रा.इ.सू.प्रौ.सं
NIELIT

National Institute of Electronics and Information Technology

(ISO 9001:2015 Certified Organisation)

An Autonomous Scientific Society of Ministry of Electronics and Information Technology, Government of India

NEWSLETTER

Vol. 09 Issue 03/ **JULY 2021 (Quarterly)**

HIGH LIGHTS

- NIELIT Celebrates International Day of Yoga
- Participation in Auto Electronics Conference
- FutureSkills PRIME Project
- Training on Tackling Crimes in Digital Space
- NIELIT Chennai Develops Virtual Lab for CATIA-V5
- MoU signed with Punjab Technical University

Message from the **Editor-in-Chief**

Dear Readers,

I am delighted to present the 1st NIELIT Newsletter of the new editorial board. In addition to showcasing the achievements of the NIELIT, the objective is to disseminate information about significant initiatives, project milestones, technical expertise, training and other services which NIELIT provides to the society and to the industry to address the skill gaps in the information, electronics and communication technology domain.

Through the newsletter, we are also soliciting suggestions and assistance from the industry and other stakeholders to help us achieve greater prominence in the field of skilling and education in electronics and IT domains. This newsletter could help you understand the strengths and capabilities of our centers across India and connect with them for solving a business problem or training and other services to your organization.

Through the various initiatives, including this newsletter, we strive to bridge the gap between academia and industry and bring together the students, faculty, and industry experts to foster collaboration, to provide an industry-ready workforce to make the dream of Atmanirbharbharat true.

We hope that you enjoy this edition of the NIELIT newsletter. Please share your suggestions and feedback at newsletter@nielit.gov.in

Dr. Pratap Kumar S

NEWS AT A **GLANCE**

Contents

NIELIT CELEBRATES INTERNATIONAL DAY OF YOGA

NIELIT celebrated the 7th International Day of Yoga (IDY) on 21st June 2021 across its centres right from Srinagar to Calicut and Aurangabad to Itanagar with the theme of "Yoga for wellness" adhering to all COVID 19 protocols. IDY aims to raise awareness of the many benefits of practicing yoga. International Yoga Day celebrates the physical and spiritual prowess that yoga has brought to the world stage. While it is an important source of exercise and healthy activity, millions join in and practice it on a daily basis. For many, these routines are a way to connect the body, mind and soul in a way that has existed for centuries.

The program started with briefing the participants regarding the benefits of ancient practice in terms of relief from physical ailments and mental tension. All the staff members along with their family members performed sitting and standing asanas through online/offline mode. Expert talks about regular practice of yoga were held which said that it will surely help everyone achieve a better life, physically, mentally and spiritually as well. A Quiz competitions were also organized for staff members in many centres and certificates were awarded to winners.

