ACM TechNews, Friday, October 30, 2020

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Computer science, information technology, and related science, society, and technology news

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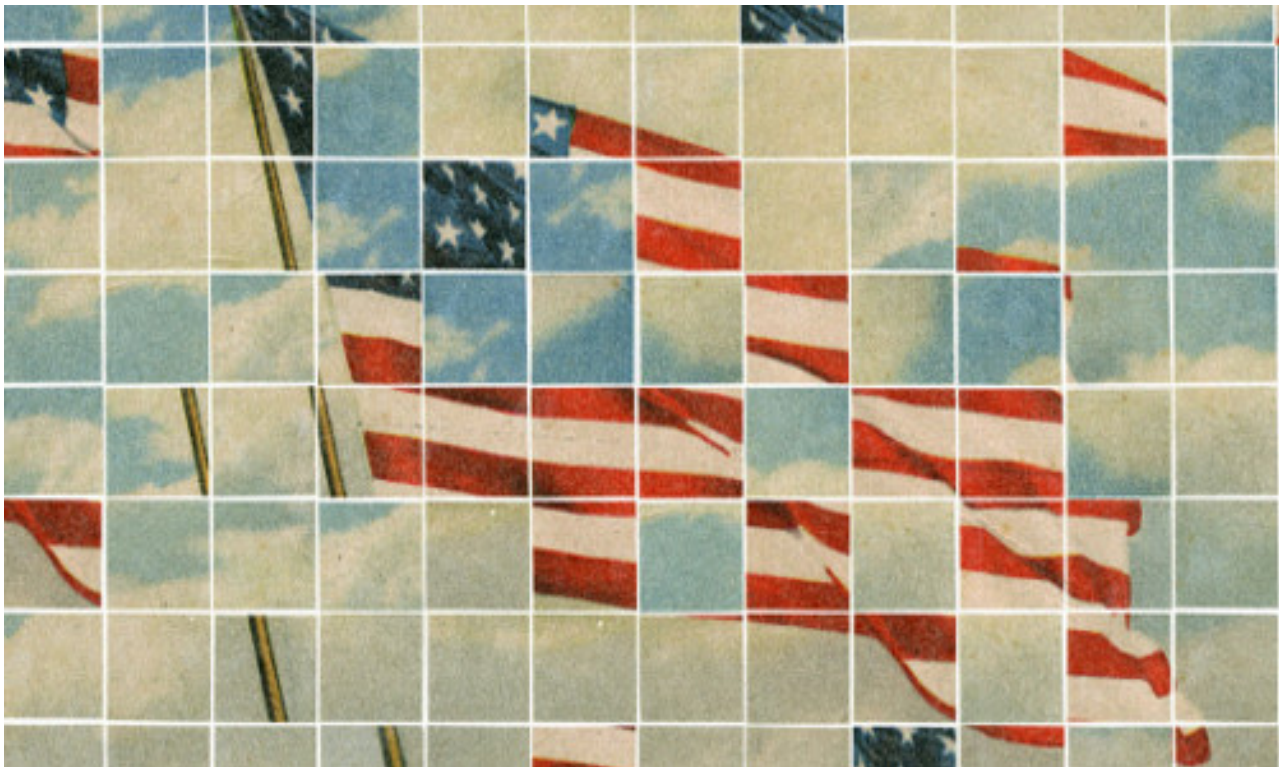
Hacker Releases Georgia County Election Data After Ransom Not Paid
The Wall Street Journal
Tawnell D. Hobbs
October 28, 2020

A computer hacker publicly released election-related files from Hall County, GA, after county officials failed to pay a ransom. The hacker labeled the released data as "example files," which generally are used to encourage ransom payment before more-compromising information is made public. A review of the DoppelPaymer ransomware group's website shows the hacked files contain voter names and registration numbers and an election-equipment inventory, among other things. The county announced the ransomware attack on Oct. 7, but has not commented about the amount of ransom demanded. Said Brett Callow of cybersecurity firm Emsisoft, "What, if any, other data the criminals obtained during the attack is something only they and, perhaps, Hall County know."

