NITTE EDUCATION TRUST

NITTE MEENAKSHI INSTITUTE OF TECHNOLOGY

An Autonomous Institution With A+ Grade By NAAC UGC | Approved By UGC / AICTE / Govt. of Karnataka | Bengaluru

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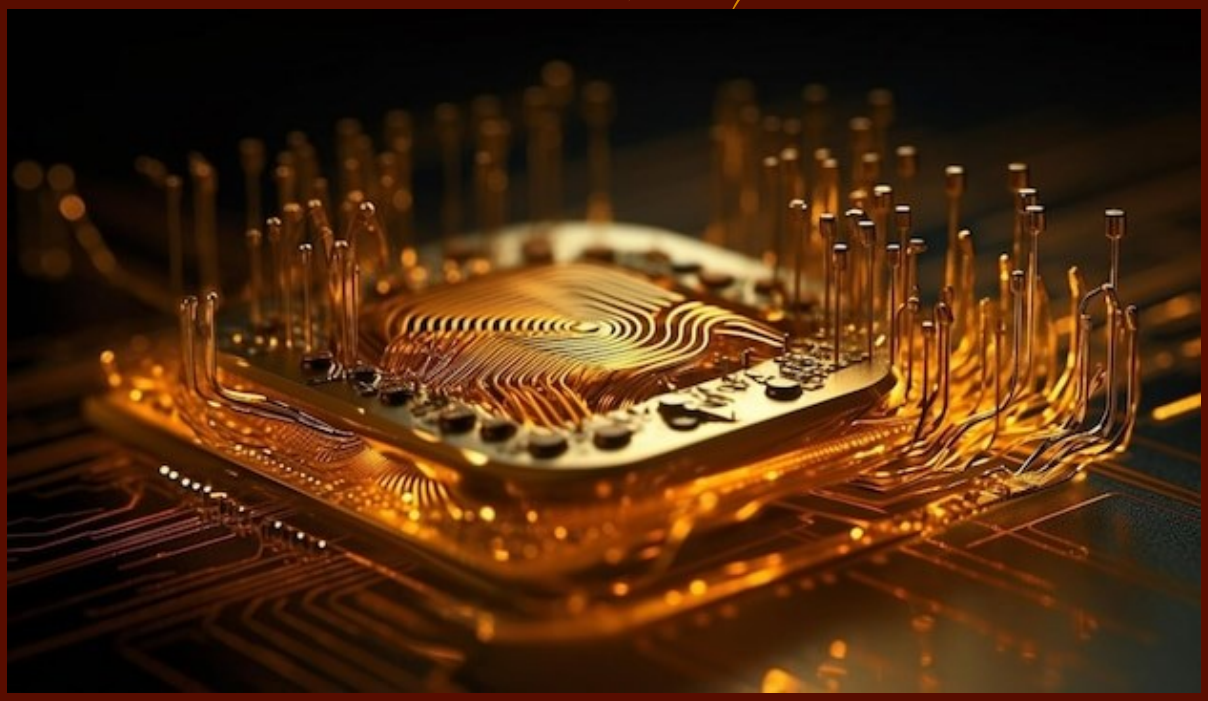

Department of

Artificial Intelligence & Machine Learning and Electrical & Electronic Engineering

Organizes

AICTE Training and Learning (ATAL) Academy

Sponsored Faculty Development Programme

on

Quantum Machine Learning: Bridging the Gap Between Quantum Computing and AI

From : Jan 8th - 13th, 2024

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Nitte Meenakshi Institute of Technology (NMIT) is an Autonomous Institution approved by University Grants Commission (UGC), Government of India and affiliated to the Visvesvaraya Technological University (VTU). and Accredited by National Board of Accreditation (NBA) under Tier-1 status and Grade-'A+' status by National Assessment and Accreditation Council (NAAC-UGC). NMIT is the youngest Engineering college in the country to be conferred the prestigious Autonomous Status by UGC/Govt. of Karnataka, New-Delhi in the year 2007.

HIGHLIGHTS OF THE INSTITUTION

- ARIIA Ranking (Year 2021) - 4th Rank
- NIRF Ranking (Year 2021)-183 Rank
- NAAC A+ Accreditation
- Several Centre of Excellences were established in association with Industries

About the Departments

The **Department of Artificial Intelligence and Machine Learning, NMIT** has started in the year 2021. The AI and Machine Learning Department at NMIT is a dynamic academic division focused on education, research, and industry collaboration. Offering cutting-edge courses, it equips students with essential AI and ML skills. Faculty research spans diverse areas, contributing to scientific advancement and real-world impact. The department emphasizes industry partnerships, fostering practical experience and innovation. Regular seminars and workshops facilitate knowledge exchange with experts. Ethical AI development is a core focus, encouraging responsible innovation. Overall, the department plays a pivotal role in shaping AI and ML advancements while preparing students for the evolving landscape.

The **Electrical & Electronics Engineering Department, NMIT** was established in the year 2001 with an intake of 60 and intake increased to 120 in the year 2019. The department is accredited (Tier 1) by National Board of Accreditation of AICTE, New Delhi and has fully equipped with state of the art laboratories. The department has the unique distinction of offering an M.Tech course in Renewable Energy which is first of its kind under VTU affiliated Colleges. The department is involved in continuous review & updating of syllabus, periodic introduction of new courses and regular conduction of add-on courses, workshops & seminars in the emerging areas of technology. It has Power Engineering Center of Excellence which started in the year 2019 with tools and resources like EPLAN, ETAP, MIPOWER, Advanced Power System Protection Kits, Automation and Renewable Energy Lab. Quantum Computing lab with Computing facilities in Innovation Consulting and Product Development Center (ICAP) is also established. Department faculty members are involved in research activities with the help of these tools and other simulation software like PSCAD, MATLAB, CONSOL to name a few.

