July-Sept 2021

CLAIRVOYANCE

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

Editorial Board

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Talk deliver outside the Institute

- Dr. Saumil Maheshwari delivered a webinar on “Artificial Intelligence and Machine Learning” on 06-Aug-21 at Shri Ram College of Engineering and Management.

NPTEL/ATAL/COURSERA/ courses attended

- Prof. Neha Bhardwaj, Assistant Professor, MITS Gwalior participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Advanced FDP on "IoT & Cyber Security" from 06/09/2021 to 10/09/2021 at Institute of Engineering & Management.
- Prof. Abhilash Sonker, Assistant Professor, MITS Gwalior participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Software Testing : Emerging Trends" from 2021-07-26 to 2021-07-30 at Manipal University Jaipur.
- Prof. Abhilash Sonker, Assistant Professor, MITS Gwalior participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Quantum Computing Algorithms and Machine Learning" from 2021-08-02 to 2021-08-06 at R V College of Engineering.
- Prof. Abhilash Sonker, Assistant Professor, MITS Gwalior has participated in Five Day International STTP on Blockchain for Digital Transformation held virtually during 12 – 16 August, 2021 organized by Department of CSE, CBIT(A), Hyderabad, Telangana, INDIA.
- Prof. Namrata Agrawal , Assistant Professor, MITS Gwalior participated & completed successfully AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Cyber Security" from 2021-07-05 to 2021-07-09 at Vivekanand Education Society's Institute of Technology.

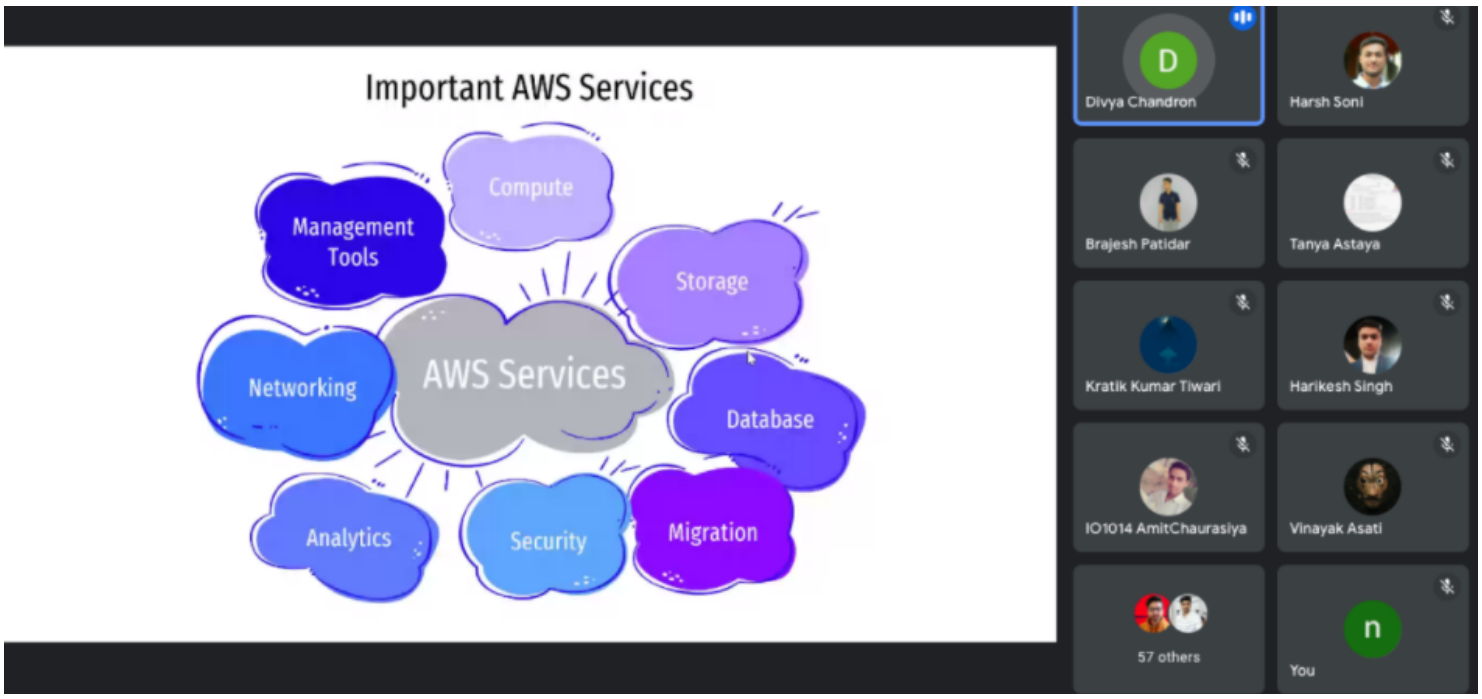
Students achievement

- Kanha Bindal, Nikhil Meena and Priyanshu Chaurasiya participated in ICPC 2020 Asis Amritapuri site regional and qualified for the first round. (Eliminated in the successive round)

Innovation is the ability to see change as an opportunity not a treat
-Steve Jobs

Workshop Conducted

- A one day workshop was conducted on Amazon web services in the department on 18th July 2021 (Sunday). In workshop, the speaker/ expert was Ms. Divya Chandron, Alumni of the department. 100+ students have registered and 41 students have actively participated.



