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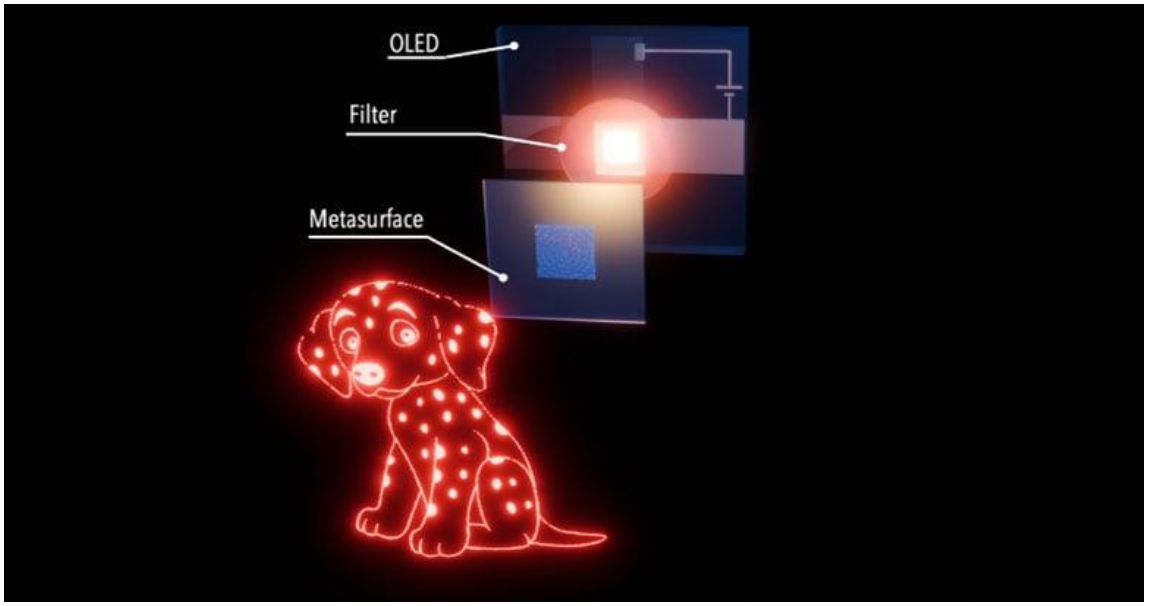
Department of Data Science

Weekly Data Science Bytes

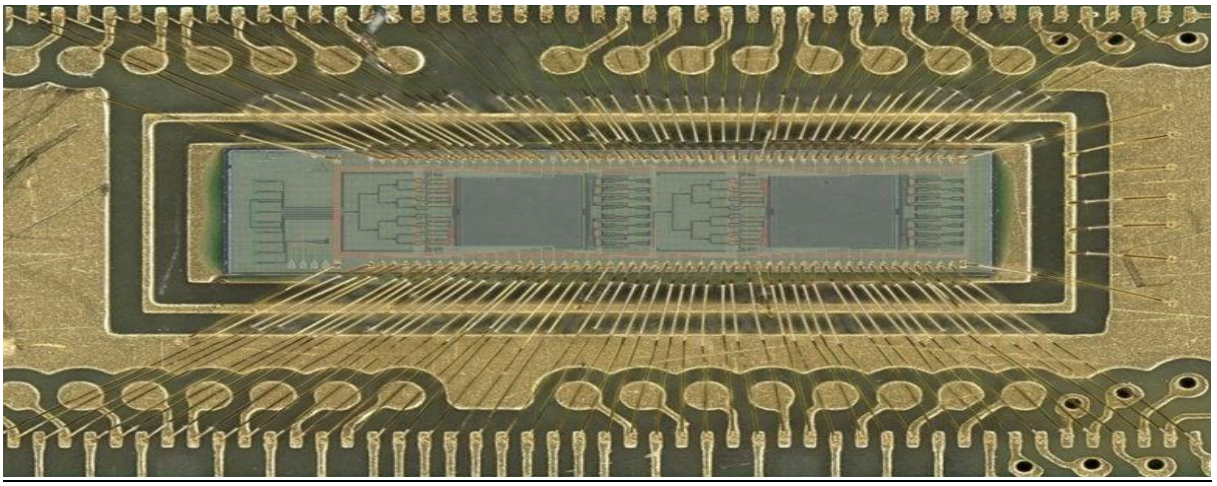
From Sci-Fi to Reality: New Breakthrough Could Bring Holograms to Your Phone

