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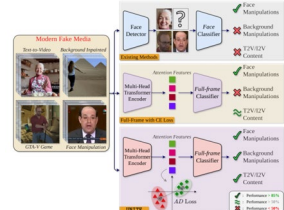
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AI
Towards A Universal Synthetic Video Detector: From Face or Background Manipulations to Fully AI-Generated Content



"Existing DeepFake detection techniques primarily focus on facial manipulations, such as face-swapping or lipsyncing. However, advancements in text-to-video (T2V) and image-to-video (I2V) generative models now allow fully Algenerated synthetic content and seamless background alterations, challenging face-centric detection methods and demanding more versatile approaches. To address this, we introduce the Universal Network for Identifying Tampered and synthEtic videos (UNITE) model, which, unlike traditional detectors, captures fullframe manipulations. UNITE extends detection capabilities to scenarios without faces, non-human subjects, and complex background modifications. It leverages a transformerbased architecture that processes domain-agnostic features extracted from videos via the SigLIP-So400M foundation model. Given limited datasets encompassing both facial/background alterations and T2V/I2V content, we integrate task-irrelevant data alongside standard DeepFake datasets in training. We further mitigate the model's tendency to over-focus on faces by incorporating an attentiondiversity (AD) loss, which promotes diverse spatial attention across video frames. Combining AD loss with crossentropy improves detection performance across varied contexts. Comparative evaluations demonstrate that UNITE outperforms state-of-the-art detectors on datasets (in crossdata settings) featuring face/background manipulations and fully synthetic T2V/I2V videos, showcasing its adaptability and generalizable detection capabilities."

Source: [University of California](#) (25 Jul 2025)

AI
Meet Aeneas: The AI That Can Fill in the Gaps of Damaged Latin Texts



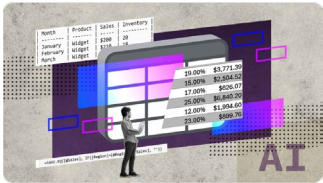
"An artificial intelligence (AI) model can predict where ancient Latin texts come from, estimate how old they are and restore missing parts. The model, called Aeneas and described in Nature today, was developed by some of the members of the team that created a previous AI tool that could decipher ancient Greek inscriptions.

Studying ancient inscriptions, known as epigraphy, is challenging because some texts are missing letters, words or sections, and languages change over time. Historians analyse texts by comparing them with other inscriptions containing similar words or phrases. But finding these other inscriptions is incredibly time consuming, says co-author Thea Sommerschild, an epigrapher at the University of Nottingham, UK.

Another challenge is that new inscriptions continue to be discovered, so there is too much information for any single person to know, says Anne Rogerson, who studies Latin texts at the University of Sydney, Australia.

To make it easier to restore, translate and analyse inscriptions, a team including researchers from universities in the United Kingdom and Greece, and from Google's AI company DeepMind in London, developed a generative AI model trained on inscriptions from the three of the world's largest databases of Latin epigraphy. The combined data set contained text from 176,861 inscriptions — plus images of 5% of them — with dates ranging from the seventh century bc to the eighth century ad. The model comprises three neural networks, each designed for different tasks: restoring missing text; predicting where the text comes from; and estimating how old it is. Along with the results, Aeneas also provides a list of similar inscriptions from the data set to support its answer, ranked by how relevant they are to the original inscription."

Source: [Nature](#) (23 Jul 2025)



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ARCHITECTURE
Halfway Through Expo 2025 Osaka: 10 Must-Visit Pavilions



"As Expo 2025 Osaka passes the midpoint of its six-month duration on July 13, the international exposition continues to serve as a global platform for architectural experimentation, cultural exchange, and technological innovation. Officially opened on April 13 on the reclaimed island of Yumeshima, the event is organized under the theme "Designing Future Society for Our Lives," and has already welcomed more than 13 million visitors as of late July. Conceived as a space for collaboration across disciplines and borders, the Expo brings together more than 150 national, thematic, and corporate pavilions.

