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Dear Friends,

In the third quarter [October-December 2023], CSI, Lucknow chapter organized a Tech-Talk Session on "Print Hardware Software Integration – Fortifying Cyber security" on 08 November 2023 in association with M/s Canon India Private Limited. The session was appreciated by the participants. The beauty of the session was that the concepts/solutions were explained not only by the learned speakers but also demonstrated to the participants on the "Printing products" kept by M/s Canon India Private Limited

We have been conducting meeting of Management Committee regularly and making ensured that there should be at least one meeting in every month. Thanks to all members for their active participation and valuable suggestions for improving/enhancing the CSI activities. Under the valuable guidance of learned members of Management Committee, our chapter is achieving new heights.

The newsletter "TechWings@CsiLko" for the period from October to December, 2023 is now in your hands. Please do not forget send your views on this newsletter to Shri Deepak Sharma, Chairman, CSI, Lucknow Chapter (deepak.sharma@nic.in) or to me (shyamatbird@gmail.com) or on the e-mail address of any members of CSI Management Committee.

We are now gearing up for constituting the next Management Committee [April 2024 to March 2025]. The announcement of election for the vacant posts in the Management Committee would be made shortly. Interested CSI members having the due eligibility may apply for the same.

Finally, happy new year 2024 to all beloved CSI friends. Wishing all of you nothing but health, wealth, and endless blessings in the New Year 2024.

With love and Regards

(Dr. Shyam Kumar Garg)
Hon. Secretary,
CSI, Lucknow Chapter

Tech-Talk on "Print Hardware Software Integration – Fortifying Cyber security"

With the rapid adoption of digitalization, new challenges and threats have been visualized, making cybersecurity among the top priorities for businesses, especially feeling the heat of the cyber-attacks as they are becoming more frequent and sophisticated in recent times. The business establishments have to work with an efficient and secure digital network to quash the known and unknown threats.

Realizing the importance of the cyber security, Computer Society of India, Lucknow Chapter organized a Tech-Talk Session on "Print Hardware Software Integration – Fortifying Cyber security" on 08 November 2023 (Wednesday) in association with M/s Canon India Private Limited.

The key note speakers were Sh. Merlino Braganza, Pre-sale, Senior Specialist and Sh. Abhishek Kumar Roy, Product Manager, M/s Canon India Private Limited.

At the outset Sh. Merlino Braganza and Sh. Abhishek Kumar Roy were welcomed with the bouquets of flowers by Sh. Sh. RAS Tyagi, Patron & Senior CSI member and Sh. Vinay Kumar Johari, Vice Chairman, Lucknow Chapter. Sh. Balendu Jaiswal, Member of Management Committee of CSI, Lucknow Chapter introduced the speakers to the audience and anchored the tech-talk session.

During the session, the speakers explained how their "Printing Products" are providing the cyber-secured platform/solutions to deal with targeted attacks, ransomware attacks, zero-day attacks, APTs (Advanced Persistent Threats), phishing attacks etc.

The solutions can be deployed on-premise or from the cloud.

The speakers further explained how Canon provides infrastructural, application, and automation   end-to-end service support, professional consultation and seamless deployment of solutions to their clients. Importance of adapting to the current digital landscape for helping businesses succeed was explained.

M/s Canon India Private Limited kept variety range of their products to demonstrate them to the audience.

The session was appreciated by all the participants.

Some Glimpses of the Event :

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The e-BHARTIYA CULTURE

Appears far-fetching, but the true Indian Scenario can be seen and felt with the approach to visit to the market or a specific Window Shopping module in a City Mall. The diverse learning scenario in schools with have and have-nots' has really taken in a grim picture to the audiences and the Government at large.

The learners today face the culture of mobiles and laptops with a limited accessibility to govern but a desire. The presence of computers in schools or with the teacher as a showpiece based tool of entertainment to check the FB walls or their mails from one fine associate is a fashion.

For the student from a normal livelihood, the computer is a desire……. For all. Even in the face of diminishing budgets the learners make the learning possible via cyber hubs and free IT access to make the freedom exposed. The integration of technology into the classroom is a distant future for the majority but they seek information through various options further. As a matter of fact, technology is not a tool to them but the building block of learning and social interaction. On the other hand the great divide in the Indian Learning Society also has one phase where the lot of students have never known life without the ability to connect, communication and explore 24x7, and for this portion of the society, this is a practical norm in particular. The nicer informed lot is tied up with dependency for immediacy of information sharing from a device in the palm of their hands.

