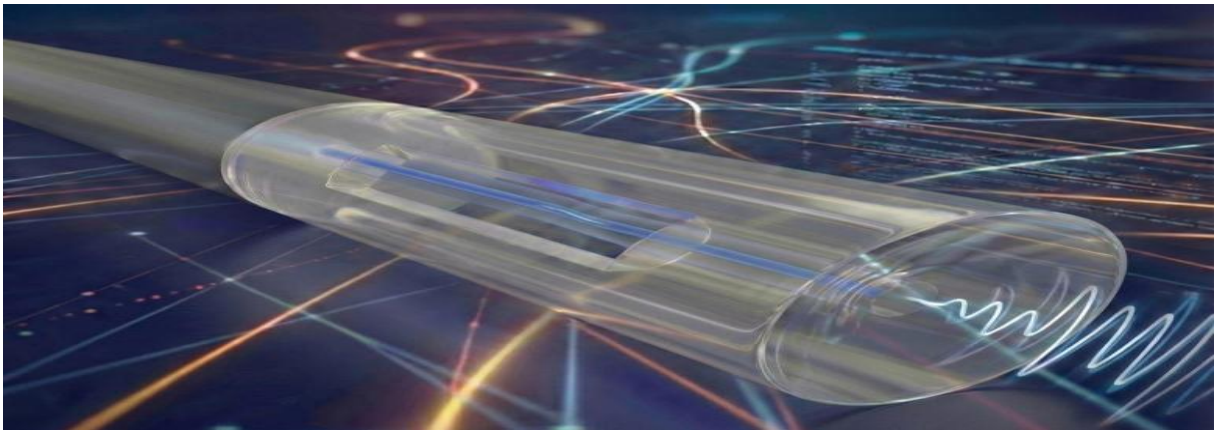
Department of Data Science

Weekly Data Science Bytes

This Microphone Made of Glass Can Survive Extreme Heat and Electromagnetic Chaos



- **A newly developed fiber-optic microphone demonstrates how light-based sensing can overcome the limitations of conventional electronics in extreme environments.**
- A team of researchers has built a microphone so small it fits inside a strand of pure silica fiber, yet it can pick up ultrasound far above the limits of human hearing. Because the device is made from glass rather than electronics, it is designed to keep working in punishing conditions, including temperatures up to 1,000 °C.

- One long-term goal is to place it inside high-voltage transformers so it can detect early signs of trouble before failures cascade into outages.

- "Conventional electronic sensors often fail under thermal stress or suffer from severe signal interference," said Xiaobei Zhang, a member of the research team from Shanghai University. "Our all-fiber microphone can survive in hazardous environments and is completely immune to electromagnetic interference while remaining sensitive enough to hear the subtle early warning signals of equipment failure."

Source: https://scitechdaily.com/this-microphone-made-of-glass-can-survive-extreme-heat-and-electromagnetic-chaos/

Quantum Computing Breakthrough: Scientists Finally Unlock the Secret of Majorana Qubits

- "This is a crucial advance," says Ramón Aguado, a CSIC researcher at the Madrid Institute of Materials Science (ICMM) and co author of the study. He explains that the team has shown it is possible to retrieve information stored in Majorana qubits using a technique known as quantum capacitance. According to Aguado, this method works as "a global probe sensitive to the overall state of the system," allowing researchers to detect properties that were previously out of reach.

Source: https://scitechdaily.com/quantum-computing-breakthrough-scientists-finally-unlock-the-secret-of-majorana-qubits/

IT Ministry mandates label for AI-generated content, reduces takedown timeline to 2–3 hours

- The Union Government has notified amendments requiring photorealistic AI-generated contents to be prominently labelled and significantly shortening timelines for takedown of illegal material, including non-consensual deepfakes. The changes, under the Information Technology Act, 2021, will come into force on February 20.

Source: https://www.thehindu.com/news/national/govt-tightens-rules-on-ai-generated-deepfake-content-mandates-faster-takedown-of-flagged-material/article70615674.ece

"AI Reshaping Jobs. It Needs Rules, Not Panic": Top UN Technology Envoy To NDTV

- As India prepares to host one of the world's most consequential summits on Artificial Intelligence, the United Nations' Technology Envoy has issued a clear message to governments, industry and citizens alike: do not fear AI, but do not surrender control to it either.