Latest Technologies

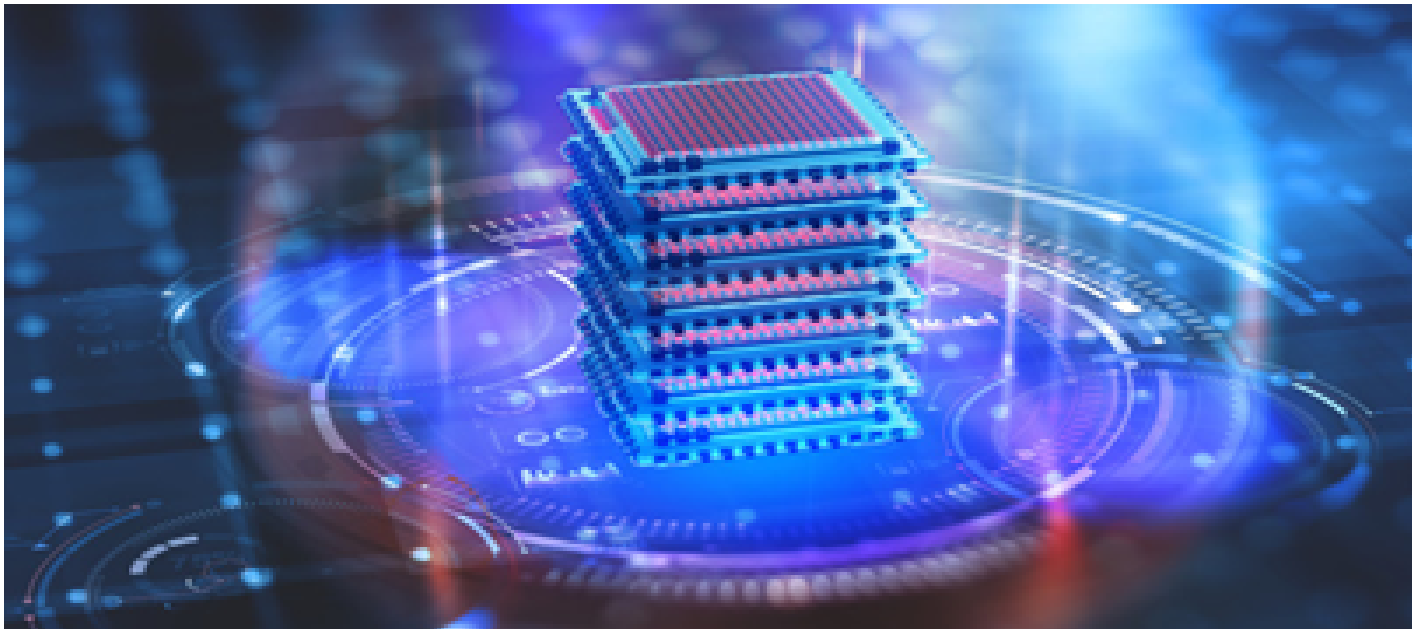
Quantum computing

It is an area of computing focused on developing computer technology based on the principles of quantum theory (which explains the behavior of energy and material on the atomic and subatomic levels). Computers used today can only encode information in bits that take the value of 1 or 0—restricting their ability.

Quantum computing, on the other hand, uses quantum bits or qubits. It harnesses the unique ability of subatomic particles that allows them to exist in more than one state (i.e., a 1 and a 0 at the same time).

Quantum computing is the study of how to use phenomena in quantum physics to create new ways of computing.

- Quantum computing is made up of qubits.
- Unlike a normal computer bit, which can be 0 or 1, a qubit can be either of those or a superposition of both 0 and 1.
- The power of quantum computers grows exponentially with more qubits.
- This is unlike classical computers, where adding more transistors only adds power linearly



"It has become appallingly obvious that our technology has exceeded our humanity." — Albert Einstein.

Superposition and entanglement are two features of quantum physics on which these supercomputers are based. This empowers quantum computers to handle operations at speeds exponentially higher than conventional computers and at much lesser energy consumption.

The field of quantum computing started in the 1980s. It was then discovered that certain computational problems could be tackled more efficiently with quantum algorithms than with their classical counterparts. Quantum computing could contribute greatly in the fields of finance, military affairs and intelligence, drug design and discovery, aerospace designing, utilities (nuclear fusion), polymer design, machine learning and artificial intelligence (AI) and Big Data search, and digital manufacturing.