Above all the American model as the Pew Research Center's Internet American Life Project, a non-profit, nonpartisan research organisation, provides free data and analysis on the social impact of the Internet. It says that over 95 percent of teens aged 12 to 17 are now online. And much to surprise many, over 62 percent of them use wireless and mobile devices for digital activities away from home or work. Looking at the above facets to the Indian ICT culture, there is a need for tools like video conferencing, screen sharing and interactive applications which shall allow them access to virtual laboratories, complex simulations and interaction with a wider community of learners and teachers.

What is now required is a cult for enhancing ICT in Academics by means to generate interest towards 100% attendance to schools, participation by the wards and their keen participation in the teaching and the teaching-learning process at large. Above all, teachers- who by and large are now becoming digital natives themselves, have been at the forefront of the movement to use technology to augment curriculum. We all know and believe in the fact that the DIGITAL DIVIDE still exists in the country and shall be for a couple of years to come but the low entry price of SMART PHONES combined with 5G pocket Internet offers is helping to connect the students, the Google Generation. In addition, Artificial Intelligence (AI) has reached kids too. As we navigate a tech-driven society, AI education for youngsters is becoming more important. Children need AI education for numerous reasons:

Future Workforce Prep:

AI is spreading throughout sectors. Kids may learn work skills by introducing AI principles early. Nearly every job will benefit from AI knowledge.

Problem-solving:

AI requires problem-solving and critical reasoning. AI education supports analytical problem-solving and creativity.

Digital Literacy:

AI education improves digital literacy. Understanding AI fundamentals helps kids utilise digital technologies responsibly as technology progresses.

An ethical perspective:

AI education covers ethics and ethical technology usage. Teaching kids about AI ethics promotes technological responsibility.

Increases Computational Thinking:

AI education encourages computational thinking—a computer science essential. Kids learn to break down issues and solve them rationally, which helps them in life.

Enhanced Creativity:

AI may boost creativity. Kids exposed to AI may learn to utilise technology for art or music.

Early Tech Exposure:

In the digital era, early technological exposure is nearly inevitable. Structured AI education helps kids utilise technology ethically.

Technology adaptability:

Dynamic technological landscape. AI education helps youngsters adapt to technology developments throughout their life.

Promotes Lifelong Learning:

Innovation is continual in AI. AI helps youngsters comprehend that technology is always changing and encourages lifelong learning.

Collaboration globally:

Diverse teams collaborate on AI research. AI education fosters cooperation and emphasises worldwide collaboration to solve challenging issues.

Fun, Engaging Learning:

Fun and entertaining ways to explain AI ideas. AI-themed educational games and activities may make learning fun and promote a good tech mindset.

Decreases Fear and Misconceptions:

Early AI education reduces worries and misunderstandings. Kids have a better connection with technology by learning about AI's potential and limits.

Kudos to the service providers making Mera Bharat Mahan !

Dr. Dheeraj Mehrotra
Principal,
Kunwar's Global School, Lucknow,

QUANTUM COMPUTING :
"The door to endless opportunities."

- Shraddha Singh
B-Tech-CSE(AIML)1stYear,SRMCEM,Lucknow

On 20th April, 2023, the Indian Government approved the "National Quantum Mission" (NQM) at a total cost of Rs.6003.65 crore from 2023-24 to 2030-31, hence becoming one of the major countries that have participated in the Quantum race to dominate the world economics.

The NQM can take India to new heights and provide tremendous advantages in the field of communication, health, metrology, finance and Quantum sensing. And there's no doubt that the Nation priorities like Digital India, Make in India, Skill India and Stand-up India, Self-reliant India and Sustainable Development Goals (SDG) will get a huge booster.

India and The United States of America have forged groundbreaking collaboration in AI and Quantum Computing. Top Universities in the world have decided to give Advance Quantum Education to 40,000 students in Japan, South Korea And the USA.

The world is witnessing the formation of an advanced future for the mankind with the increasing likely hood of making Quantum Computers.

But, with all this, a common question that arises is,

What is Quantum Computing?

- To put in simple words, Quantum computing is the field that utilizes the concepts of Quantum Mechanics, such as Quantum superposition and coherence, to solve extremely complex problems.

- In a Quantum computer, the basic information unit is a Quantum bit or Qubit. A qubit is a two-level quantum system where the two basic qubit states are usually written as $|0\rangle$ and $|1\rangle$. A qubit can be in state $|0\rangle$, $|1\rangle$ or in a linear combination of both the states. This phenomenon is called superposition.

