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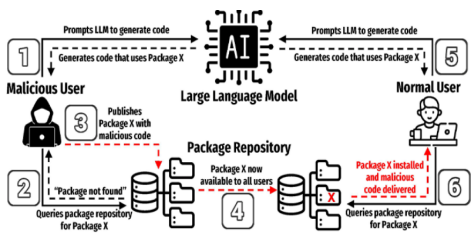
Weekly Discovery

We SHARE to inspire and ignite ideas!

14 Apr - 18 Apr 2025

AI

UTSA Researchers Investigate AI Threats In Software Development



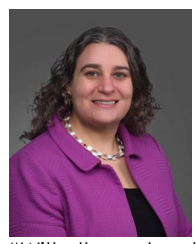
"UTSA researchers recently completed one of the most comprehensive studies to date on the risks of using AI models to develop software. In a new paper, they demonstrate how a specific type of error could pose a serious threat to programmers that use AI to help write code.

Joe Spracklen, a UTSA doctoral student in computer science, led the study on how large language models (LLMs) frequently generate insecure code. His team's paper has been accepted for publication at the USENIX Security Symposium 2025, a premier cybersecurity and privacy conference."

Source: UTSA (9 Apr 2025)

AI

While AI Could Be the Game Changer in Predicting Health Outcomes It Should Not Be the Only Method



"With the advent of artificial intelligence (AI), predictive medicine is becoming an important part of healthcare, especially in cancer treatment. Predictive medicine uses algorithms and data to help doctors understand how a cancer might continue to grow or react to specific drugs—making it easier to target precision treatment for individual patients.

While AI is important in this work, researchers from University of Maryland School of Medicine (UMSOM) say that it should not be relied on exclusively. Instead, AI should be combined with other methods, such as traditional mathematical modeling, for the best outcomes.

In a commentary published April 14 in Nature Biotechnology, Elana Fertig, PhD, Director of the Institute for Genome Sciences (IGS) and Professor of Medicine at UMSOM and Daniel Bergman, PhD, an IGS scientist argue that mathematical modeling has been underestimated and under-used in precision medicine to date.

All health computational models need three key components to work: datasets, equations, and software. Then, after generating data comes leveraging it to improve early diagnoses, discover new treatments, and aid understanding of the diseases."

Source: EurekAlert! (15 Apr 2025)

ARCHITECTURE

Environmental Noise: Improving Urban Soundscapes for Well-Being

"According to several recent studies, noise in cities has become an increasing hazard to health. Environmental noise, that is, noise from traffic, industrial activities, or amplified music, which reaches internal spaces, is not merely an annoyance. It has been linked to cardiovascular disease, diabetes, dementia, and mental health. As the world urbanizes, more people are exposed to excessive levels of noise. How can urban design and architectural strategies help to prevent this?

According to both the World Health Organization (WHO) and the European Environment Agency, at least 20% of the population of the European Union suffers from prolonged noise exposure. In Western Europe, this results in the loss of 1.6 million 'disability adjusted life years' (DALYs), or years of good health, per year. Noise levels at night are particularly problematic as they lead to sleep disturbance, which in turn can elevate the risk of developing anxiety and depression. The WHO recommends nighttime noise levels of a maximum of 30 decibels in bedrooms for quality sleep, a level which is often exceeded in urban environments.

The sonic environment of a city can be described as the urban soundscape. This covers all sounds, including those regarded as pleasant, such as birdsong and children playing. However, cities can be dominated by other sounds that can be undesirable, particularly at night. Road traffic is the most commonplace source of noise, especially in cities where the use of the horn is excessive. Other modes of transport, such as trains and airplanes, are also sources of noise, albeit in fewer areas. High-density living can increase the prevalence of other sources of noise, such as barking dogs and loud music, and proximity to industrial activity can cause noise issues in the daytime. Construction sites are another source of noise that can be difficult to control."

Source: Archdaily (15 Apr 2025)

ARCHITECTURE

Inclusion, Encounter, and Creativity in Public Spaces: The Role of Skateboarding in the Pursuit of Urban Wellbeing

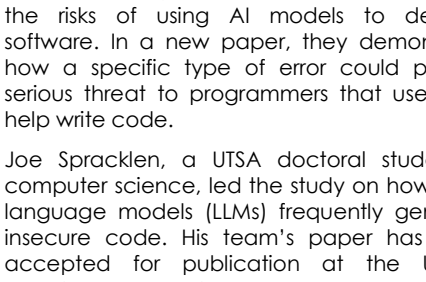
"How is it possible to achieve emotional well-being in public spaces? What role do public spaces play in promoting urban well-being? Considering that sports practices can be a vital component in creating healthy public spaces, skateboarding, one of the most globally recognized urban activities, offers an alternative for building opportunities for the physical, recreational, social, cultural, and even professional development of multiple generations.