- New research from the University of St Andrews is advancing holographic technology, with potential applications in smart devices, communication, gaming, and entertainment. In a paper published in the journal *Light, Science and Application*, physicists from the School of Physics and Astronomy reported the creation of a new optoelectronic device that combines Holographic Metasurfaces (HMs) with Organic Light-Emitting Diodes (OLEDs).
- Until now, holograms have typically been generated using lasers. The St Andrews team, however, demonstrated that pairing OLEDs with HMs provides a more compact and straightforward method. This approach is not only easier to implement but also less expensive, addressing one of the key challenges that has limited wider use of holographic technology.



Source: https://scitechdaily.com/from-sci-fi-to-reality-new-breakthrough-could-bring-holograms-to-your-phone/

New Light-Based Chip Supercharges AI Efficiency by up to 100x



- A group of engineers has created a breakthrough computer chip that relies on light rather than electricity to carry out one of the most energy-demanding functions in artificial intelligence: identifying images and detecting patterns.
- By shifting to light, the chip requires far less energy, achieving efficiencies that are 10 to 100 times greater than today's chips running the same types of calculations. This innovation could ease the massive strain AI places on power grids while also supporting the development of more advanced and capable AI models.
- The key operation involved is known as "convolution," a process central to how AI interprets photos, videos, and even written language. At present, convolution is highly resource-intensive and time-consuming. The new design solves this by integrating lasers and tiny lenses directly onto circuit boards, allowing the chip to complete these computations with significantly less energy and greater speed.

Source: https://scitechdaily.com/new-light-based-chip-supercharges-ai-efficiency-by-up-to-100x/

Password resets cost businesses more than they realise': Zoho exec on ROI of going passwordless

- The world is rapidly moving away from traditional security methods. With FIDO standards in place, more companies are shifting toward passwordless authentication. Many industry players are already phasing out passwords from their authenticator apps.
- In India, the passwordless market is estimated at $411 million in 2024 and projected to reach more than $1.5 billion by 2030. This reflects how businesses are opting for faster, smarter, and safer login experiences. To understand what's driving this trend and how companies are adapting, *indianexpress.com* spoke with Chandramouli Dorai, chief evangelist, cyber solutions and digital signatures at Zoho Corp.

Source: https://indianexpress.com/article/technology/passwordless-authentication-india-fido-market-growth-zoho-10253213/

Zoom CEO Eric Yuan predicts 3-day working week as AI reshapes traditional job roles

- Amid mounting concerns over the impact of AI on the jobs market, Zoom CEO Eric Yuan has joined the discussion, noting that most employees will see shortened weekly work schedules with advancements in technology.
- More specifically, Yuan said that staffers might be required to clock in a few days every week in the coming, AI-led future.
- "I feel like if AI can make all of our lives better, why do we need to work for five days a week? Every company will support three days, four days a week. I think this ultimately frees up everyone's time," Yuan was quoted as saying in a recent interview with The New York Times

Source: https://indianexpress.com/article/technology/artificial-intelligence/zoom-ceo-predicts-3-day-working-week-ai-job-roles-10253611/

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RESEARCH & SKILLING ARE KEY TO QUANTUM SUCCESS

Experts say Indian industry can be transformed with quantum tech

Akhil George & Shilpa Phadnis | TNN

Many reports indicate 2023 would mark a major inflection point in quantum computing — where we begin to realise quantum-centric supercomputing. Quantum computing is an attempt to harness the laws of quantum mechanics to solve problems too complex for classical computers. Over the last few years, interest in quantum technology, and specifically quantum computing, has been surging in India. Some experts say it could once again be India's moment of glory, just like Y2K, when Indian coders stepped in to avert what many thought would be a major computer-crash crisis at the turn of the millennium. Others take a more nuanced view of India's opportunities and challenges.

Gireesh Kumar Neelakantaiah, senior director of strategy and go-to-market for Capgemini Quantum Lab and Group Portfolio India, says there are two kinds of opportunities available to India. One is creating quantum-based products and services and offering them to customers domestically and globally. This, he says, is significantly larger and technically more complex than what Indian engineers did during Y2K.

The second opportunity is around transforming Indian industry itself by leveraging quantum technology. Neelakantaiah says quantum technology has a high potential for use across the value chain of every industry, and that there is a possibility entirely new segments of products and solutions will be created which we can't imagine at the moment, not to mention workflow changes.