- Artificial Intelligence, he says, is rapidly reshaping jobs, governance and global power structures, and unless it is guided by human values and global cooperation, its risks could outweigh its promise.

In a wide-ranging, exclusive conversation with NDTV, Dr Amandeep Singh Gill, the UN Secretary-General's Envoy on Technology, said India should brace for losing jobs, especially in the information technology and business process outsourcing (BPO) sectors as machines will increasingly take over lower-end jobs in the sectors.

Source: https://www.ndtv.com/india-news/dr-amandeep-singh-gill-ai-reshaping-jobs-it-needs-rules-not-panic-top-un-technology-envoy-to-ndtv-10995755

United Nations Envoy on Technology: "With New Technologies Our World Will Be Shaped in Ways We Can't Even Imagine."

- At CES 2024 in Las Vegas in January, Amandeep Singh Gill, the United Nations Envoy on Technology, who reports directly to the UN Secretary-General, discusses the importance of technology governance as we transition from the Industrial Age to the Knowledge Age. On behalf of the Human Security For All (HS4A) campaign, he spoke with Ketan Patel of Force For Good, a London-based organization that believes that capital, finance and tech can achieve the goals of the 17 SGD's if approached correctly.
- Gill explained that the UN is focused on initiatives such as the Global Digital Compact and having international conversations on AI governance to address the digital divide and harness technology's opportunities for all humanity. Gill emphasized the need to address institutional and human capacity deficits and transform medieval institutions to adapt to the future of work brought about by new technologies.

Source: https://www.livemint.com/technology/a-memory-chip-shortage-is-squeezing-consumer-tech-and-its-set-to-get-worse-11770952908721.html

AI AND THE FUTURE OF WORK

Arnab Bhattacharya

Artificial intelligence (AI) has pervaded almost every field of innovation and development, starting from driverless cars to recommendation of products online to personalised healthcare and natural language conversations. Sensors and internet-of-things (IoT) are delving into our lives more rapidly than we realise. Governments, financial institutions and big industries are relying on cyber-physical systems for their day-to-day activities. The question, however, is how long before the institutions become too dependent on it?

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Given the tremendous progress of AI in speech and language processing, computer vision, etc, it is conceivable that in the near future, almost any task that is "measurable" will be taken over by AI. The increasing success of AI in super-skilled application scenarios such as in medical and legal domains clearly reinforce this trend. Even in tasks that are considered to be purely based on human creativity, such as writing poetry, painting, and composing music, success of AI is impressive and worrying to many who practise it. What then will be left for humans in the future?

The answer probably lies in the way current AI models are designed. At their heart, they are mathematical tools, albeit too complex for humans to explain. This, therefore, leads to the conclusion that anything that can be "measured" in terms of numbers can be solved by AI models. Thus, humans may not be required for these so-called "left-brain" functions. This disruption calls for a massive re-skilling of the human population. Humans should focus on developing and utilising right-brain skills, such as critical thinking, creativity, emotional intelligence, and empathy. These skills are difficult for AI to replicate and will become increasingly valuable in the future of work. We should focus on developing skills that complement AI technology, such as data analysis and programming, as well as skills that involve human interaction, such as customer service and healthcare. Ultimately, humans need to be flexible, adaptable, and have a zeal to continuously learn to thrive in a world with AI technology.

Instead of worrying about jobs being taken over by AI, we should focus on the tasks that AI will be fulfilling. We've already been using AI features like auto-correct and auto-complete. AI will take care of grunt work and save time. We need to learn how to use AI effectively and diversify our work requirements.

AI may open up newer avenues or scopes of learning and employment. Rather than fearing the changes brought by AI, students and young engineers should embrace the opportunities it presents.

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As AI is taking over the academic sphere as well, we might probably have to wait for a decisive overhaul of education. Educational institutions would need to incorporate AI into the curriculum like other mandatory subjects, provide opportunities for students to work on AI-related projects, and develop programmes that teach skills that are difficult for AI to replicate, such as creativity and emotional intelligence. In addition, educational institutions need to focus on developing lifelong learning skills and promote a culture of continuous learning, as the skills required in the workforce will continue to evolve and change as AI technology advances.

The youth of today stand at the threshold of several unprecedented challenges both in terms of technology as well as societal and ethical values that are set to disrupt the world order. Summits like the Y20 Summit by the Union ministry of youth affairs and sports can be some pertinent platforms to involve the youth in these crucial discussions and collectively seek ideas and recommendations for the future of work.

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