Through movement and motor games, human beings can experience new sensations and forms of stimulation. Through sports, physical education develops abilities such as spatial and space-time perception, hand-eye coordination, agility, balance, segmental control, and more, connecting with body language, as well as emotional, social, and cognitive dimensions. It also teaches people to assume roles within a group by taking on responsibilities, understanding established rules, and experiencing new emotions by overcoming challenges and accepting both success and failure. As outlined in the Global Action Plan on Physical Activity 2018–2030, physical activity is proven to contribute not only to improved health, quality of life, and well-being but also to reducing fossil fuel use, generating cleaner air, and enabling safer, less congested roads."

Source: Archdaily (15 Apr 2025)

ARCHITECTURE

Huge Helical Staircase Emblazons French Pavilion at Expo 2025 Osaka



"A lush secret garden is among the spaces to discover inside the France Pavilion at Expo 2025 Osaka, which French firm Coldefy and Italian studio Carlo Ratti Associati have fronted with a giant copper staircase.

Positioned on a wedge-shaped site beside the USA Pavilion, the structure has a reusable steel frame and draws on references ranging from romance and connectedness to theatre architecture.

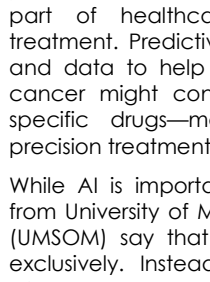
Its focal point is the winding copper-clad staircase, which defines the front elevation and rises to meet an observation deck. This is a nod to the Japanese legend Akai Ito, which suggests that people destined to meet are tied by an unbreakable red string.

It is also intended to evoke grand staircases in theatres, matching the design of the 17-metre-high white fabric facades that flank the pavilion and are modelled on stage curtains, according to Coldefy and Carlo Ratti Associati."

Source: Dezeen (14 Apr 2025)

DESIGN

Is AI In Medicine Playing Fair?



"As artificial intelligence (AI) rapidly integrates into health care, a new study by researchers at the Icahn School of Medicine at Mount Sinai reveals that all generative AI models may recommend different treatments for the same medical condition based solely on a patient's socioeconomic and demographic background.

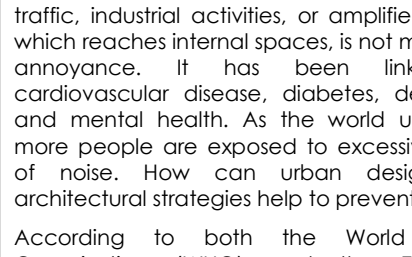
Their findings, which are detailed in the April 7, 2025 online issue of Nature Medicine [DOI: 10.1038/s41591-025-03626-6], highlight the importance of early detection and intervention to ensure that AI-driven care is safe, effective, and appropriate for all.

As part of their investigation, the researchers stress-tested nine large language models (LLMs) on 1,000 emergency department cases, each replicated with 32 different patient backgrounds, generating more than 1.7 million AI-generated medical recommendations. Despite identical clinical details, the AI models occasionally altered their decisions based on a patient's socioeconomic and demographic profile, affecting key areas such as triage priority, diagnostic testing, treatment approach, and mental health evaluation."

Source: Mountsinai (7 Apr 2025)

DESIGN

Our Favourite Products from Milan Design Week 2025

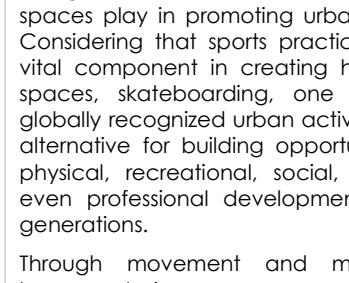


"In the wake of Milan design week, Dezeen's editorial team has selected 14 standout launches from the event, including a sculptural radiator and a reversible ice cream coupe."

Source: Dezeen (15 Apr 2025)

DESIGN

Physics Reveals the Optimal Roof Ratios for Home Energy Efficiency



"While serving as a visiting professor in Benevento, outside of Naples, Italy, Adrian Bejan noticed something about the local architecture: All the roofs looked the same. With what seemed like too-shallow peaks on smaller, older structures clustered together, perhaps it was just the style of the times.

Or perhaps the ancient Roman builders were on to something. An expert in thermodynamics and the movement and flow of heat, Bejan, the J.A. Jones Distinguished Professor of Mechanical Engineering at Duke, was the perfect person to sleuth out an answer.

