VOLUME 1 ISSUE 5

VEDAVYASA INSTITUTE OF TECHNOLOGY

TECH NEWS

SEPTEMBER 2021

RECENT UPDATES ON TECHNOLOGY

Prepared By S2 Students under the Guidance of DSH (Department Of Science and Humanities)

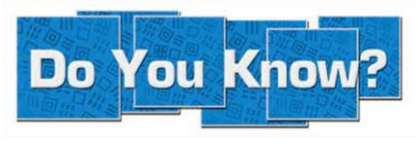
CHINA'S "ARTIFICIAL SUN"

China's '*artificial sun*' recently broke the world record as it achieved a plasma temperature of 120 million degree Celsius for 101 seconds and 160 million Celsius for 20 seconds. This has set new records in the field of nuclear fusion. The experiment was achieved by Experimental Advanced Superconducting Tokamak (EAST) device, or the "artificial sun," located at the Hefei Institutes of Physical Science of the Chinese Academy of Sciences, the Global Times reported. EAST is part of the International Thermonuclear Experimental Reactor (ITER) facility a collaboration of 35 nations, also comprising India. EAST is designed to replicate the nuclear fusion process that occurs naturally in the sun and stars to provide almost infinite clean energy through controlled nuclear fusion, which is often dubbed the "artificial sun."Previously, the plasma could be maintained up to a temperature of 100 million Celsius for 100 seconds.

"The breakthrough is significant progress, and the ultimate goal should be keeping the temperature at a stable level for a long time," Li Miao, director of the Physics Department of the Southern University of Science and Technology in Shenzhen, was quoted as saying. The next milestone might be to maintain the stability for a week or more, Li added. Achieving a plasma temperature above 100 million Celsius is one of the key challenges to harness nuclear fusion. The temperature at the core of the sun is widely believed to be 15 million degrees Celsius, meaning that the plasma at the device's core will be seven times hotter than that of the sun.

https://weather.com/en-IN/india/science/news/2021-06-11-china-artificial-sun-sustains-set-new-record

By Soorya S2 CSE



- The Firefox logo isn't a fox. It's a red panda.
- Samsung is 38 years and 1 month older than Apple.
- NASA's internet speed is 91 GB per second.
- Alexa is always listening to your conversation and stores all of your dialogue history in the cloud to improve its experience.
- AI accurately identifies what ever objects can be recycled from a glance.
- Antarctica is covered in sheet of ice 7000 feet thick.
- Lady liberty wears a shoes of Size 879.
- Haumea is a dwarf planet that's shaped like a potato.
- Jingle bells was the First song played in space.
- STRENGTHS is the longest word in the English language with one vowel.

By: Amra Fathima,S2 CS, Yedunandan S2 ME, Binsila S2 ECE

RUNNING QUANTUM SOFTWARE ON A CLASSICAL COMPUTER

The specific quantum software known as"*Quantum Approximate Optimization Algorithm"* (QAOA) and is used to solve classical optimization problems in mathematics; it's essentially a way of picking the best solution to a problem out of a set of possible solutions. There is a lot of interest in understanding what problems can be solved efficiently by a quantum computer, and QAOA is one of the more prominent candidates. Ultimately, QAOA is meant to help us on the way to the famed "quantum speed-up," the predicted boost in processing speed that we can achieve with quantum computers instead of conventional ones. Understandably, QAOA has a number of proponents, including Google, who have their sights set on quantum technologies and computing in the near future: in 2019 they created Sycamore, a 53-qubit quantum processor, and used it to run a task it estimated it would take a state-of-the-art classical supercomputer around 10,000 years to complete. Sycamore ran the same task in 200 seconds. But the barrier of quantum speed-up is all but rigid and it is being continuously reshaped by new research, also thanks to the progress in the development of more efficient classical algorithms.