Structured around three subthemes, Saving Lives, Empowering Lives, and Connecting Lives, the Expo presents architecture as a medium to explore solutions to pressing global challenges. The overall [master plan](#), developed by [Sou Fujimoto](#), is centered around the [Grand Ring](#), a monumental circular structure that now stands [as the largest wooden architectural work in the world](#). [Expo 2025](#) has drawn participation from more than 160 countries and regions, with around 80 architecturally distinct national pavilions showcasing their visions of the future. Many of these are the work of leading international architects: [Kenzo Kuma's](#) design for the [Qatar Pavilion](#) draws from desert topographies; [Lina Ghotmeh](#) interprets [Bahrain's](#) maritime traditions through craft; and [Mario Cucinella Architects](#) offers a bio-based vision for Italy."

Source: [Archdaily](#) (28 Jul 2025)

ARCHITECTURE
GMP Architekten Uses Ring of Bridges and Ramps to Connect Chinese Stadium to Parkland Site



"German practice GMP Architekten has completed the Kunshan Olympic Sports Centre in China, a 45,000-seat football stadium that "seamlessly connects" to its parkland site via a ring of elevated bridges and walkways.

The stadium was designed by German practice Gerkon, Marg and Partners (GMP Architekten) in collaboration with engineering firm Schlaich Bergermann Partner (SBP) and landscape architects WES LandschaftsArchitektur.

Located on a parkland site through which a narrow waterway winds, GMP Architekten looked to combine a connection to the landscape with efficient visitor flow, creating a ring-shaped structure of concrete beams between which staircases, ramps and bridges have been inserted.

"We preserved as much of the original environment as possible and integrated it into the stadium's design, including a ring of water around the stadium that functions as a natural barrier," GMP Architekten executive partner Magdalena Weiss told Dezeen."

Source: [Dezeen](#) (26 Jul 2025)

BATTERIES
Mobile BESS Powers Remote Heavy Equipment: Automakers, Startups Offer Transportable Batteries for Large Loads



"In June, a fuel delivery to a Johns Hopkins Hospital campus went terribly awry, [spilling 2,000 gallons of diesel](#) into Baltimore's harbor. As the Maryland capital raced to contain the mess, responders discovered a problem: They didn't have access to reliable power at the waterfront site.

Usually in these kinds of situations, responders bring in fossil-fuel generators. But city officials wanted to do better than burning more fuel while cleaning up [diesel](#). So they tracked down [Scott Calhoun](#), chief operating officer of [Power Up Connect](#). The Baltimore-based company has begun to build mobile battery units that can store enough energy to back up an entire hospital or, in this case, energize a harbor cleanup crew.

The company is one of several groups developing mobile battery systems to serve large electricity needs. [Volvo](#) builds such systems to charge its all-electric excavators, loaders, and other heavy construction equipment. [Tesla](#) has trucked in [batteries to beef up the performance of its EV Supercharging stations](#) during times of peak demand.

The batteries are a mobile version of a battery energy storage system, or BESS. In the past, BESS has been used in stationary locations to store grid-scale electricity to help balance supply and demand, such as storing [solar energy](#) so that it can be used at night or storing backup power in case of outages. The [improvements](#) to both the

BIOSENSORS
Artificial Biosensor Can Better Measure the Body's Main Stress Hormone



"Cortisol is a crucial hormone that regulates many important bodily functions like blood pressure and metabolism, and imbalances of this stress hormone can lead to health problems.

Traditionally, cortisol levels must be measured in a doctor's office or other clinical setting. But a new advance in the design of artificial biosensors paves the way for point-of-care testing and diagnoses with far greater accuracy than is currently available.