OBJECTIVES

1. Explore advanced quantum algorithms for AI and ML applications.
2. Develop participants' proficiency in quantum programming.
3. Foster interdisciplinary expertise by bridging quantum computing concepts with AI and ML techniques.
4. Facilitate collaboration and networking among educators, researchers, and practitioners interested in quantum machine learning and AI.
5. Exploration of Research Opportunities
6. Development of Collaborative Projects

Abstract/Faculty Development Program

The Faculty Development Program (FDP) on "Quantum Machine Learning: Bridging the Gap Between Quantum Computing and AI" is designed to empower educators with a comprehensive understanding of the synergy between quantum computing and artificial intelligence (AI). Through this program, participants will delve into the foundational concepts of quantum computing, explore cutting-edge quantum algorithms for machine learning, and gain practical experience in quantum programming. By bridging the gap between quantum computing and AI, participants will be equipped to integrate these transformative technologies into their teaching and research. The FDP also aims to foster collaborative networks, research opportunities, and innovative educational approaches, ultimately preparing participants to educate the next generation of AI practitioners within the quantum realm.

Course Content

- Introduction to Quantum Computing and AI/ML
- Quantum Machine Learning Algorithms
- Quantum Programming and Simulations
- Research scope and latest trends of Al/ ML in various domains
- Quantum Optimization Challenges
- Formulate Quantum Problems
- Handson session on Quantum Machine learning

Expected Outcome

The Faculty Development Program on "Quantum Machine Learning: Bridging the Gap Between Quantum Computing" aims to equip participants with a profound understanding of quantum computing principles, enabling the integration of quantum and machine learning expertise. Participants will gain practical skills in quantum programming, proficiency in quantum machine learning techniques, and the ability to teach and incorporate quantum concepts into curricula. By fostering interdisciplinary knowledge and collaborative research opportunities, the program will empower educators to drive quantum machine learning advancements, enhancing institutional capabilities, engaging with industry, and contributing to the broader quantum community while preparing students for emerging quantum technologies.

CO-ORDINATORS

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Target Audience

- Faculty members and PhD. research scholars of AICTE affiliated educational institutions are eligible to participate.
- There is no registration fees for the course and maximum of 50 participants will be allowed to register through ATAL portal,
- The preference will be on the first-come-first-serve basis.
- The intimation regarding selection will be sent to the candidates by email as per the schedule,
- Certificates will be issued to the participants only after attending the complete course, take the exam and those who register and submit their feedback in ATAL

Registration

- The faculty members of the AICTE Approved institutions, PG & Research scholars from Government, Industry can participate in this FDP.
- Number of participants is limited to 50
- To register, please visit: https://atalacademy.aicte-india.org/signup
- There is No Registration Fee.
- Participants will be selected on first-come first-served basis
- Selected candidates will be intimated by e-mail.
- E-certificate shall be issued to those participants who have attended the program with minimum 80% attendance and scored minimum 60% marks in the test.

About the Speakers

Eminent speakers from International Universities, IITs, NIT, and Industry experts with rich experience research and development.

Days/Sessions	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
9:00 - 11:00 AM	Inauguration followed by Keynote address	Quantum Gates and Qubits/ Quantum Entanglement and Superposition	Quantum / Classical ML Algorithms	Lattice Based Cryptog-raphy Lattice based Public Key encryption and Signature Scheme	Hands on session (Qiskit /AWS /Matlab)	Industry Visit
11:00 - 11:15 AM	**Tea Break**					
11:15 AM-1:00 PM	Quantum Computing Fundamentals	Quantum Circuits	Engineering challenges currently faced by developers of quantum computers.	Hands on session (Qiskit /AWS /Matlab)	NEP	Industry Visit
1:00 - 1:30 PM	**Lunch Break**					
1:30- 3:00 PM	Mathematical Models of Quantum Computation	Quantum Gate Implementations and Quantum Circuits	Quantum Key Distribution	Hands on session (Qiskit /AWS /Matlab)	Hands on session (Qiskit /AWS /Matlab)	Indian values & ethos, Classroom conduct & behaviour
3:00- 3:15 PM	**Tea Break**					
3:15 - 4:30 PM	Convergence of Quantum Computing and AI	Quantum Data Clustering and Classification Techniques	Quantum Random number generator	Hands on session using Qiskit/AWS/Matlab	Stress management	Research Methodology
4:30-5:30 PM	Foundations of Artificial Intelligence and Machine Learning	Setting Up Quantum Programming Environment	Quantum Data Representation and Encoding for Machine Learning	Hands on session using Qiskit/AWS/Matlab	Hands on session (Qiskit /AWS /Matlab)	Quiz and Feedback session

Shri Vinay Hegde
President, Nitte Education Trust & Hon'ble Chancellor, Nitte University

Prof. N. R. Shetty
Advisor, Nitte Education Trust,
Hon'ble Chancellor, Central University of Karnataka, Kalaburgi.

Advisory Committee

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