In their study, Carleo and Medvidovi address a key open question in the field: can algorithms running on current and near-term quantum computers offer a significant advantage over classical algorithms for tasks of practical interest? This is important since the current generation of quantum processors operate in a regime where they make errors when running quantum "software," and can therefore only run algorithms of limited complexity. Using conventional computers, the two researchers developed a method that can approximately simulate the behavior of a special class of algorithms known as variational quantum algorithms, which are ways of working out the lowest energy state, or "ground state" of a quantum system. QAOA is one important example of such family of quantum algorithms, that researchers believe are among the most promising candidates for "quantum advantage" in near-term quantum computers. The approach is based on the idea that modern machine-learning tools, e.g. the ones used in learning complex games like Go, can also be used to learn and emulate the inner workings of a quantum computer. The key tool for these simulations are Neural Network Quantum States, an artificial neural network that Carleo developed in 2016 with Matthias Troyer, and that was now used for the first time to simulate QAOA. The results are considered the province of quantum computing, and set a new benchmark for the future development of quantum hardware.

https://www.sciencedaily.com/releases/2021/08/210803121404.html

By Vyshnav S2 ECE

SMART GADGET
NON LEAF REMOTE

This lit dodecahedron device controls any smart light switch, smart light bulb and other home accessories when you rotate it to different sides. Sure, that may not be the most practical way to turn your lights off, but this smart gadget is guaranteed to make you feel like a James Bond villain while you're doing mundane tasks.

AMAZING FACTS:

"One million Earths could fit inside the sun!"

PHOTONIC PROCESSOR COULD PERFORM 'AT SPEED OF LIGHT'

A tensor processing unit (TPU) is a chip developed by Google specifically for the purposes of machine learning using the company's Tensor Flow framework. The TPU has been demonstrated to outperform graphics processing units (GPUs) by almost three orders of magnitude, due to a stronger signal and greater energy efficiency.Machine learning is computationally expensive, with operations taking place one at a time while requiring continuous access to the cache memory, generating a bottleneck. While specialised machine learning architecture like GPUs and TPUs have been designed to reduce the effect of this bottleneck, they remain slow and power-hungry. A team of George Washington University researchers looked at alternative platforms which could perform operations in parallel, reducing time and power consumption during machine learning. They experimented with using a photonic TPU to perform mathematical operations foundational for training neural networks, specifically matrix multiplication. This processor was capable of performing many operations in parallel via wavelength division multiplexing: use of different wavelengths of light to run multiple signals on a single optical fibre. Performing operations using this photonic processor allowed for near-zero static power consumption due to a design which adjusts its optical properties in response to local heating, and very low latency. According to the Applied Physics Review paper describing the study, up to 2x1015 operations could be executed every second (two petaFLOPS) thanks to delays in the circuitry of just tens of picoseconds. Professor Mario Miscuglio said that, when appropriately designed and trained, integrated photonic processors with may be able to perform "at the speed of light"."The architecture shows execution time limited only by the time of flight of the photon in the chip," the study said. Although the processor consumes approximately 80W of power, its performance (in terms of operations per joule) is estimated to be two to three orders of magnitude higher than a conventional electrical TPU with similar chip areas. Reducing the energy and time cost for machine learning could allow for TPUs to be embedded in more mobile devices and PCs without having to send large volumes of data to the cloud for processing. "This work shows that photonic specialised processors have the potential to augment electronic systems and may perform exceptionally well in network-edge devices in the looming 5G networks and beyond.

https://eandt.theiet.org/content/articles/2020/07/photonic-processor-limited-only-by-speed-of-light

