SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

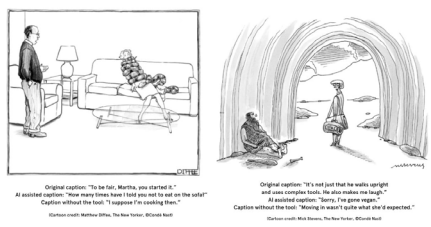
Weekly Discovery

We SHARE to inspire and ignite ideas!

22 Apr – 26 Apr 2024

AI

AI Can Write You a Poem and Edit Your Video. Now, It Can Help You Be Funnier



"University of Sydney researchers have used an AI-assisted application to help people write cartoon captions for cartoons published in The New Yorker Cartoon Caption Contest.

Twenty participants with little to no experience writing cartoon captions wrote 400 cartoon captions. 200 captions were written with the help from the AI tool, and the remainder were written without assistance.

A second group of 67 people then rated how funny these cartoon captions were. The researchers found jokes written with the help of the tool were found to be significantly funnier than those written without the tool. Comparatively, ratings for the AI assisted captions were almost 30 percent closer to the winning captions in The New Yorker Cartoon Caption Contest.

Participants said the tool helped them piece together humorous narratives and get started, helping to understand nuances and funny elements, and to come up with new ideas.

Almost half, 95 out of the 200 jokes written with the help of AI were also rated as funnier than the original cartoon captions by The New Yorker."

Source: SYDNEY (13 Apr 2024)

AI

Study Reveals AI Enhances Physician-Patient Communication

"The results of a new University of California San Diego School of Medicine study indicate that, although AI-generated replies did not reduce physician response time, they have contributed to relieving cognitive burden by starting an empathetic draft, which physicians can edit rather than starting from scratch.

The study, published in the April 15, 2024 online edition of the Journal of the American Medical Association's Network Open, is the first randomized prospective evaluation of AI-drafted physician messaging.

"We are very interested in using AI to help solve health system challenges, including the increase in patient messages that are contributing to physician burnout," said study senior author Christopher Longhurst, MD, executive director of the Joan and Irwin Jacobs Center for Health Innovation, chief medical officer and chief digital officer at UC San Diego Health. "The evidence that the messages are longer suggests that that they are higher quality, and the data is clear that physicians appreciated the help, which lowered cognitive burden."

Source: UCSD (15 Apr 2024)

AI

Artificial Intelligence Beats Doctors in Accurately Assessing Eye Problems

"A study has found that the AI model GPT-4 significantly exceeds the ability of non-specialist doctors to assess eye problems and provide advice

The clinical knowledge and reasoning skills of GPT-4 are approaching the level of specialist eye doctors, a study led by the University of Cambridge has found.

GPT-4 - a 'large language model' - was tested against doctors at different stages in their careers, including unspecialised junior doctors, and trainee and expert eye doctors. Each was presented with a series of 87 patient scenarios involving a specific eye problem, and asked to give a diagnosis or advise on treatment by selecting from four options.

GPT-4 scored significantly better in the test than unspecialised junior doctors, who are comparable to general practitioners in their level of specialist eye knowledge.

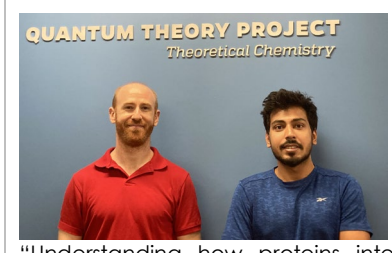
GPT-4 gained similar scores to trainee and expert eye doctors - although the top performing doctors scored higher.

The researchers say that large language models aren't likely to replace healthcare professionals, but have the potential to improve healthcare as part of the clinical workflow."

Source: CAMBRIDGE (17 Apr 2024)

AI

Researchers Create a New AI Pipeline for Identifying Molecular Interactions



"Understanding how proteins interact with each other is crucial for developing new treatments and understanding diseases. Thanks to computational advances, a team of researchers led by Assistant Professor of Chemistry ALBERTO PEREZ have developed a groundbreaking algorithm to identify these molecular interactions.

Perez's research team included two graduate students from UF, Arup Mondal and Bhumika Singh, and a handful of researchers from Rutgers University and Rensselaer Polytechnic Institute. The team published their findings in Angewandte Chemie, a leading chemistry journal based in Germany.

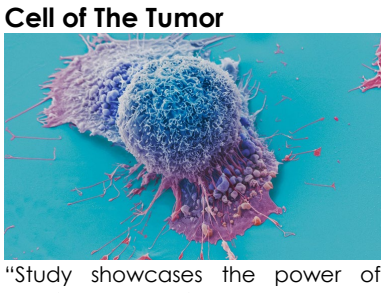
Named the AF-CBA Pipeline, this innovative tool offers unparalleled accuracy and speed in pinpointing the strongest peptide binders to a specific protein. It does this by using AI to simulate molecular interactions, sorting through thousands of candidate molecules to identify the molecule that interacts best with the protein of interest.

