SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Weekly Discovery

We SHARE to inspire and ignite ideas!

19 Jun – 23 Jun 2023

AI

Asia's Opportunity for Generative AI

"Suddenly, everybody is talking about generative artificial intelligence (AI). (Disclaimer: this article is written by a human.) The idea of software that generates dynamic, customised content is exciting. While chatbots have existed for years, a rapidly expanding suite of generative AI-based image, video, and text generators such as DALL-E 2, Fotor, Runway, AlphaCode, and ChatGPT (just to name a few) have the potential to democratise AI and put it into the hands of every person and every organisation. Integrating these into mainstream software products in the form of "co-pilots" to assist in everyday tasks hold even more promise."

Source: MIT Tech Review (14 Jun 2023)

AI

AI Could Replace Humans in Social Science Research

"In an article published yesterday in the prestigious journal Science, leading researchers from the University of Waterloo, University of Toronto, Yale University, and the University of Pennsylvania look at how AI (large language models or LLMs in particular) could change the nature of their work.

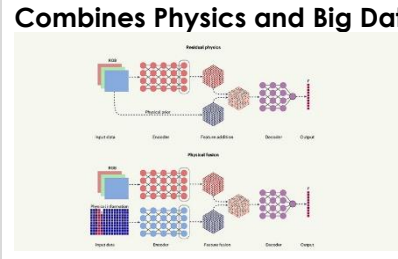
"What we wanted to explore in this article is how social science research practices can be adapted, even reinvented, to harness the power of AI," said Igor Grossmann, professor of psychology at Waterloo.

Grossmann and colleagues note that large language models trained on vast amounts of text data are increasingly capable of simulating human-like responses and behaviours. This offers novel opportunities for testing theories and hypotheses about human behaviour at great scale and speed. "

Source: UWaterloo (8 Jun 2023)

AI

Hybrid AI-Powered Computer Vision Combines Physics and Big Data



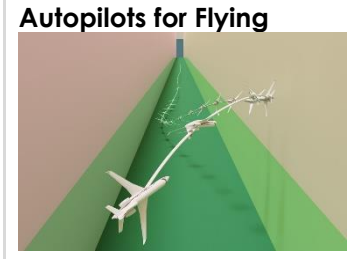
"Researchers from UCLA and the United States Army Research Laboratory have laid out a new approach to enhance artificial intelligence-powered computer vision technologies by adding physics-based awareness to data-driven techniques.

Published in Nature Machine Intelligence, the study offered an overview of a hybrid methodology designed to improve how AI-based machinery sense, interact, and respond to its environment in real time — as in how autonomous vehicles move and manoeuvre, or how robots use the improved technology to carry out precision actions."

Source: Samueli (16 Jun 2023)

AI

A Step Toward Safe and Reliable Autopilots for Flying



"MIT researchers have developed a new technique that can solve complex stabilise-avoid problems better than other methods. Their machine-learning approach matches or exceeds the safety of existing methods while providing a tenfold increase in stability, meaning the agent reaches and remains stable within its goal region.

In an experiment that would make Maverick proud, their technique effectively piloted a simulated jet aircraft through a narrow corridor without crashing into the ground."

Source: MIT (12 Jun 2023)

ARCHITECTURE

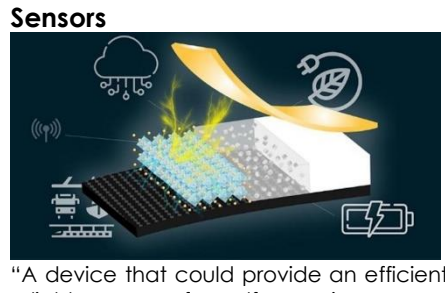
Un-Making Architecture: An Introduction to A Critical Framework

"This special issue of The Journal of Architecture surveys the concept of 'un-making' as an overarching facet of architectural thinking and production that has yet to be considered at a synoptic scale. When we refer to 'un-making,' we mean the actions that result in the dismantling of architectural forms, modes of thought, and means of production. A historical study of these operations, we hope, might generate necessary theoretical frameworks to conceptualise transformations in architecture amid today's unprecedented socio-political and environmental challenges. "

Source: Taylor&Francis (8 Jun 2023)

ENERGY HARVESTING

Transforming Vibrations into Electricity Could Facilitate Self-Powered IOT Sensors



"A device that could provide an efficient and reliable means for self-powering sensors has been developed by an international research team.