Full Article

*May Require Paid Registration

The Algorithm That Could Get You Back in the Office
Bloomberg
Andrew Zaleski
October 27, 2020

As company offices reopen, some are using software to help them shuffle employees, schedule meetings, map office hot spots, and practice social distancing. Maptician detects areas of high transmission risk, such as desks placed too close together, and allows co-workers to view the map to see if they were ever seated near a colleague who tested positive for Covid-19. Employees of commercial real estate brokerage SquareFoot developed an algorithm to determine work rotations for a company's teams. Salesforce's Work.com has developed a software platform that includes a shift-management algorithm that calculates potential building bottlenecks based on the number of projected workers.
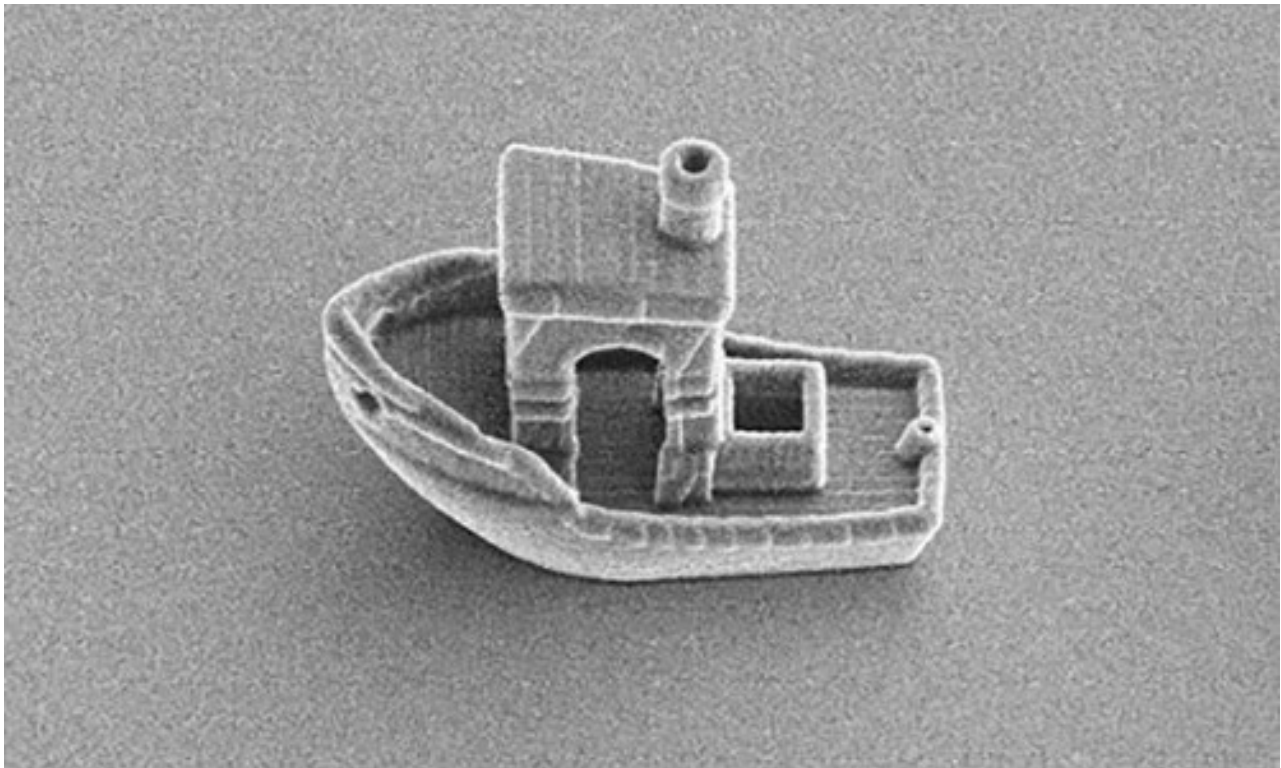
Scientists Used 3D Printer to Create World's Smallest Boat