The AI-driven approach allows the pipeline to perform these actions in a fraction of the time it would take humans or traditional physics based-approaches to accomplish the same task."

Source: CLAS (10 Apr 2024)

AI

AI Tool Predicts Responses to Cancer Therapy Using Information from Each Cell of The Tumor



"Study showcases the power of machine learning to predict therapy outcomes using rich information from single-cell omics

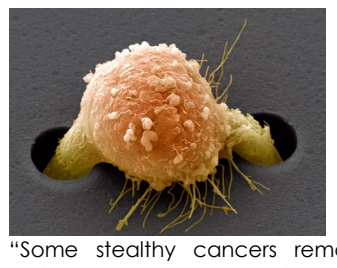
With more than 200 types of cancer and every cancer individually unique, ongoing efforts to develop precision oncology treatments remain daunting. Most of the focus has been on developing genetic sequencing assays or analyses to identify mutations in cancer driver genes, then trying to match treatments that may work against those mutations.

But many, if not most, cancer patients do not benefit from these early targeted therapies. In a new study published on April 18, 2024, in the journal Nature Cancer, first author Sanju Sinha, Ph.D., assistant professor in the Cancer Molecular Therapeutics Program at Sanford Burnham Prebys, with senior authors Eytan Ruppin, M.D., Ph.D., and Alejandro Schaffer, Ph.D., at the National Cancer Institute, part of the National Institutes of Health (NIH)—and colleagues—describe a first-of-its-kind computational pipeline to systematically predict patient response to cancer drugs at single-cell resolution."

Source: sbpdiscovery (18 Apr 2024)

AI

AI Traces Mysterious Metastatic Cancers to Their Source



"Some stealthy cancers remain undetected until they have spread from their source to distant organs. Now scientists have developed an artificial intelligence (AI) tool that outperforms pathologists at identifying the origins of metastatic cancer cells that circulate in the body1. The proof-of-concept model could help doctors to improve the diagnosis and treatment of late-stage cancer, and extend people's lives.

The researchers trained their AI model on some 30,000 images of cells found in abdominal or lung fluid from 21,000 people whose tumour of origin was known. They then tested their model on 27,000 images and found there was an 83% chance that it would accurately predict the source of the tumour. And there was a 99% chance that the source of the tumour was included in the model's top three predictions."

Source: Nature (17 Apr 2024)

ARCHITECTURE

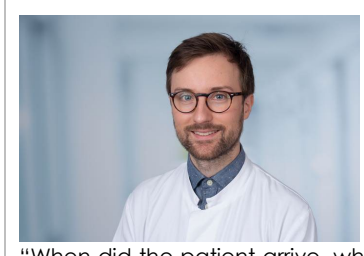
Earth Day 2024: Urban And Architectural Strategies to Navigate the Climate Crisis

"Every year, Earth Day, celebrated on April 22, presents us with an opportunity to contemplate the conditions of our planet and our impact upon it. Generating around 37% of global carbon emissions, the construction industry has an important, often detrimental, role to play, thus placing an increasingly urgent responsibility on architects and builders to devise strategies for reducing this number. Still, the built environment represents the habitat for most of humanity, and so it has the potential to protect and shelter people from the risks posed by the changing climate. Read on to discover a collection of articles delving into the strategies available at urban and architectural scales for mitigating the effects of climate change and minimizing the industry's impact upon it."

Source: Archdaily (22 Apr 2024)

CHATGPT

ChatGPT Extracts Data for Ischaemic Stroke Almost Perfectly



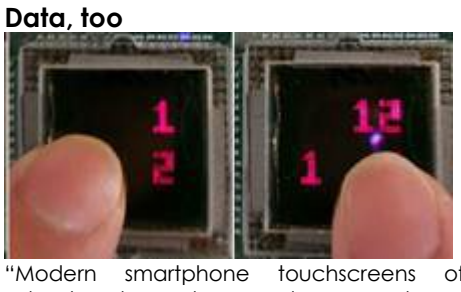
"When did the patient arrive, when was a CT scan performed, when was the first puncture, when could the blood flow be restored,... During mechanical thrombectomy, a range of data must be recorded in the patient report and then manually transferred to various registers for the clinical outcome and for prospective studies. "This is a labour-intensive task that is also prone to transcription errors," says Dr Nils Lehnen, who also conducts research at the University of Bonn. "We therefore asked ourselves whether an AI such as ChatGPT could perform this transfer faster and possibly even more reliably."

In radiology, ChatGPT is already being tested in various procedures - for example, in the simplification of reports or in answering patient questionson breast cancer screening. However, whether ChatGPT can correctly extract data from free-text reports of a mechanical thrombectomy for a database and simultaneously generate clinical data was previously unexplored and was the research objective of this new study."

