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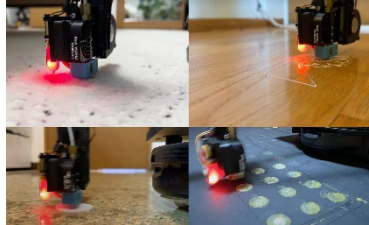
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3D PRINTING

This Mobile 3D Printer Can Print Directly on Your Floor: Mobiprint Autonomously Maps Its Environment—Then Alters It



"Waiting for each part of a 3D-printed project to finish, taking it out of the printer, and then installing it on location can be tedious for multi-part projects. What if there was a way for your printer to print its creation exactly where you needed it? That's the promise of MobiPrint, a new 3D printing robot that can move around a room, printing designs directly onto the floor.

MobiPrint, designed by Daniel Campos Zamora at the University of Washington, consists of a modified off-the-shelf 3D printer atop a home vacuum robot. First it autonomously maps its space—be it a room, a hallway, or an entire floor of a house. Users can then choose from a prebuilt library or upload their own design to be printed anywhere in the mapped area. The robot then traverses the room and prints the design.

It's "a new system that combines robotics and 3D printing that could actually go and print in the real world," Campos Zamora says. He presented MobiPrint on 15 October at the ACM Symposium on User Interface Software and Technology."

Source: [IEEE Spectrum](#) (11 Nov 2024)

AI

Machine Learning Might Save Time on Chip Testing: Experimental NXP Algorithm Could Cut Majority of Tests for Some Chips



"Finished chips coming in from the foundry are subject to a battery of tests. For those destined for critical systems in cars, those tests are particularly extensive and can add 5 to 10 percent to the cost of a chip. But do you really need to do every single test?

Engineers at NXP have developed a machine-learning algorithm that learns the patterns of test results and figures out the subset of tests that are really needed and those that they could safely do without. The NXP engineers described the process at the IEEE International Test Conference in San Diego last week.

NXP makes a wide variety of chips with complex circuitry and advanced chip-making technology, including inverters for EV motors, audio chips for consumer electronics, and key-fob transponders to secure your car. These chips are tested with different signals at different voltages and at different temperatures in a test process called continue-on-fail. In that process, chips are tested in groups and are all subjected to the complete battery, even if some parts fail some of the tests along the way."

Source: [IEEE Spectrum](#) (10 Nov 2024)

ARCHITECTURE

Amplifying Female Voices: Premiering The Second Chapter Of 'Women in Architecture'



"ArchDaily is excited to present the second installment of the docu-series Women in Architecture, a project launched by Sky-Frame and directed by Boris Noir. Following an initial episode featuring Toshiko Mori, Gabriela Carrillo, and Johanna Meyer-Grohbrügge, the documentary moves to Copenhagen and Lagos, spotlighting Dorte Mandrup and Tosin Oshinowo. "Two distinct personalities at very different stages in their lives and careers," as Boris Noir describes it, the protagonists bring unique perspectives to similar challenges.

By showcasing diversity and equity in architecture, Women in Architecture broadens perspectives and ensures that the built environment reflects and serves all communities. The film highlights how the unique experiences of Dorte Mandrup and Tosin Oshinowo shape their architectural contributions. As a documentary—a powerful medium for truth-telling—it captures real, compelling stories authentically, inviting audiences to view life from diverse perspectives and fostering empathy."

Source: [Archdaily](#) (12 Nov 2024)

ARCHITECTURE

Big 5 Global and Liveablecitiesx: Premier Global Gathering for Urban Development and Construction Leaders



"As global urbanization accelerates, the demand for forward-thinking urban development and construction strategies is more pressing than ever, with an estimated 80% of the world's population expected to live in cities by 2080—particularly in the Middle East, Africa and South Asia. From 26 to 29 November, Big 5 Global, together with co-located events LiveableCitiesX, GeoWorld and Future FM, will host five strategic summits, bringing together 1,500 leaders from both government and the private sector to shape the future of urban communities.

