

AI
A New Role for Intelligent Tutors Powered by AI In Brain Surgery?



"Neurosurgery is perhaps one of the most demanding professions in healthcare. Surgeons spend long hours performing operations where expert performance means the difference between a good and bad patient outcome. While operative injuries are rare, when they occur, they can have serious, and lifelong consequences.

Researchers at the Neurosurgical Simulation and Artificial Intelligence Learning Centre at The Neuro are striving to improve brain surgery training by designing real-time, intelligent tutors powered by AI. These systems are designed to mimic the role of human surgical instructors in brain surgical training. Intelligent tutors help the learner acquire excellent operative skills by continuously assessing hand movements during simulated brain procedures and providing personalized verbal feedback."

Source: [McGill](#) (5 Aug 2024)

AI
Study: People Facing Life-Or-Death Choice Put Too Much Trust In AI



"In simulated life-or-death decisions, about two-thirds of people in a UC Merced study allowed a robot to change their minds when it disagreed with them -- an alarming display of excessive trust in artificial intelligence, researchers said.

Human subjects allowed robots to sway their judgment despite being told the AI machines had limited capabilities and were giving advice that could be wrong. In reality, the advice was random.

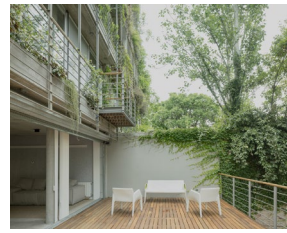
"As a society, with AI accelerating so quickly, we need to be concerned about the potential for overtrust," said Professor Colin Holbrook, a principal investigator of the study and a member of UC Merced's Department of Cognitive and Information Sciences. A growing amount of literature indicates people tend to overtrust AI, even when the consequences of making a mistake would be grave.

What we need instead, Holbrook said, is a consistent application of doubt.

"We should have a healthy skepticism about AI," he said, "especially in life-or-death decisions."

Source: [UCMERCED](#) (4 Sep 2024)

ARCHITECTURE
Balcony Design for Urban Living: A Comprehensive Guide

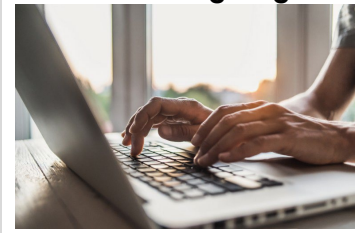


"In dense urban living, the ability to connect with the outdoors for enjoyment and for wellbeing becomes starkly important. This became particularly apparent in the COVID-19 pandemic when millions of people across the globe had to be confined to their homes for long periods. Notwithstanding that, as the world increasingly urbanizes, good quality housing design is vital and this includes access to the outside. In a city like London, this need was recognized, and providing an outside space in every dwelling became mandatory around the year 2010. In multi-storey housing, providing outside space usually takes the form of a balcony. The design possibilities are endless, so what are the key considerations when incorporating balconies in an urban residential building?

The first consideration is use. While this can vary between regions and cultures, some basic opportunities are afforded by balconies. Primarily, this is the ability to be outside while being at home – simple enjoyment of the fresh air, sunshine, or the elements. Being outside enables a connection with the street below and even communication with neighbors. Activities on the balcony include lounging, socializing, dining, and even gardening, where the balcony can be a place for growing food or inviting bees and wildlife. There are also practical benefits such as being able to hang washing outside or store bulky outdoor belongings such as bicycles. A successful balcony design should cater to a variety of uses."

Source: [Archdaily](#) (8 Sep 2024)

AUTHORSHIP
Publishing Nightmare: A Researcher's Quest to Keep His Own Work from Being Plagiarized



"A scientist reviewing a study spotted figures that looked identical to his own, leading to a frustrating campaign to prevent its publication.