NIELIT HQ

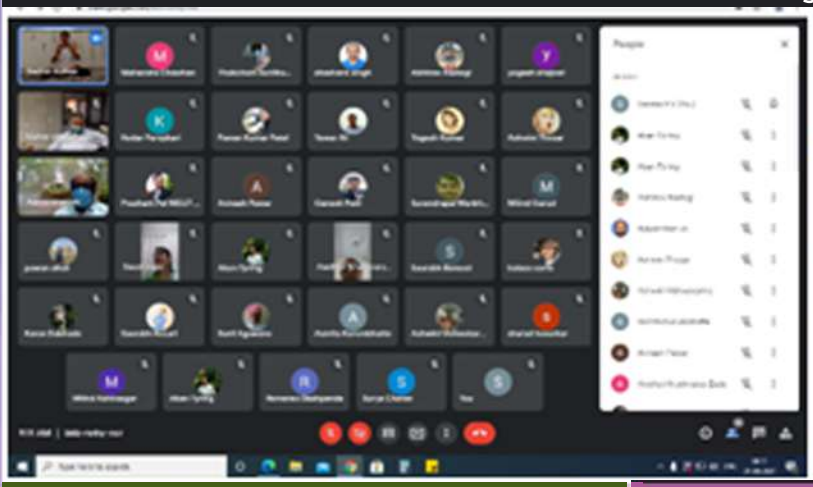
NIELIT Haridwar

NIELIT J&K

NIELIT Delhi

NIELIT CELEBRATES INTERNATIONAL DAY OF YOGA

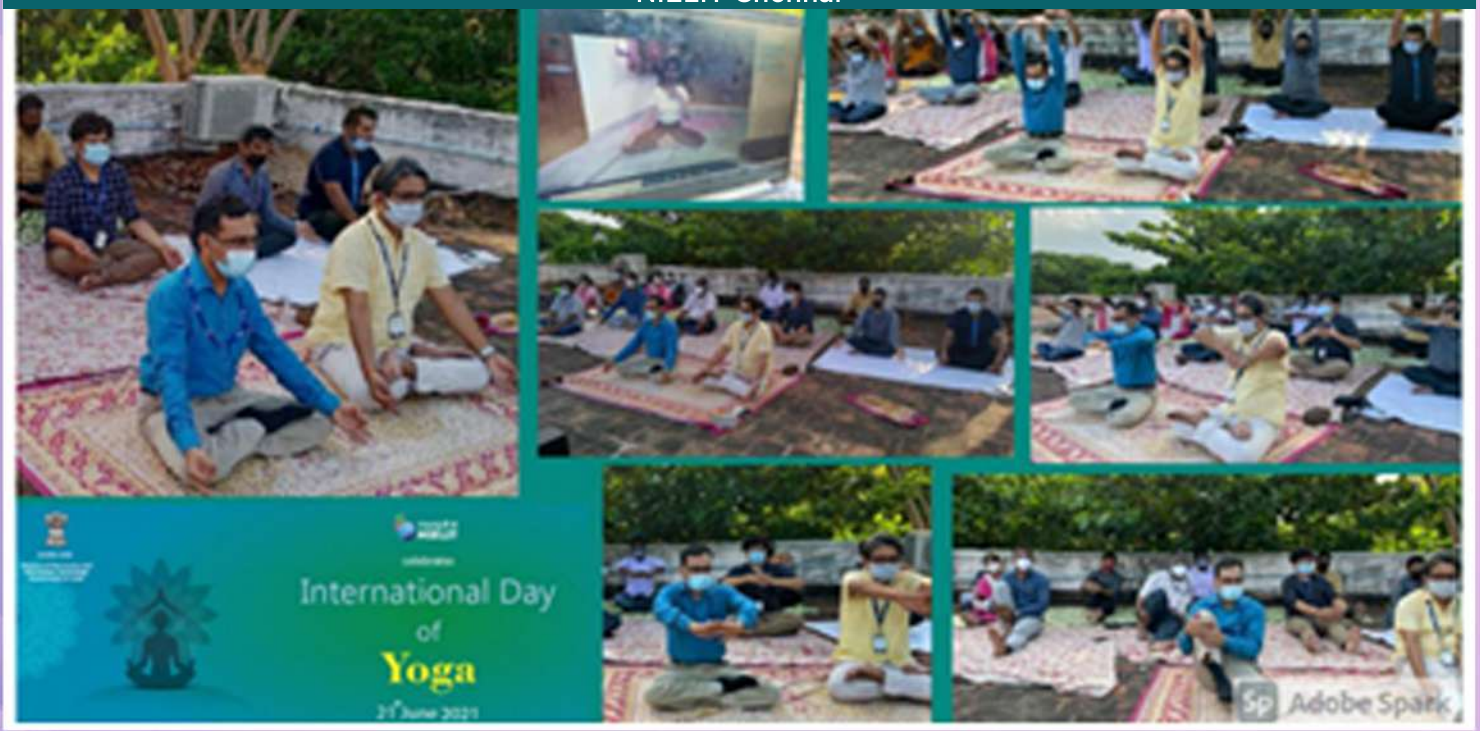
NIELIT Aurangabad



NIELIT Imphal

NIELIT Chandigarh

NIELIT Chennai



CONFERENCES/ WORKSHOPS/ INVITED TALKS

Expert Talk on "Advances in Mathematics and Interdisciplinary Sciences"

NIELIT Chandigarh was invited by **RayatBahra University** to give an expert talk on **"Advances in Mathematics and Interdisciplinary Sciences"** on **National Mathematics Day. Dr. Deepak Wasan,** Additional Director delivered the talk on the interdisciplinary topic to more than 100 students, faculty and research scholars. Ms. Anita Budhiraja also made students aware about the importance of Mathematics in Artificial Intelligence and Machine Learning.