"As cities in the Global South face challenges like overcrowding and resource optimization, the Global North faces the complexities of aging populations and infrastructure, all which require immediate action. This calls for governments, national vision initiatives and the construction sector to work together and build liveable cities of tomorrow," said Josine Heijmans, Senior Vice President, dmg events."

Source: [Archdaily](#) (12 Nov 2024)

ARCHITECTURE

Airports As Destinations: Branding Cities in East and Southeast Asia



"Air travel has opened up multiple avenues for travel experiences. Lately, these transitional spaces have become destinations themselves, with airports like the Hong Kong International Airport and Incheon International Airport commanding over 60 million visitors per year. Airports are often the first and last impression of a city, and designers and city planners are recognizing their role in telling a place's brand story. As hubs of both travel and tourism, these airports aim to blend functionality with cultural engagement, offering passengers a taste of the local flavor before they even leave the terminal.

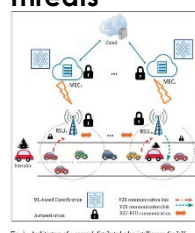
Packed with a golf course, ice skating rink, and even a Museum of Korean Culture, Seoul's Incheon International Airport offers amenities that provide entertainment for long layovers and attract even casual visitors. The Hong Kong Airport is another one of the growing number of airports enticing passengers with exciting forms of entertainment. The airport hosts a four-month cultural festival of music and art and also boasts a workshop where passengers can make personalized gifts and enjoy VR experiences.

These mega-hubs set a new vision for what airports can be, breaking the distinction between transportation infrastructure and urban attractions. By integrating art, culture, and recreation into their design, these airports are going beyond the typical passenger experience, transforming what was once merely a waiting area into a community space and a touristic attraction in its own right."

Source: [Archdaily](#) (11 Nov 2024)

AUTONOMOUS VEHICLES

Researchers Develop AI Tool To Safeguard Vehicles from Cyber Threats



"Scientists claim to have developed an artificial intelligence tool to consolidate the privacy of vehicles and their drivers.

How to preserve the privacy of the so-called Internet of Vehicles (IoV) has emerged as a major challenge due to geographical mobility of vehicles and insufficient resources, the scientists say.

The problem has aggravated, according to the scientists, due to the "limited resources of onboard units (OBUs)" and the shortcomings of embedded sensors installed in vehicles, which "lure the adversaries to launch various types of attacks."

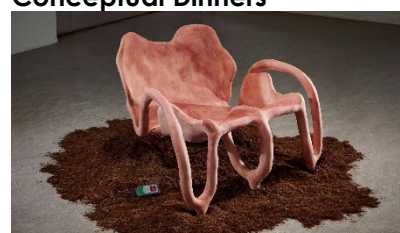
"Thus, lightweight but reliable authentication schemes need to be designed to combat these attacks," they write in the IEEE Internet of Things Journal. The research is co-authored by scientists from the University of Sharjah in the United Arab Emirates, the University of Maryland in the US, and Abdul Wali Khan University Mardan, Pakistan.

The Internet of Vehicles (IoV) refers to a network in which vehicles can communicate with each other, as well as with intelligent communication devices in parking lots, pedestrians, and road infrastructure. This technology "has transformed cities around the globe by providing real-time communication," the authors note."

Source: [EurekAlert!](#) (11 Nov 2024)

DESIGN

Six Trends from Dutch Design Week 2024 Including Polluted Materials and Conceptual Dinners



"A heated chair and dye made from heavy metal contamination feature in this roundup of six key trends from Dutch Design Week.

Taking over Eindhoven from 19 to 27 October, the festival is billed as the "largest design event in northern Europe" and is perhaps the most significant platform for emerging designers on the continent.

In projects by more than 2,600 designers set across some 120 venues, Dezeen's design editor Jennifer Hahn found plenty of innovative and unorthodox ideas around sustainability and society.

Read on for the six key trends to know from this year's Dutch Design Week."