When bioinformatician Sam Payne was asked to review a manuscript on a topic relevant to his own work, he agreed — not anticipating just how relevant it would be. The manuscript, which was sent to Payne in March, was about a study on the effect of cell sample sizes for protein analysis. "I immediately recognized it," says Payne, who is at Brigham Young University in Provo, Utah. The text, he says, was similar to that of a paper he'd authored three years earlier, but the most striking feature was the plots: several were identical down to the last data point. He fired off an e-mail to the journal, BioSystems, which promptly rejected the manuscript.

In July, Payne discovered that the manuscript had been published in the journal Proteomics, and he alerted the editors. On 15 August, the journal retracted the paper. An accompanying statement cited "major unattributed overlap between the figures" in it and Payne's work. In response to questions from Nature, a spokesperson for Wiley, which publishes Proteomics, said, "This paper was simultaneously submitted to multiple journals and included plagiarized images."

The retraction statement also stated that four of the authors said they "did not participate in the writing and submission of the article and gave no consent for publication", and that the fifth author did not respond. However, Nature's news team found links between several of the authors and International Publisher, a paper mill based in Moscow. Neither the authors nor International Publisher responded to Nature's requests for comment.

The alleged plagiarism of Payne's paper highlights systemic vulnerabilities in the global research community, says Lisa Rasmussen, editor-in-chief of the journal Accountability in Research. According to one analysis, roughly 70,000 papers with characteristics common to work produced by paper mills were published in 2022 alone."

Source: [Nature](#) (4 Sep 2024)

AUTONOMOUS VEHICLES
Autonomous Vehicles Get a Boost to Seeing in the Dark: Better light polarization data improves driving ability by 10 percent



"A team of researchers in China have uncovered a way to help autonomous cars "see" better in the dark—boosting the vehicles' driving abilities by more than 10 percent. The secret to the researchers' success is in a decades-old theory on how the human eye works.

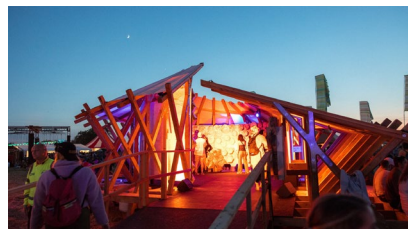
One way for autonomous cars to navigate is using a collection of cameras, which are each equipped with a special filter to discern the polarization of incoming light. Polarization refers to the direction of oscillation of light waves as they propagate—which can provide a lot of information about the object it last bounced off, including the object's surface features and details.

However, while polarization filters provide an autonomous vehicles with additional info about the objects surrounding them, the filter involves some pitfalls.

"While providing further information, this double filter design makes capturing photons at night more difficult," says Yang Lu, a Ph.D. candidate at the University of Chinese Academy of Sciences in Beijing. "The result is that in low-light conditions, the image quality of a polarization camera drops dramatically, with detail and sharpness being more severely affected."

To overcome this problem, Lu and his colleagues turned to a theory that attempts to explain why humans are able to discern colors relatively well under low-light conditions. The Retinex theory suggests that our visual system is able to discern light in two different ways—namely, the reflectance and illumination components of the light. Importantly, even in low-light conditions, our eyes and brain are able to compensate for changes in illumination of the light enough to discern colors."

DESIGN
Ten Outdoor Music Festival Installations and Pavilions



"Salvaged timber pavilions and colourful steel-framed towers are among the many bespoke projects created annually for popular music festivals.

Both entertaining and accommodating to festival goers around the world, these projects showcase the imagination, creativity and craftsmanship of many contemporary designers.

Read on for 10 installations with the most innovative designs and constructions."

DESIGN
AI Boosts Indoor Food Production's Energy Sustainability



"Integrating artificial intelligence into today's environmental control systems could reduce energy consumption for indoor agriculture by 25% – potentially helping to feed the world as its population rises, Cornell engineers have found.