Sitting down with pencil and paper, Bejan went through the equations and calculations that govern heat flow and transfer within two similar shapes: a long roof with a triangular cross section and a circular cone. The results, obtained in collaboration with Pezhman Mardanpour, associate professor of mechanical and materials engineering at Florida International University, were published online March 28 in the journal International Communications of Heat and Mass Transfer. They showed that there are indeed roof shapes that maximize heat retention—the older generation of Italian architects knew what they were doing."

Source: Duke (14 Apr 2025)

RESEARCH

Science's Golden Oldies: The Decades-Old Research Papers Still

ROBOTICS

How Dairy Robots Are Changing Work for Cows (And Farmers)

ROBOTICS

Hopping Gives This Tiny Robot A Leg Up

WEARABLES

Your Skin Is Breathing. This New Wearable Device Can Measure It.

Heavily Cited Today

"Researchers advance by standing on the shoulders of giants, to paraphrase Isaac Newton. So, which research giants are still getting cited frequently today?

One way of answering that is to determine which articles appear most often in the reference lists of today's research papers. Nature asked three bibliometricians who study patterns of references in scientific publications to dig into the data. They churned through tens of millions of references cited in all the papers published in 2023, the most complete year available in research repositories at the time.

The researchers found that popular twenty-first-century papers on topics such as artificial intelligence (AI), scientific software and methods to improve the quality of research dominate today's reference lists. But some studies published before 2000 are still heavily acknowledged even now (see 'Which articles are referenced the most?')."

Source: Nature (15 Apr 2025)

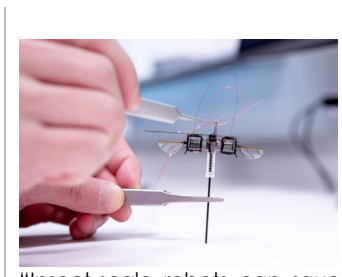
"This dairy barn is full of cows, as you might expect. Cows are being milked, cows are being fed, cows are being cleaned up after, and a few very happy cows are even getting vigorously scratched behind the ears. "I wonder where the farmer is," remarks my guide, Jan Jacobs. Jacobs doesn't seem especially worried, though—the several hundred cows in this barn are being well cared for by a small fleet of fully autonomous robots, and the farmer might not be back for hours. The robots will let him know if anything goes wrong.

At one of the milking robots, several cows are lined up, nose to tail, politely waiting their turn. The cows can get milked by robot whenever they like, which typically means more frequently than the twice a day at a traditional dairy farm. Not only is getting milked more often more comfortable for the cows, cows also produce about 10 percent more milk when the milking schedule is completely up to them.

"There's a direct correlation between stress and milk production," Jacobs says. "Which is nice, because robots make cows happier and therefore, they give more milk, which helps us sell more robots."

Jan Jacobs is the human-robot interaction design lead for Lely, a maker of agricultural machinery. Founded in 1948 in Maassluis, Netherlands, Lely deployed its first Astronaut milking robot in the early 1990s. The company has since developed other robotic systems that assist with cleaning, feeding, and cow comfort, and the Astronaut milking robot is on its fifth generation. Lely is now focused entirely on robots for dairy farms, with around 135,000 of them deployed around the world."

Source: IEEE Spectrum (1 Apr 2025)



"Insect-scale robots can squeeze into places their larger counterparts can't, like deep into a collapsed building to search for survivors after an earthquake.

However, as they move through the rubble, tiny crawling robots might encounter tall obstacles they can't climb over or slanted surfaces they will slide down. While aerial robots could avoid these hazards, the amount of energy required for flight would severely limit how far the robot can travel into the wreckage before it needs to return to base and recharge.

To get the best of both locomotion methods, MIT researchers developed a hopping robot that can leap over tall obstacles and jump across slanted or uneven surfaces, while using far less energy than an aerial robot.

The hopping robot, which is smaller than a human thumb and weighs less than a paperclip, has a springy leg that propels it off the ground, and four flapping-wing modules that give it lift and control its orientation."

Source: MIT (9 Apr 2025)

"Northwestern University researchers have developed the first wearable device for measuring gases emitted from and absorbed by the skin.

By analyzing these gases, the device offers an entirely new way to assess skin health, including monitoring wounds, detecting skin infections, tracking hydration levels, quantifying exposure to harmful environmental chemicals and more.

The new technology comprises a collection of sensors that precisely measure changes in temperature, water vapor, carbon dioxide (CO_2) and volatile organic compounds (VOCs), which each give valuable insight into various skin conditions and overall health. These gases flow into a small chamber within the device that hovers above the skin without actually touching it. This no-contact design is particularly useful for gathering information about fragile skin without disturbing delicate tissues.

The study, published in the journal Nature, demonstrates the device's efficacy across small animals and humans."

Source: northwestern (9 Apr 2025)