Source: [Dezeen](#) (23 Oct 2024)

MED TECH

UC Study Shows the Effectiveness of a Portable EKG Patch



"Research from the University of Cincinnati College of Medicine shows that a newly-developed wireless EKG patch is as accurate, if not more accurate, than results from traditional EKG machines. The device, known as the EKG Patch Solution, was developed by the Cincinnati-based MG Medical Products...

Its lead author, Richard Becker, MD, professor of medicine in the UC College of Medicine, says the patch is easier for medical staff to correctly attach to patients and less likely to display misrepresentations of important information when reading the electrical activity of the heart.

"It's easy to use and can consistently be placed on the chest without a complicated learning curve for medical staff," says Becker, also a cardiologist at UC Health, the university-affiliated health care system. "We also found that the likelihood of an artifact which is due to one of the leads not being placed correctly or as firmly as it should be, was 50% less likely to occur. Having a high quality EKG is essential to diagnostic accuracy and achieving good health outcomes."

Becker says Patch EKG has an all-in-one design with built-in lead wires attached to pre-positioned electrodes for easier placement on the chest to eliminate electrode misplacement errors. It was tested in a prospective, single blind study of 200 heart patients against the standard traditional 12-lead EKG procedure."

Source: [UC](#) (7 Nov 2024)

NEUROSCIENCE

The Quest to Build Bionic Limbs That Feel Like the Real Thing

QUANTUM

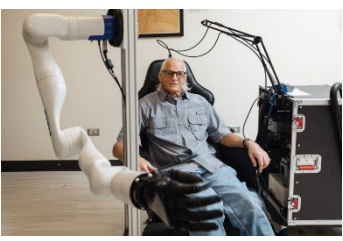
Compact Error Correction: Towards A More Efficient Quantum 'Hard Drive'

ROBOTS

Giving Robots Superhuman Vision Using Radio Signals

SENSORS

New Haptic Patch Transmits Complexity of Touch to The Skin



"Scott Imbrie still remembers the first time that physicians switched on the electrodes sitting on the surface of his brain. He felt a tingling, poking sensation in his hand, like "reaching into an evergreen bush", he says. "It was like I was decorating a Christmas tree."

Back in 1985, a car crash shattered three of Imbrie's vertebrae and severed 70% of his spinal cord, leaving him with very limited sensation or mobility in parts of his body. Now, thanks to an implanted brain-computer interface (BCI), Imbrie can operate a robotic arm, and receive sensory information related to what that arm is doing. Imbrie spends four days a week, three hours at a time, testing, refining and tuning the device with a team of researchers at the University of Chicago in Illinois.

Scientists have been trying to restore mobility for people with missing or paralysed limbs for decades. The aim, historically, was to give people the ability to control prosthetics with commands from the nervous system. But this motor-first approach produced bionic limbs that were much less helpful than hoped: devices were cumbersome and provided only rudimentary control of a hand or leg. What's more, they just didn't feel like they were part of the body and required too much concentration to use.

Scientists gradually began to realize that restoring full mobility meant restoring the ability to sense touch and temperature, says Robert Gaunt, a bioengineer at the University of Pittsburgh in Pennsylvania. Gaunt says that this realization has led to a revolution in the field."

Source: [Nature](#) (12 Nov 2024)



"University of Sydney quantum researchers Dominic Williamson and Nouédyn Baspin have revealed a transformative new architecture for managing errors that emerge in the operation of quantum computers.

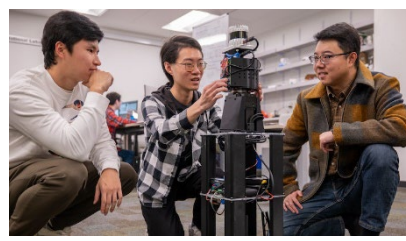
Their innovative theoretical approach promises to not only enhance the reliability of quantum information storage but also significantly reduce the physical computing resources needed to create 'logical qubits' (or 'quantum switches' that can perform useful calculations). This should lead to the development of a more compact "quantum hard drive".