"If we incorporate AI into agricultural plant factories – large-scale indoor farms with complete lighting and climate control – all around the world, we can facilitate crop photosynthesis, transpiration and respiration in these buildings," said Benjamin Decardi-Nelson, a postdoctoral fellow in the laboratory of Fengqi You, the Roxanne E. and Michael J. Zak Professor in Energy Systems Engineering in Cornell Engineering. "We can expect to see substantial energy reduction while amplifying efficiency and a savings of precious resources."

EV's
Study: EV Charging Stations Boost Spending at Nearby Businesses



"Charging stations for electric vehicles are essential for cleaning up the transportation sector. A new study by MIT researchers suggests they're good for business, too.

The study found that, in California, opening a charging station boosted annual spending at each nearby business by an average of about \$1,500 in 2019 and about \$400 between January 2021 and June 2023. The spending bump amounts to thousands of extra dollars annually for nearby businesses, with the increase particularly pronounced for businesses in underresourced areas.

The study's authors hope the research paints a more holistic picture of the benefits of EV charging stations, beyond environmental factors.

"These increases are equal to a significant chunk of the cost of installing an EV charger, and I hope this study sheds light on these economic benefits," says lead author Yunhan Zheng MCP '21, SM '21, PhD '24, a postdoc at the Singapore-MIT Alliance for Research and Technology (SMART). "The findings could also diversify the income stream for charger providers and site hosts, and lead to more informed business models for EV charging stations."

Lu's team applied this concept to their autonomous car navigation system, which processes the reflective and luminescence qualities of polarized light separately. One algorithm—trained using real-world data of the same images in light and dark conditions—works like our own visual system to compensate for changes in brightness. A second algorithm processes the reflective properties of incoming light, removing background noise."

Source: [EurekAlert!](#) (7 Sep 2024)

Source: [Dezeen](#) (27 Jun 2024)

Source: [Cornell](#) (9 Sep 2024)

Source: [MIT](#) (4 Sep 2024)

ROBOTICS
Artificial Muscles Propel a Robotic Leg to Walk and Jump



"Inventors and researchers have been developing robots for almost 70 years. To date, all the machines they have built – whether for factories or elsewhere – have had one thing in common: they are powered by motors, a technology that is already 200 years old. Even walking robots feature arms and legs that are powered by motors, not by muscles as in humans and animals. This in part suggests why they lack the mobility and adaptability of living creatures.

A new muscle-powered robotic leg is not only more energy efficient than a conventional one, it can also perform high jumps and fast movements as well as detect and react to obstacles – all without the need for complex sensors. The new leg has been developed by researchers at ETH Zurich and the Max Planck Institute for Intelligent Systems (MPI-IS) in a research partnership called Max Planck ETH Center for Learning Systems, known as CLS. The CLS team was led by Robert Katzschmann, Soff Robotics Lab at ETH Zurich and Christoph Keplinger at MPI-IS. Their doctoral students Thomas Buchner and Toshihiko Fukushima are the co-first authors of the team's publication team has now reported on an their animal-inspired musculoskeletal robotic leg in external pageNature Communications."

Source: [Ethz](#) (9 Sep 2024)

SUSTAINABLE DESIGN
Aquafade Water-Soluble Electronics Provide Way to Tackle E-Waste



"Tech start-up Pentaform has devised a potential solution to e-waste: making gadgets that dissolve in water and leave behind only their electronic components for recycling.

Pentaform's idea involves making both the housing of an electronic product and its circuit board from a type of biodegradable and fully water-soluble plastic that the company is calling Aquafade.

The product – for instance, a computer or remote control – is given a thin waterproof coating on the outside to protect it from moisture, but when its housing is opened and the whole thing is submerged in water, it completely dissolves in six to eight hours.

As the plastic starts to break down, the valuable electronic parts can be easily separated from the material by hand, and the remainder of the plastic-water mixture is tipped down a sink or toilet so it can finish decomposing in the sewage system.

Pentaform co-founders Samuel Wangsaputra and Joon Sang Lee came up with Aquafade out of frustration with both e-waste and biodegradable plastics.