CNN

Amy Woodyatt
October 28, 2020

Researchers at Leiden University in the Netherlands created the world's smallest boat using an electron microscope and a high-resolution three-dimensional (3D) printer. The 30-micrometer-long boat was developed as part of an investigation into synthetic, self-propelled microswimmers that could travel inside the human body to administer medical treatments, among other things. As part of the study, the researchers created objects as small as 4 micrometers. Said Leiden's Daniela Kraft, "We hope to learn about what is now a good design principle for creating a little drug delivery vehicle."

Raptor-Inspired Drone with Morphing Wing, Tail
EPFL (Switzerland)
October 28, 2020

A next-generation drone developed by engineers at the Swiss Federal Institute of Technology Lausanne (EPFL) has a feathered wing and tail for increased flight agility. The northern goshawk, a type of raptor (bird of prey), served as the inspiration for the drone. Artificial feathers allow the drone to adjust the shape of its wing and tail, but a propeller is used for forward thrust, which is more efficient than flapping wings. Said EPFL's Enrico Ajanic, "Our design extracts principles of avian agile flight to create a drone that can approximate the flight performance of raptors, but also tests the biological hypothesis that a morphing tail plays an important role in achieving faster turns, decelerations, and even slow flight."

Full Article

Researchers Break Magnetic Memory Speed Record
Berkeley News
October 27, 2020

An international research team led by the French National Centre for Scientific Research developed a new method for magnetization switching that is almost 100 times faster than state-of-the-art spintronic devices. The researchers achieved magnetization switching, or writing information into magnetic memory, by directing an optical pump at a photoconductive switch to convert light into six-picosecond electrical pulses that were guided toward a magnet. This technique could pave the way for ultrafast magnetic memory for computer chips that would retain information even when power is off. Said the University of California, Berkeley's Jeffrey Bokor, "Such a high-speed, low-energy spintronic device can potentially tackle the performance limitations of current processor-level memory systems, and it could also be used for logic applications."

Full Article

FBI Warns Ransomware Assault Threatens U.S. Healthcare System
Associated Press
Frank Bajak
October 29, 2020

The U.S. Federal Bureau of Investigation, Department of Homeland Security, and Department of Health and Human Services issued a joint alert this week that they had "credible information of an increased and imminent cybercrime threat to U.S. hospitals and healthcare providers" in an effort to cause "data theft and disruption of healthcare services." The alert came amid a spike in cases of Covid-19 nationwide. At least five U.S. hospitals were hit by the ransomware attacks this week. Attacks by an Eastern European criminal gang involved the Ryuk strain of ransomware, which Microsoft has been working to counter. Hold Security's Alex Holden said the cybercriminals are demanding ransoms of more than $10 million per target, and have discussed plans on the dark

web to attack more than 400 hospitals, clinics, and other medical facilities.

Dog Training Methods Help JHU Teach Robots to Learn New Tricks
Johns Hopkins Hub
Jill Rosen
October 26, 2020

Computer scientists at Johns Hopkins University used positive reinforcement to show a robot how to teach itself new tasks quickly. The training technique, often used to change a dog's behavior, helped the robot improve its skills in a matter of days, rather than the month it previously would have taken. The researchers used a reward system to help the robot learn from its mistakes. When it came to stacking blocks, the robot quickly determined it would earn high points for correct behaviors and zero points for failing to grasp a block or knocking over a stack. Said Johns Hopkins' Andrew Hundt, "The robot wants the higher score. It quickly learns the right behavior to get the best reward."