Andy Yeh, an assistant professor of biomolecular engineering at the University of California, Santa Cruz, has invented an artificial, luminescent sensor that binds with cortisol in the blood or urine and then emits light to indicate the levels of the stress hormone in the body. A new study in the Journal of the American Chemical Society demonstrates that this technique can detect cortisol across all levels relevant to human health.

Yeh demonstrated that this biosensor can be used in combination with the camera on a smartphone to enable people to measure cortisol levels at home or in a clinic, with high levels of sensitivity and without the costly instrumentation of the lab, greatly expanding access to accurate measurement of this important health indicator."

DESIGN
Consent Soap Provides Sex Education for People with Learning Disabilities



"Students from Indonesia's Binus University have won a White Pencil at this year's [D&AD](#) New Blood Awards for their colour-coded [soaps](#), designed to teach vulnerable users about consent.

Elva Gracia, Maverick Lee, Lestat Kane and Allya Malaikha developed Consent Soap in response to a brief calling for educational tools that could help to give people with [Down's](#) and [Fragile X syndrome](#) agency over their sexual intimacy.

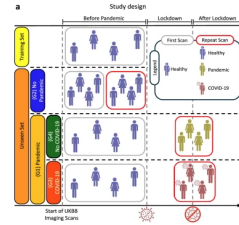
The students from [Binus University](#) in [Jakarta](#) developed a concept that involves three colour-coded soaps for different parts of the body, designating them as "okay to touch", "private", or for "trusted help only".

Nine out of ten people with intellectual and developmental disabilities will experience some form of sexual assault in their lifetime, according to the brief set for the students by healthcare agency [21 Grams](#).

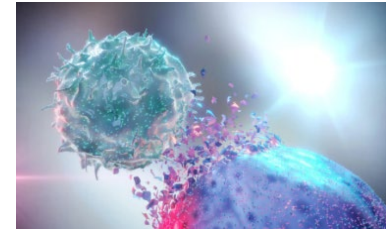
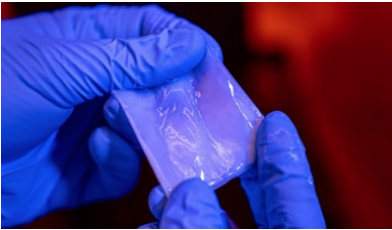


People with Down's and Fragile X syndrome in particular face the highest rates of sexual misconduct, largely due to a lack of comprehensive education and limited understanding of consent.

Consent Soap was designed to help caregivers make sexual education a natural part of routine care, as repetition using simple language and visual cues is considered the best way to engage users with learning

HEALTH
Accelerated Brain Ageing During The COVID-19 Pandemic



"The impact of SARS-CoV-2 and the COVID-19 pandemic on brain health is recognised, yet specific effects remain understudied. We investigate the pandemic's impact on brain ageing using longitudinal neuroimaging data from the UK Biobank. Brain age prediction models are trained from hundreds of multi-modal imaging features using a cohort of 15,334 healthy participants. These models are then applied to an independent cohort of 996 healthy participants with two magnetic resonance imaging scans: either both collected before the pandemic (Control groups), or one before and one after the pandemic onset (Pandemic group). Our findings reveal that, even with initially matched brain age gaps (predicted brain age vs. chronological age) and matched for a range of health markers, the pandemic significantly accelerates brain ageing. The Pandemic group shows on average 5.5-month higher deviation of brain age gap at the second time point compared with controls. Accelerated brain ageing is more pronounced in males and those from deprived socio-demographic backgrounds and these deviations exist regardless of SARS-CoV-2 infection. However, accelerated brain ageing correlates with reduced cognitive performance only in COVID-infected participants. Our study highlights the pandemic's significant impact on brain health, beyond direct infection effects, emphasising the need to consider broader social and health inequalities."