By Aravind S2 CSE

HUMAN-BODY COMMUNICATIONS WITH BINAURAL HEARING AIDS

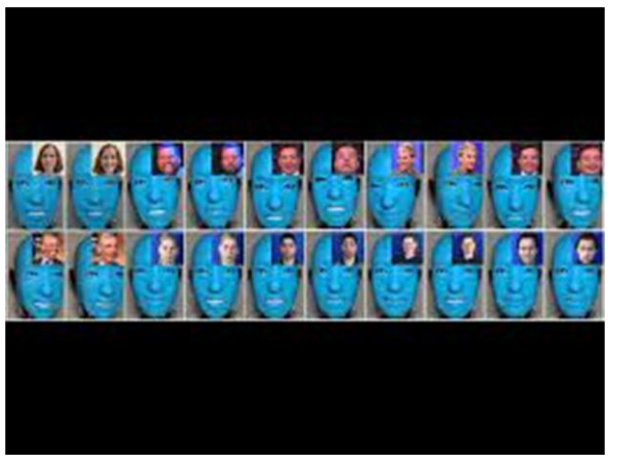
Modern portable devices are the result of great progress in miniaturization and wireless communications. Now that these devices can be made even smaller and lighter without loss of functionality, it's likely that a great part of next-generation electronics will revolve around wearable technology. However, for wearables to truly transcend portables, we will need to rethink the way in which devices communicate with each other as "wireless body area networks" (or WBANs). The usual approach of using an antenna to radiate signals into the surrounding area while hoping to reach a receiver won't cut it for wearables. One promising approach is "human body communication" (HBC), which involves using the body itself as a medium to transmit signals. The main idea is that some electric fields can propagate inside the body very efficiently without leaking to the surrounding area. By interfacing skin worn devices with electrodes, we can enable them to communicate with each other using relatively lower frequencies than those used in conventional wireless protocols like Bluetooth. Such hearing aid devices come in pairs one for each ear and greatly improve intelligibility and sound localization for the wearer by communicating with each other to adapt to the sound field. Because these hearing aids are in direct contact with the skin, they made for a perfect candidate application for HBC.

https://gadgets.ndtv.com/apps/news/openai-codex-coding-using-english-language-natural-software-tool-free-to-use-2508652

By Harisankar S2 ECE

AI HUMANOID HEAD EVA THAT USES FACIAL EXPRESSIONS TO COMMUNICATE LIKE HUMANS.

A team of scientists at Columbia University's Department of Mechanical Engineering has made a major breakthrough and developed a robot that can smile, smirk, raise eyebrows, and mimic the forehead wrinkles of humans. The artificial intelligence-powered robot, named Eva, can emulate human facial expressions to an extent not seen before in the field of robotics. While several humanoid robots have been developed in the last two decades, emotional intelligence in robots has been largely limited. Scientists who were part of this study said facially expressive humanoid robots are expensive and inaccessible to most people, thus limiting the number of researchers in this field. This is exactly what the study titled, "Facially expressive humanoid robotic face", published in the journal Science Direct aims to change.



The development can aid potential artificial intelligence researchers by providing a relatively inexpensive, open-source robot which can serve as a platform for research into emotional communication between humans and machines, scientists said. Eva is an adult-sized humanoid head and it mimics facial expressions, head movements, and speech using 25 muscles, reads the abstract of the paper. The humanoid head has 12 facial muscles that have the capability to produce a skin displacement of up to 15 mm. While not as sophisticated as the ones developed by organisations such as Hanson Robotics and Hiroshi Ishiguro Laboratories, Eva is capable of realistically mimic human facial expressions and head movements, scientists said. They have even shared a video of how Eva works.

https://gadgets.ndtv.com/science/news/ai-robot-eva-facial-expressions-communicate-with-humans-columbia-university-2455521

By Yedunandan S2 ME

TECH PUZZILE

D	F	H	G	B	E	J	X	W	P
G	T	E	N	S	I	O	N	R	D
N	K	Y	N	O	N	A	G	R	L
O	P	T	I	M	I	Z	E	Z	S
C	Q	P	O	V	W	N	M	U	T
C	A	G	C	B	G	M	P	T	R
M	A	T	Y	I	O	Z	R	L	O
C	A	S	S	E	M	B	L	Y	N
A	O	E	K	A	V	Y	N	O	G
S	D	A	N	M	R	V	Q	P	U

CLUE

1. The act of constructing something,as a piece of machinery
2. Make optimal, get the most out of ,use best
3. Someone who creates plans to be used in making something
4. Having strength or power greater than average or expected
5. A stress that produces an elongation of a physical body

By Abhijith , S2 EEE

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ACKNOWLEDGMENT: DIRECTOR, PRINCIPAL, HEAD OF THE DEPARTMENT, FACULTIES AND STUDENTS