Source: Eurekalert! (19 Apr 2024)

FINGERPRINT READER

LED Touchscreen Is Also A PV Charger Perovskite Display Tech Can Read Fingerprints and Gather Health Data, too



"Modern smartphone touchscreens offer edge-to-edge glass and use advanced bonding that makes the screen nearly flush with the surface of the phone. Beneath it,

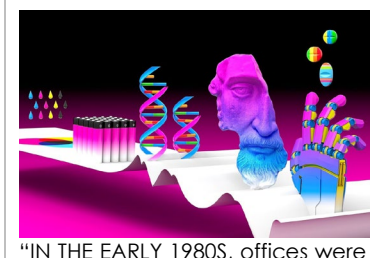
ROBOTICS

Octopus Inspires New Suction Mechanism for Robots

"The team, based at Bristol Robotics Laboratory, studied the structures of octopus biological suckers, which have superb adaptive suction

SEMICONDUCTORS

Inkjets Are for More Than Just Printing: They Can Build DNA Arrays, 3D Structures, And Much More



"IN THE EARLY 1980S, offices were noisy places, filled with the sound of metal striking inked ribbons to mark characters on paper. IBM Selectric typewriters clacked, daisy wheel

SUSTAINABLE DESIGN

Is A Plastic-Free Future Possible?

"With Earth Day 2024 and an increasing number of environmental campaigners calling for an end to plastics, is time finally up for the 20th century's miracle material? Rima

however, there's still layer upon layer of glass, polarizes, color filters, capacitive touch sensors, and more. That's an obstacle for smartphone makers looking to integrate sensors or create flexible displays.

However, new research highlights another option: photo-sensitive pixels. They can do far more than detect touch. They can image objects placed on a display, detect fingerprints, and even charge a device.

"We know that LG Display, and other display companies, are interested in how to integrate the function of a touchscreen, or imaging," said Chunxiong Bao, a co-author on the new research and professor at Nanjing University's School of Physics. "They have tried materials like OLED and QD-LED, but the photoresponsivity is not so good. For our perovskite LED, it's good.""

Source: IEEE Spectrum (19 Apr 2024)

abilities enabling them to anchor to rock.

In their findings, published in the journal PNAS today, the researchers show how they were able create a multi-layer soft structure and an artificial fluidic system to mimic the musculature and mucus structures of biological suckers.

Suction is a highly evolved biological adhesion strategy for soft-body organisms to achieve strong grasping on various objects. Biological suckers can adaptively attach to dry complex surfaces such as rocks and shells, which are extremely challenging for current artificial suction cups. Although the adaptive suction of biological suckers is believed to be the result of their soft body's mechanical deformation, some studies imply that in-sucker mucus secretion may be another critical factor in helping attach to complex surfaces, thanks to its high viscosity."

Source: BRISTOL (18 Apr 2024)

printers clattered, and dot-matrix printers made loud ripping sounds.

Today, those noises are gone. And though we do spend more time reading on screens, we haven't stopped printing on paper.

The main reason for the quiet? The inkjet printer. While laser printers do the big printing jobs in commercial settings, the inkjet printer has become the printer most of us use at home and at the office.

The printhead of an inkjet printer performs a remarkable task. Even at the coarse resolution of 96 dots per inch (dpi), as was typical for the first models in the 1980s, the distance from dot center to dot center is a mere 260 micrometers. To fill a standard letter page that has 2.5-centimeter margins would require more than half a million individual ink droplets. Delivery of those tiny droplets involves moving them with very precise control, repeated a vast number of times as rapidly as possible. This process is ideally suited for microelectromechanical systems (MEMS), which are electronic devices with microscopic components that employ movement."

Source: IEEE Spectrum (25 Mar 2024)

Sabina Aouf finds out if we can – and should – abolish plastic.

Earth Day 2024 has the theme of "Planet vs Plastics", campaigning for "the end" of the material starting with a 60 per cent reduction in plastic production by 2040 and ultimately building to a "plastic-free future".

"Better to incinerate plastic than recycle it"

The proposal is indicative of a broader escalation in the rhetoric around plastic.

In the face of mounting evidence of dangers to the health of people and planet, and with lobbying efforts ramping up as United Nations member states work towards a draft of a global plastics treaty by the end of this year, more abolitionist voices are emerging, and even clashing with campaigners for circularity.

Sian Sutherland, co-founder of advocacy group A Plastic Planet and alternative materials database PlasticFree, is among those who believe we should put an end to plastics – recycling and all.

"It is better to incinerate the plastic – safely – than it is to perpetuate its toxic existence by recycling it," Sutherland told Dezeen."

Source: Dezeen (22 Apr 2024)