<p>chemistry and engineering of lithium-ion batteries has made it possible to move megawatt-level power on the back of a semi truck.</p> <p>The development opens the possibility to commercialize clean, large-scale electricity on the go for applications that previously relied solely on fossil-fuel generators."</p> <p>Source: IEEE Spectrum (24 Jul 2025)</p>	<p>challenges."</p> <p>Source: Eurekalert! (28 Jul 2025)</p>	<p>Source: Dezeen (24 Jul 2025)</p>	<p>Source: Nature (22 Jul 2025)</p>
<p>HEALTHCARE</p> <p>Breakthrough: How Radiation Helps the Immune System Kill Cancer</p>  <p>"Caltech scientists have found a fast and efficient way to add up large numbers of Feynman diagrams, the simple drawings physicists use to represent particle interactions. The new method has already enabled the researchers to solve a longstanding problem in the materials science and physics worlds known as the polaron problem, giving scientists and engineers a way to predict how electrons will flow in certain materials, both conventional and quantum."</p> <p>Source: John Hopkins (23 Jul 2025)</p>	<p>MATERIALS</p> <p>Goodbye Plastic? Scientists Create New Supermaterial That Outperforms Metals and Glass</p>  <p>"Scientists at Rice University and the University of Houston have created a powerful new material by guiding bacteria to grow cellulose in aligned patterns, resulting in sheets with the strength of metals and the flexibility of plastic—without the pollution. Using a spinning bioreactor, they've turned Earth's purest biopolymer into a high-performance alternative to plastic, capable of carrying heat, integrating advanced nanomaterials, and transforming packaging, electronics, and even energy storage."</p> <p>Source: RICE (22 Jul 2025)</p>	<p>ROBOTICS</p> <p>Robots That Learn to Fear Like Humans Survive Better: Snap Judgments Can Help Make for Better Robot Risk Assessment</p>  <p>"Imagine walking downtown when you hear a loud bang coming from the construction site across the street—you may have the impulse to freeze or even duck down. This type of quick, instinctual reaction is one of the most basic but important evolutionary processes we have to protect ourselves and survive in unfamiliar settings.</p> <p>Now, researchers are beginning to explore how a similar, fast-reacting thought process can be translated into robots. The idea is to program robots to make decisions the same way that humans do, based on our innate emotional responses to unknown stimuli—and in particular our fear response. The results, published 27 June in IEEE Robotics and Automation Letters, show that the approach can significantly enhance robots' ability to assess risk and avoid dangerous situations.</p> <p>Alessandro Rizzo, an associate professor in automation engineering and robotics at the Polytechnic University of Turin in Italy, led the study. He notes that robots currently face many challenges in adapting to dynamic environments while enacting self-preserving strategies. This is in large part because their control systems are often designed to accomplish very specific tasks. "As a result, robots may struggle to operate effectively in complex and changing conditions," Rizzo says."</p> <p>Source: IEEE Spectrum (26 Jul 2025)</p>	<p>SUSTAINABILITY</p> <p>New Global Study Shows Freshwater Is Disappearing at Alarming Rates</p>  <p>"New findings from studying over two decades of satellite observations reveal that the Earth's continents have experienced unprecedented freshwater loss since 2002, driven by climate change, unsustainable groundwater use and extreme droughts.</p> <p>The study, led by Arizona State University and published today in Science Advances, highlights the emergence of four continental-scale "mega-drying" regions, all located in the Northern Hemisphere, and warns of severe consequences for water security, agriculture, sea-level rise and global stability.</p> <p>The research team reports that drying areas on land are expanding at a rate roughly twice the size of California every year. And, the rate at which dry areas are getting drier now outpaces the rate at which wet areas are getting wetter, reversing long-standing hydrological patterns.</p> <p>The negative implications of this for available freshwater are staggering. Seventy-five percent of the world's population lives in 101 countries that have been losing freshwater for the past 22 years. According to the United Nations, the world's population is expected to continue to grow for the next 50 to 60 years — at the same time the availability of freshwater is dramatically shrinking."</p> <p>Source: ASU (25 Jul 2025)</p>

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