- The phenomenon of superposition, where a qubit can be in all it's possible states, leads us to the concept of Quantum entanglement which states that the qubits in superposition state can be correlated with each other!

Illustration:

To illustrate everything I said till now, let us assume a situation where you need to measure the area of a door. If you were a classical computer, you would be first measuring the length, then, the breadth, and then multiply both the quantities in order to get the final result i.e. the area. This is because, the classical computers use binary system of information encoding, 0 and 1, that perform their roles one by one. Whereas in Quantum Computers, the qubits are in superposition and exhibit the

phenomenon of Quantum entanglement that allows them to perform multiple tasks at once.

So, a quantum computer will be measuring the length and the breadth of the door simultaneously and the area will be calculated at the exact same moment!

Why do we need Quantum Computers?

- Quantum computers can solve certain problems much faster than the classical computers.

- One of the drawbacks of Classical computers is limited memory and data storage. Quantum memory has a great advantage over Classical computers as it can store vast amount of information in various states because of Quantum entanglement.

- Because of their amazing property of entanglement, quantum computers can help us create better models for how atoms interact with each other, leading to a more precise understanding of molecular structures. This may impact drug and chemical research and the way medicines are developed.

- More precise study of molecular structure and rapid analysis of genomic data means more effective medicines. This means, that Quantum computers can help us find cure for presently incurable and life threatening diseases like Cancer.

- Quantum Computers can also help AI systems learn and adapt faster, making them more proficient in tasks like natural language processing and image recognition.

NATIONAL QUANTUM MISSION (NQM) :

- NQM objectives include developing intermediate-scale quantum computers with 50-1000 physical qubits in 8 years in various platforms like superconducting and photonic technology.

- Satellite-based secure quantum communications between ground stations over a range of 2000 kilometers within India, long-distance secure quantum communications with other countries, inter-city quantum key distribution over 2000 km as well as multi-node Quantum networks with quantum memories are also some of the deliverables of the Mission.

- This Mission will focus on developing magnetometers with high sensitivity in atomic systems and Atomic Clocks for precision timing, communications, and navigation.

- It will also support the design and synthesis of quantum materials such as superconductors, novel semiconductor structures, and topological materials for the fabrication of quantum devices.

- Single photon sources/detectors, and entangled photon sources will also be developed for quantum communications, sensing, and metrological applications.

- Mission Implementation includes setting up of four Thematic Hubs (T-Hubs) in top academic and National R&D institutes in the domains – Quantum Computing, Quantum Communication, Quantum Sensing & Metrology and Quantum Materials & Devices. The hubs which will focus on generation of new knowledge through basic and applied research as well as promote R&D in areas that are mandated to them.

A little bit more about Quantum Computers :

- It all started with Professor Richard Feynman, who, in 1981, presented the quandary that classical computers cannot simulate the evolution of quantum systems in an efficient way. And so he proposed the basic concept of a Quantum Computer that would help us with the problem. This is from where the idea of Quantum Computing came into existence.

- In 1985, David Deutsch at the University of Oxford described the first universal quantum computer,

becoming 'The father of Quantum Computing'.

• QUBIT :

1. The amount of information a qubit system can represent grows exponentially. Information that 500 qubits can easily represent would not be possible with even more than 2^{500} classical bits

2. It would take a classical computer millions of years to find the prime factors of a 2,048-bit number. Qubits could perform this calculation in just minutes.
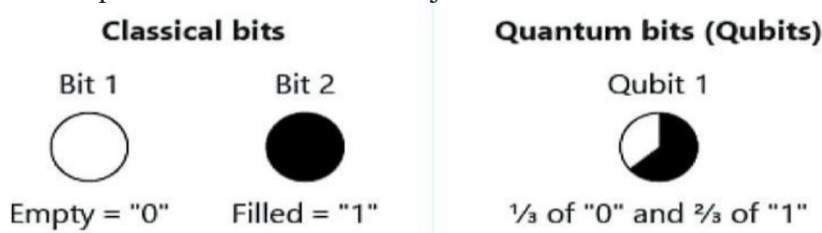
An interpretation of Qubits in comparison to classical bits.

Temperature dependence :

1. Quantum computers require temperatures close to absolute zero to maintain the delicate quantum states of their qubits.

2. Most qubits must be cooled to within a few thousandths of a degree of absolute zero to eliminate thermal noise and vibrations, which tend to destroy the information contained in the qubits.

**Source: https://dst.gov.in/national-quantum-mission

nqm#:~:text=The%20National%20Quantum%20Mission%20will,timing%2C%20communications%2C%20an d%20navigation.**