coming from human muscles. In lab experiments, the researchers showed that humans could use

SEMICONDUCTORS The New, New Transistor: In Power Electronics, Aluminum Nitride Could Overtake Two Powerhouses That Only Recently Bested Silicon



"Over the past decade, one of the biggest stories in semiconductors has been a surprise eclipsing of traditional silicon—in the field of power electronics, where silicon carbide (SiC) and gallium nitride (GaN) have raced past silicon to capture multibillion-dollar segments of the market. And as major applications fell to these upstarts, with their superior attributes, a question naturally arose. What would be the next new power semiconductor—the one whose superior capabilities would grab major market share from SiC and GaN?"

WASTE MANAGEMENT As Cities Grow, How Will City Trash, Wastewater, and Emissions Rise?



"To address these matters, Lu and Chris Kempes, a professor at the Sante Fe Institute, and their colleagues examined waste production in urban systems. Specifically, the authors used scaling theory to analyze waste products—municipal solid waste, wastewater, and greenhouse gas emissions—from more than 1,000 cities around the world. Scaling theory, which describes how changes in the size of systems impact a range of system properties, has been used to elucidate phenomena in urban systems—such as the

results are reported in the journal IEEE Robotics and Automation Letters.

Human fingertips are remarkably sensitive and help us gather information about the world around us. Our fingertips can detect tiny changes in the texture of a material or help us know how much force to use when grasping an object: for example, picking up an egg without breaking it or a bowling ball without dropping it.

Reproducing that level of sensitivity in a robotic hand, in an energy-efficient way, is a big engineering challenge. In Professor Fumiya Iida's lab in Cambridge's Department of Engineering, researchers are developing solutions to this and other skills that humans find easy, but robots find difficult."

Source: [Cambridge](#) (29 Jan 2024)

these devices to operate robotic exoskeletons more efficiently—machines that try to mimic, and even enhance, the power of human muscles and bones.

The team hopes that one day, similar patches may help people move robotic arms or legs, or even assist doctors in diagnosing neurological illnesses.

"We get these natural signals from muscles and send them to outside equipment to give people more control," said Jianliang Xiao, associate professor in Paul M. Rady Department of Mechanical Engineering at CU Boulder."

Source: [COLORADO](#) (31 Jan 2024)

Attention has focused on three candidates: gallium oxide, diamond, and aluminum nitride (AlN). All of them have remarkable attributes, as well as fundamental weaknesses that have so far precluded commercial success. Now, however, AlN's prospects have improved enormously thanks to several recent breakthroughs, including a technological advance at Nagoya University reported at the most recent IEEE International Electron Devices Meeting, held this past December in San Francisco."

Source: [IEEE Spectrum](#) (30 Jan 2024)

accelerating wealth creation as cities get bigger—so is a suitable means for understanding how waste production scales with the growth of a city.

"The key question is whether waste is produced more or less efficiently as systems scale up, and how big a recycling burden there is as a consequence," says Kempes.

Their findings, which appear in the journal Nature Cities, showed distinct differences in waste production as cities grow."

Source: [NYU](#) (30 Jan 2024)

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