Participation in Auto Electronics Conference

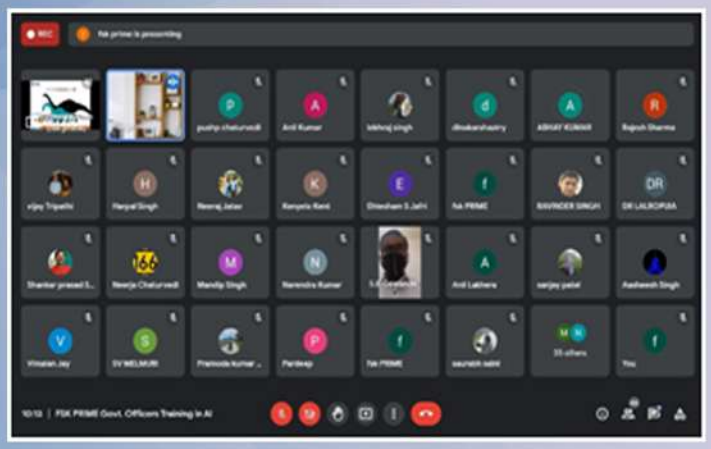
Dr Pratap Kumar S, Director, NIELIT Chennai delivered a talk on the **Emerging contours of Automotive Electronics** and shared his vision of setting up a **Centre of Excellence Infrastructure for Automotive Electronics** in Chennai at the valedictory session of the **Auto Electronics Conference** on 30th April, 2021 with the theme – **The New Age Mobility: Smart, Safe, Connected and Sustainable,** organised by **SAEINDIA.**

CORPORATE TRAINING/ FDPS

Training for Officials of Rail Coach Factory

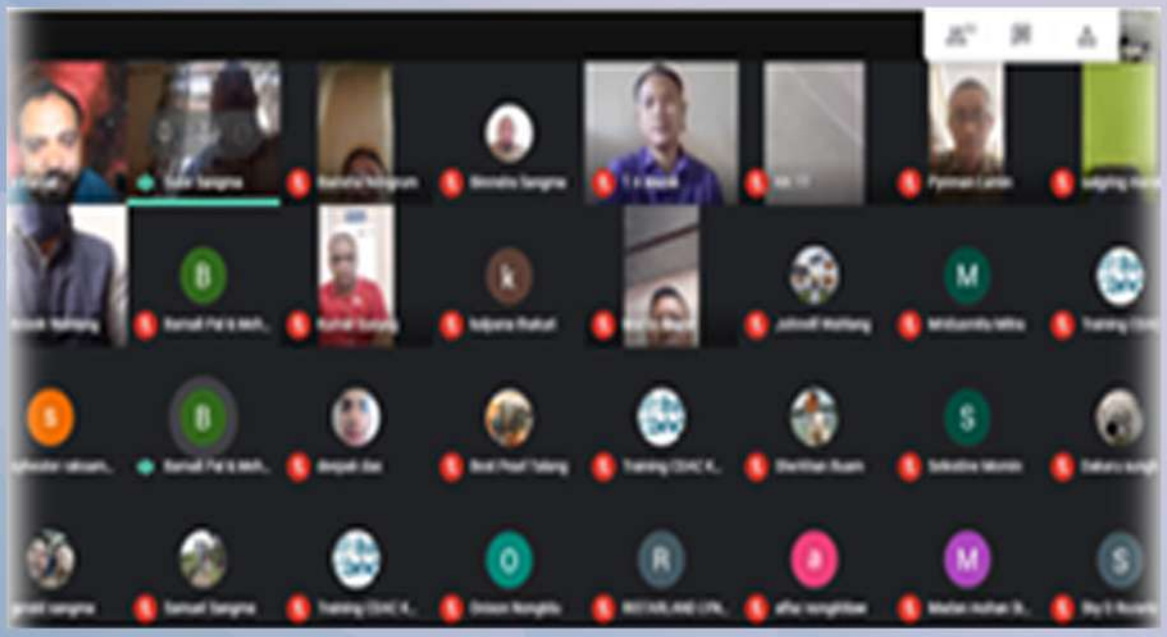
NIELIT Chandigarh conducted online corporate training for 46 officials of Rail Coach Factory in Python with Data Science, Raspberry Pi with Python, Core Java and Advanced Java.