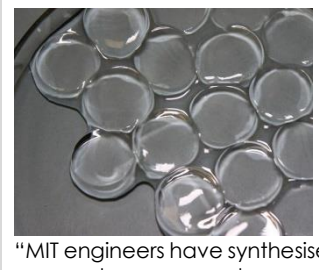
The new energy-generating device was made by combining piezoelectric composites with carbon fibre-reinforced polymer (CFRP), a commonly used material that is both light and strong.

This composition allows it to transform vibrations from the surrounding environment into electricity. "

Source: E&T (16 Jun 2023)

MATERIALS

Scientists Develop Material That Could Harvest Water from Desert Air



"MIT engineers have synthesised a hydrogel that can soak up a record amount of moisture from the air in the driest of climates.

The rubbery material is made from hydrogel and can swell to absorb water vapour even in desert-like conditions, where there is only 30 per cent relative humidity in the air.

Once absorbed by the gel, the water could be heated, condensed, and collected as ultrapure water.

The MIT researchers were able to achieve "record-breaking" vapour absorption by infusing the hydrogel with larger amounts of lithium chloride — a type of salt that is known to be a powerful desiccant."

Source: E&T (16 Jun 2023)

MEDIA

The Media's Bottom-Line Problem

"In its most dystopian moment, the award-winning HBO drama Succession imagined the ownership of a major media corporation—a fictional rendering of Fox News—using the power of their live election night broadcast to try to subvert democracy, in order to serve their own short-term ambitions. If Succession was a penetrating character study in the pathologies of great wealth, it was also a provocative exploration of the political and economic power of media institutions. As the show's creator Jesse Armstrong explained, one of the goals was "to consider what happens when something as important as the flow of information in a democracy hits the reductive brutality of the profit calculation.""

Source: JSTOR (15 Jun 2023)

METAVERSE

Metaverse Could Put a Dent in Global Warming

"For many technology enthusiasts, the metaverse – a virtual 3D environment in which the physical and digital worlds converge – has the potential to transform almost every facet of human life, from work to education to entertainment.

New Cornell research shows the metaverse could have environmental benefits, too: lowering the global surface temperature by up to 0.02 degrees Celsius before the end of the century."

Source: Cornell (14 Jun 2023)

ROBOTICS

Researchers Discover Materials Exhibiting Huge Magnetoresistance

"A group of researchers from Tohoku University has unveiled a new material that exhibits enormous magnetoresistance, paving the way for developments in non-volatile magneto resistive memory (MRAM).

Details of their unique discovery were published in the Journal of Alloys and Compounds on May 29, 2023."

Source: Tohoku (9 Jun 2023)

ROBOTICS

Robotic Dog Spots Invasive Fire Ant Nests Better Than Humans

"Scientists in China and Brazil are testing robotic dogs and artificial intelligence (AI) to detect invasive fire ant nests.

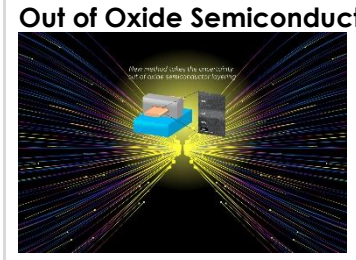
The researchers taught an open-source AI to visually differentiate fire ant nests from those of other ant species, then ran the program on a robotic dog equipped with specialised computer hardware.

The robot outperformed humans in identifying hidden fire ant nests within a 300-square-meter (3,229-square-foot) nursery garden, detecting three times as many nests with greater accuracy in less than 10 minutes."

Source: ACM (15 Jun 2023)

SEMICON

New Method Takes the Uncertainty Out of Oxide Semiconductor Layering



"3D integrated circuits are a key part of improving the efficiency of electronics to meet the considerable demands of consumers. They are constantly being developed, but translating theoretical findings into actual devices is not easy. Now, a new design by a research team from Japan can turn these theories into reality.

In a study recently published for the VLSI Symposium 2023, researchers from Institute of Industrial Science, The University of Tokyo have reported a deposition process for nanosheet oxide semiconductor. The oxide semiconductor resulting from this process has high carrier mobility and reliability in transistors. "

Source: IIS (9 Jun 2023)