But to actualise these opportunities, India needs to focus on a few key areas. Amith Singhee, director of IBM Research India & CTO for IBM India and South Asia, says India badly needs its own intellectual capacity, research technology, and intellectual property across the tech stack. And academia is where he says he is seeing traction. "Industry may play a role, but where India is, a lot of it has to start with academia. And we hope that the National Mission for Quantum Technologies and Applications (the Rs 8,000-crore central government scheme) will catalyse a lot of that," he says.

The next area India needs to focus on, SInghee says, is around workforce and enablement. He says we need to look at skilling from a very targeted approach to see what personas we need for a quantum workforce. "Because not everybody needs to know everything about quantum. There will be technicians, physicists, data scientists, material scientists, software developers and even business people who need to understand how to make quantum actually give a return on investment for a particular business," he says.

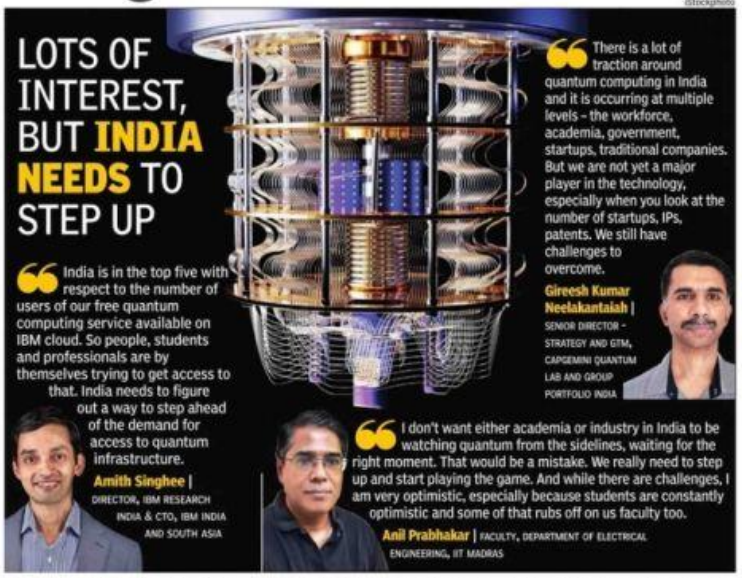
All of this requires a kind of skilling that is different, he says. "We need to be adaptive to how the job market evolves, because if you skill people and there are no jobs, then they will forget the skills and get disappointed."

Anil Prabhakar, professor at the department of electrical engineering at IIT Madras, knows more than most the difficulties in imparting the right skills in a new field like quantum computing. He has engaged across multiple laboratories that work on quantum technologies, fibre lasers and optofluidics. He is also a co-founder of QNu Labs, a quantum technology startup incubated in IIT Madras.

Prabhakar says improving learning material around quantum technologies to prepare a future ready workforce is an ongoing effort. He says the early adopters are the ones who have some familiarity around quantum mechanics and are curious. He also says that the student population is getting more interdisciplinary and so are the interest levels from industry participants. "I'm constantly upgrading my notes and so are my colleagues because you can't stick to a static syllabus. We have also gone web-enabled for many of these things while also relying on traditional textbooks which we keep upgrading."

He says the role of a teacher now is figuring out how to organise the vast troves of information that is out there, and that qualifying and classifying all this information is a key part of what a teacher in this field does now.

Prabhakar says the amount of work that needs to be done in this field is so large and the opportunities so massive, that no single organisation can take it on themselves, at least in these early stages. "Interestingly, there is also an opportunity to look at algorithms afresh and understand not just quantum computing but also quantum-inspired algorithms that can benefit people who do classical computing, and there have been instances of this already," he says.



QUANTUM SPECIAL

Quantum computing presents enormous opportunities for India, given the technology talent the country has. The government has also prioritised quantum as a technology India must play a leadership role in. A recent World Economic Forum report says China has announced $15.3 billion in government funding for quantum, the European Union $7.2 billion, and the US $1.9 billion. In this special page on quantum computing, we look at where India stands today, and what more needs to be done.