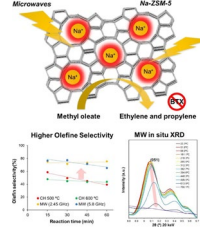
According to the duo, biodegradable plastics usually ends up in landfill rather than proper composting facilities and enters the environment as microplastics.

They are also critical of the carbon emissions generated from composting sites and waste transportation, which they think could be reduced.

With Aquafade, there is a shortcut to the best processing facility and no microplastics are left behind, they say."

Source: [Dezeen](#) (6 Sep 2024)

SUSTAINABILITY
Microwaving Waste Cooking Oil into Useful Chemicals



"Researchers from Kyushu University have revealed that a zeolite material called Na-ZSM-5 is effective in improving the chemical conversion of biomass into olefins—a precursor chemical that makes everything from plastics to pharmaceuticals—using microwaves. Publishing their work in Chemical Engineering Journal, the team explains that microwave heating of Na-ZSM-5 could open doors to a more energy-efficient and sustainable chemical industry.

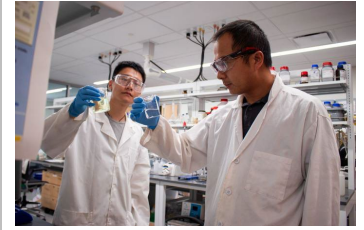
If you want to synthesize complex organic compounds, whether it be plastics, pharmaceuticals, or food additives, you generally need to start with chemical precursors with simple structures. Naturally, finding ways to efficiently and sustainably synthesize precursor chemicals is an extensively researched field.

A commonly used method of synthesizing these essential chemicals is via a process called reforming of naphtha. However, this process requires high amounts of energy and releases carbon dioxide. Cooking oil waste and microalgal oils have been considered as alternative and inexpensive sources to synthesize said simple chemicals.

These oils can be converted using a method called 'catalytic cracking' with the help of a material called zeolite. Zeolite is a porous natural material, commonly used as a catalyst or as an absorbent. In the catalytic cracking process, materials need to be heated up to temperatures as high as 500–600°C. In addition to being very energy intensive, operating at such temperatures can cause a buildup of unwanted deposits, a phenomenon known as coking, which reduces the lifetime of the catalyst."

Source: [Kyushu](#) (9 Sep 2024)

TECHNOLOGY
Researcher Develops Technology to Provide Cleaner Energy and Cleaner Water



"As the world transitions to cleaner energy sources, the need for energy-relevant metals and critical minerals has surged dramatically. Driven by the rise of electric vehicles and other green technologies, these essential materials are in high demand across the globe.

Metals, such as lithium, cannot be grown. They must be mined or recycled, making this a top priority for researchers in the mining industry. Traditional methods of mining lithium are expensive and can be harmful to the environment, but researchers at Virginia Tech have found a way to minimize this environment impact. They will optimize and scale up this method with a pending Department of Energy grant worth over \$1.8 million, including \$1.5 million in federal shares.

Wencai Zhang, associate professor in the Department of Mining and Minerals Engineering, is leading this project to recover high-demand metals, such as lithium and rare earth elements, from produced water from the Marcellus Shale in the Appalachian Basin. Produced water is naturally occurring water that comes out of the ground during the production of natural gas and can contain pollutants such as lithium, along with sodium chloride, calcium, and magnesium that cause extremely high salinity levels. Researchers aim to reduce salinity levels and remove pollutants while extracting lithium for other manufacturing applications.

"High-demand metals and minerals, such as lithium, play an essential role in electric vehicle production and are present in virtually every battery worldwide," said Zhang. "Our goal is to contribute to the supply chain of these critical materials while also making a positive environmental impact. We specifically aim to reduce the environmental consequences that can be associated with produced water."

Source: [EurekAlert!](#) (6 Sep 2024)

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