Motorists' Smartphones May Help Highways Bosses Keep Roads Safe
University of Birmingham
October 25, 2020

Researchers at the U.K.'s University of Birmingham found that high-resolution three-axis accelerometers and GPS tracking built into smartphones, along with an app, can provide useful measures of road roughness for civil engineers. This "crowdsourced" data sent by motorists of how their vehicle moves vertically in relation to the roadway could be used by road agencies to generate a low-cost summary of the condition of the entire road network, evaluate and compare

maintenance policies, and screen roads to identify and prioritize maintenance projects. Said the university's Michael Burrow, "Vertical acceleration data from smartphones could be analyzed using machine learning algorithms to enable [relative road roughness] to be predicted to a similar accuracy as would be expected from a visual inspection, but with improved repeatability and reproducibility."

Full Article

ML Model Supports Safe, Accurate Decision-making for Halifax Harbor
Dalhousie University (Canada)
Rebecca Rawcliffe
October 20, 2020

Working with ocean data analytics innovation platform DeepSense, researchers at Canada's Dalhousie University have developed a machine learning (ML) system for predicting wind speed and wave height, in order to inform safer, more accurate decision-making for the SmartAtlantic Herring Cove Buoy platform. Said Melanie Nadeau of the Centre for Ocean Ventures and Entrepreneurship, "The Smart Buoy platform hosts several ocean sensors and generates refined forecasts that have become a crucial resource for marine users that enter the Halifax Harbour." Dalhousie's Chris Widden said, "We took the main predictive variables of wind speed and wave height, and data related to these variables collected by other smart buoys and land stations, to think about how we can use machine learning to make predictions around this activity for the buoy at Herring Cove. It's novel as no one else seems to be making predictions like this from only one or two replacement sensors."

Full Article

Technology Finds Long-Hidden Quakes, Possible Clues About How Earthquakes Evolve
Stanford News

Josie Garthwaite
October 21, 2020

Stanford University scientists developed new algorithms that extract evidence of long-hidden microquakes from massive seismic datasets. The Earthquake Transformer algorithm emulates how human analysts holistically analyze a set of seismic "wiggles," then focuses on a small section of interest. The Stanford team measured the algorithm's performance using five weeks of data recorded in the region of Japan impacted two decades ago by the Tottori earthquake and its aftershocks. The algorithm detected 21,092 events—more than 2.5 times the number of quakes detected manually—within 20 minutes, using data from just 18 of 57 stations originally used to study the sequence. Said Stanford's Gregory Beroza, "Earthquake monitoring using machine learning in near-real time is coming very soon."

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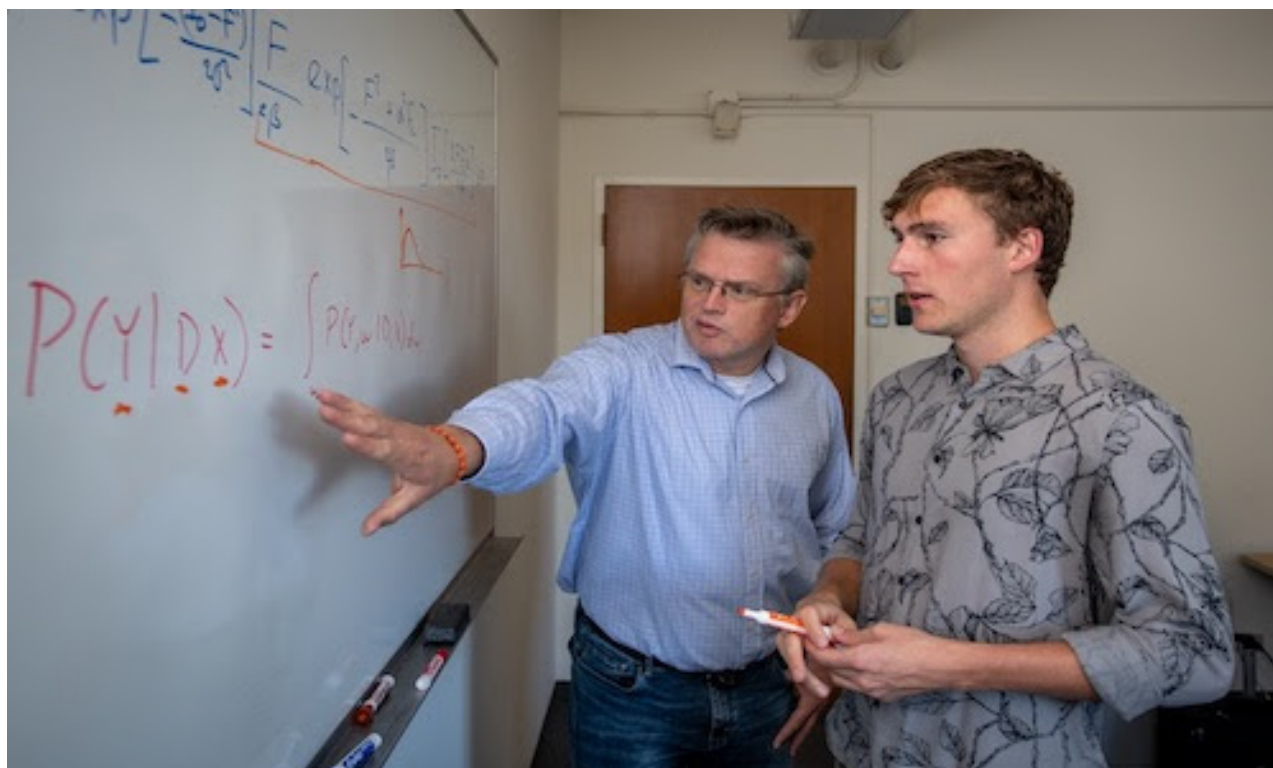
Reimagining the Shape of Noise Leads to Improved Molecular Models