Its potential and projected market size have engaged some of the most prominent technology companies to work in the field of quantum computing, including IBM, Microsoft, Google, D-Waves Systems, Alibaba, Nokia, Intel, Airbus, HP, Toshiba, Mitsubishi, SK Telecom, NEC, Raytheon, Lockheed Martin, Rigetti, Biogen, Volkswagen, and Amgen.

Quantum Computer vs. Classical Computer

Quantum computers process information differently. Classical computers use transistors, which are either 1 or 0. Quantum computers use qubits, which can be 1 or 0 at the same time. The number of qubits linked together increases the quantum computing power exponentially. Meanwhile, linking together more transistors only increases power linearly.

Classical computers are best for everyday tasks that need to be completed by a computer. Meanwhile, quantum computers are great for running simulations and data analyses, such as for chemical or drug trials. These computers must be kept ultra-cold, however. They are also much more expensive and difficult to build.

Classical computing advances include adding memory to speed up computers. Meanwhile, quantum computers help solve more complicated problems. While quantum computers might not run Microsoft Word better or faster, they can run complex problems faster.

For example, Google's quantum computer that's in development could help with many processes, such as speed up machine-learning training or help create more energy-efficient batteries.

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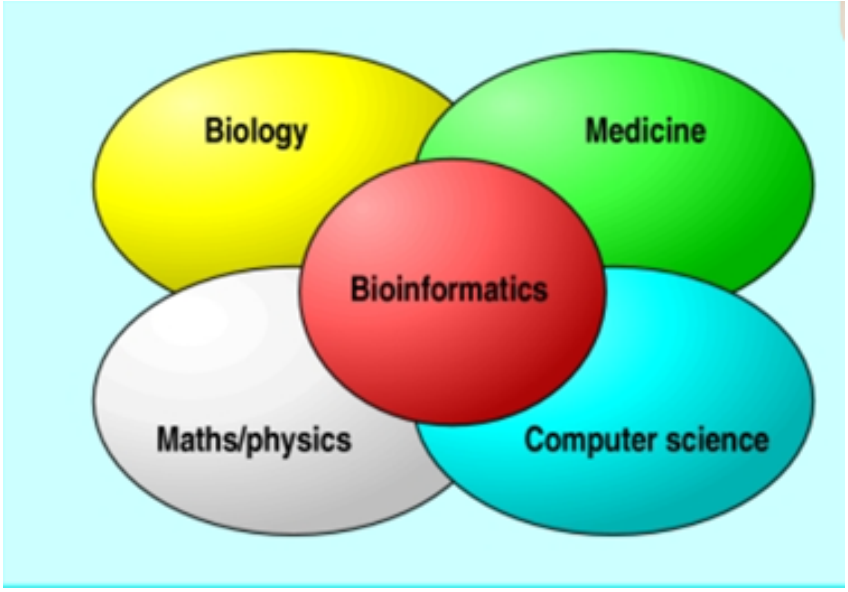
Quantum computing has a number of other applications, including securely sharing information. Other methods include fighting cancer and various health concerns, such as cancer and developing new drugs. As well, quantum computers can help improve radars and their ability to detect such things as missiles and aircraft. Other areas include the environment and using quantum computing to keep the water clean with chemical sensors.

Bioinformatics:

An unprecedented wealth of biological data has been generated by the human genome project and sequencing projects in other organisms. The huge demand for analysis and interpretation of these data is being managed by the evolving science of bioinformatics. Bioinformatics is defined as the application of tools of computation and analysis to the capture and interpretation of biological data. It is an interdisciplinary field, which harnesses computer science, mathematics, physics, and biology . Bioinformatics is essential for management of data in modern biology and medicine. This paper describes the main tools of the bioinformatician and discusses how they are being used to interpret biological data and to further understanding of disease. The potential clinical applications of these data in drug discovery and development are also discussed.



Bioinformatic tools

The main tools of a bioinformatician are computer software programs and the internet. A fundamental activity is sequence analysis of DNA and proteins using various programs and databases available on the world wide web. Anyone, from clinicians to molecular biologists, with access to the internet and relevant websites can now freely discover the composition of biological molecules such as nucleic acids and proteins by using basic bioinformatic tools. This does not imply that handling and analysis of raw genomic data can easily be carried out by all. Bioinformatics is an evolving discipline, and expert bioinformaticians now use complex software programs for retrieving, sorting out, analysing, predicting, and storing DNA and protein sequence data.

Large commercial enterprises such as pharmaceutical companies employ bioinformaticians to perform and maintain the large scale and complicated bioinformatic needs of these industries. With an ever-increasing need for constant input from bioinformatic experts, most biomedical laboratories may soon have their own in-house bioinformatician. The individual researcher, beyond a basic acquisition and analysis of simple data, would certainly need external bioinformatic advice for any complex analysis.

The growth of bioinformatics has been a global venture, creating computer networks that have allowed easy access to biological data and enabled the development of software programs for effortless analysis. Multiple international projects aimed at providing gene and protein databases are available freely to the whole scientific community via the internet.

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