Lead author Dr Dominic Williamson from the University of Sydney Nano Institute and School of Physics said: "There remain significant barriers to overcome in the development of a universal quantum computer. One of the biggest is the fact we need to use most of the qubits – quantum switches at the heart of the machines – to suppress the errors that emerge as a matter of course within the technology.

"Our proposed quantum architecture will require fewer qubits to suppress more errors, liberating more for useful quantum processing," said Dr Williamson, who is currently working for 12 months as a quantum researcher at IBM.

The study has been published in [Nature Communications](#)."

Source: [SYDNEY](#) (11 Nov 2024)



"In the race to develop robust perception systems for robots, one persistent challenge has been operating in bad weather and harsh conditions. For example, traditional, light-based vision sensors such as cameras or LiDAR (Light Detection And Ranging) fail in heavy smoke and fog.

However, nature has shown that vision doesn't have to be constrained by light's limitations — many organisms have evolved ways to perceive their environment without relying on light. Bats navigate using the echoes of sound waves, while sharks hunt by sensing electrical fields from their prey's movements.

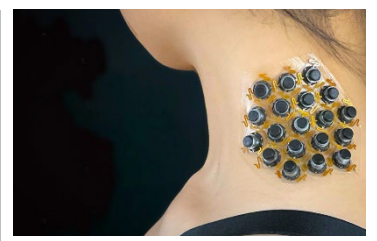
Radio waves, whose wavelengths are orders of magnitude longer than light waves, can better penetrate smoke and fog, and can even see through certain materials — all capabilities beyond human vision. Yet robots have traditionally relied on a limited toolbox: they either use cameras and LiDAR, which provide detailed images but fail in challenging conditions, or traditional radar, which can see through walls and other occlusions but produces crude, low-resolution images.

A New Way to See

Now, researchers from the University of Pennsylvania School of Engineering and Applied Science (Penn Engineering) have developed PanoRadar, a new tool to give robots superhuman vision by transforming simple radio waves into detailed, 3D views of the environment.

"Our initial question was whether we could combine the best of both sensing modalities," says Mingmin Zhao, Assistant Professor in Computer and Information Science. "The robustness of radio signals, which is resilient to fog and other challenging conditions, and the high resolution of visual sensors."

Source: [UPENN](#) (12 Nov 2024)



"In a paper published this week in Chaos, by AIP Publishing, researchers from Sergio Arboleda University in Bogotá, Colombia, and the Georgia Institute of Technology in Atlanta used an electrophysiological computer model of the heart's electrical circuits to examine the effect of the applied voltage field in multiple fibrillation-defibrillation scenarios. They discovered far less energy is needed than is currently used in state-of-the-art defibrillation techniques.

"The results were not at all what we expected. We learned the mechanism for ultra-low-energy defibrillation is not related to synchronization of the excitation waves like we thought, but is instead related to whether the waves manage to propagate across regions of the tissue which have not had the time to fully recover from a previous excitation," author Roman Grigoriev said. "Our focus was on finding the optimal variation in time of the applied electric field over an extended time interval. Since the length of the time interval is not known a priori, it was incremented until a defibrillating protocol was found."

The authors applied an adjoint optimization method, which aims to achieve a desired result, defibrillation in this case, by solving the electrophysiologic model for a given voltage input and looping backward through time to determine the correction to the voltage profile that will successfully defibrillate irregular heart activity while reducing the energy the most.

Energy reduction in defibrillation devices is an active area of research. While defibrillators are often successful at ending dangerous arrhythmias in patients, they are painful and cause damage to the cardiac tissue.

"Existing low-energy defibrillation protocols yield only a moderate reduction in tissue damage and pain," Grigoriev said. "Our study shows these can be completely eliminated. Conventional protocols require substantial power for implantable defibrillators-cardioverters (ICDs), and replacement surgeries carry substantial health risks.""

Source: [Northwestern](#) (6 Nov 2024)

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