Lawrence Berkeley National Laboratory

Greta Lorge
October 20, 2020

Researchers at the Lawrence Berkeley National Laboratory developed a mathematical concept framework to model the presence of noise in data in a more realistic way. The researchers had issues with the widely accepted view that experimental errors fall into a classic normal distribution, such as the Gaussian bell curve, where close to 100% of observations fall within 3.5 standard deviations. They determined a more realistic curve has thicker "tails" due to rare but predictable events. Said Berkeley Lab's Peter Zwart, "Including these slightly more realistic error models in crystallographic target functions allows us to model the presence of what normally might be called outliers in a more realistic way."

Full Article

AI Reveals Hundreds of Millions of Trees in the Sahara
University of Copenhagen
October 20, 2020

Researchers at Denmark's University of Copenhagen, along with international collaborators, used artificial intelligence and detailed satellite imagery to count more than 1.8 billion trees and shrubs in a 1.3-million-sq.km. area covering the western-most portions of the Sahara Desert, the Sahel region, and the sub-humid zones of West Africa. This marks the first time that trees across a large dryland region have been counted. The combination of detailed satellite imagery from the U.S. National Aeronautics and Space Administration (NASA) and deep learning helped researchers determine that trees do grow in the Sahara Desert, counting millions of trees in the desert alone. The university's Martin Brandt said the research is important because climate models generally do not include trees outside of forested areas.

Full Article

Researchers Extract Secret Key Used to Encrypt Intel CPU Code

Ars Technica
Dan Goodin
October 28, 2020

An independent researcher, working with two researchers from security firm Positive Technologies, extracted the secret key that encrypts updates to Intel central processing units (CPUs). Hackers who got their hands on the key would be able to decrypt updates Intel issues to plug security holes or update other aspects of chip operation. Independent researcher Maxim Goryachy said, "At the moment, it is quite difficult to assess the security impact" of being able to obtain such a key. Added Positive Technologies' Mark Ermolov, "For now, there's only one but very important consequence: independent analysis of a microcode patch that was impossible until now."
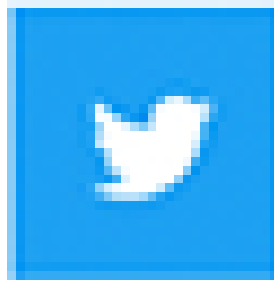
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