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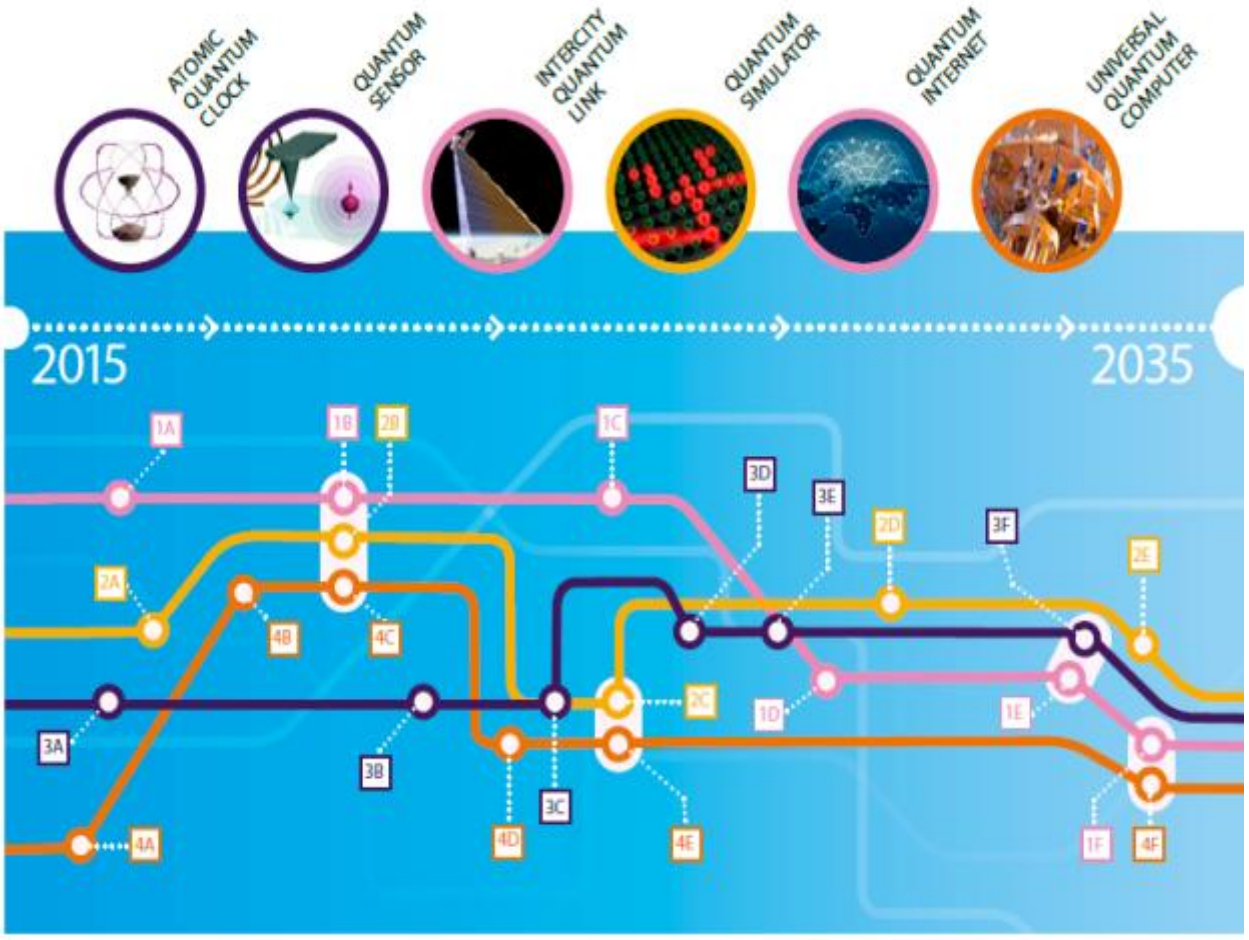
Quantum Technologies Timeline



1. Communication	2. Simulators	3. Sensors	4. Computers
0 – 5 years			
A Core technology of quantum repeaters	A Simulator of motion of electrons in materials	A Quantum sensors for niche applications (incl. gravity and magnetic sensors for health care, geosurvey and security)	A Operation of a logical qubit protected by error correction or topologically
B Secure point-to-point quantum links	B New algorithms for quantum simulators and networks	B More precise atomic clocks for synchronisation of future smart networks, incl. energy grids	B New algorithms for quantum computers
			C Small quantum processor executing technologically relevant algorithms
5 – 10 years			
C Quantum networks between distant cities	C Development and design of new complex materials	C Quantum sensors for larger volume applications including automotive, construction	D Solving chemistry and materials science problems with special purpose quantum