FutureSkills PRIME Project



As a Co-Lead Resource Centre in Artificial Intelligence, NIELIT Delhi imparted training of 4th Batch of Government Officers in Artificial Intelligence under FutureSkills PRIME Project from 14th June to 18th June 2021. The course was delivered in online mode and was attended by 65 participants from Border Security Force (BSF) and communication / radio engineers from National Academy of Broadcasting & Multimedia (NABM). These training programs intend to create awareness about Artificial Intelligence and prepare a base for further skill development of Government Officers in field of Artificial Intelligence.

Online Awareness Level Training on Cyber Forensics



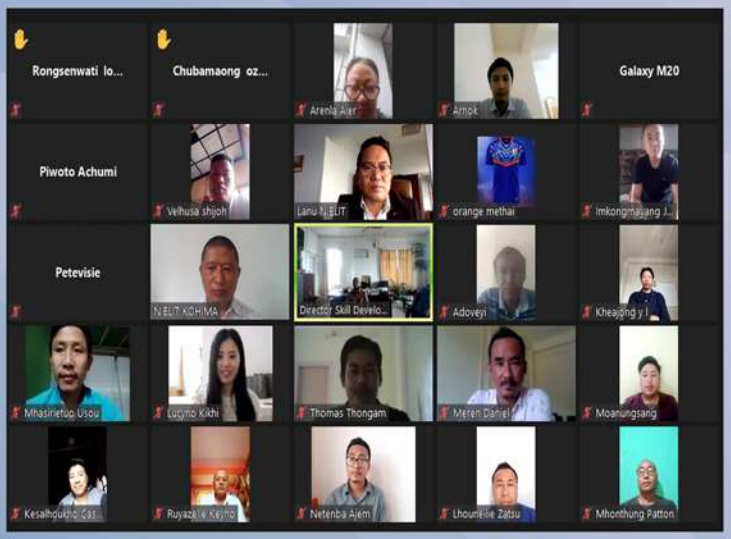
NIELIT Shillong organized an Online Awareness Level Training on Cyber Forensics for **Meghalaya Police Dept.** under the CDAC, Kolkata project "Development of Cyber Forensic Training cum Investigation Labs in NE States and Cloud based centralized CF Lab Infrastructures" sponsored by MeitY for two days on 29th & 30th April 2021, sessions were handled by the trainers from CDAC. 40 (forty) officials were nominated by the Meghalaya Police Dept from various districts for the training.

CORPORATE TRAINING/ FDPs

Training on Tackling Crimes in Digital Space

NIELIT Kohima imparted training on **Tackling crime on Digital space to LEA officers of Nagaland police** on 27th April, 2021 at Police complex Chümoukedima, Dimapur. The training was organised and conducted by NIELIT Kohima in collaboration with Nagaland Police and sponsored by **Ministry of Electronics and Information Technology (MeitY). A total of 42 LEA officers participated in the training.**

FDP in Emerging Technologies for Education



NIELIT Kohima imparted training to the faculty of ITI under Directorate of Employment, Skill Development and Entrepreneurship in **"Emerging Technologies for Education"** from 21st – 25th June 2021. All together a total of 71 officials attended from all over Nagaland. The training concluded with an online valedictory programme. The Director, Department of Employment, Skill Development and Entrepreneurship and the Director i/c NIELIT Kohima also graced the occasion with their presence.

Awareness Training on Digital Forensics for Police Personnel

NIELIT Imphal conducted one day Awareness Training on Digital Forensics for Police Personnel at Thoubal District from 30th April, 2021 to 1st May, 2021 under the project "Development of Cyber Forensic Training cum Investigation Lab in North Eastern-States", sponsored by MeitY, Govt. of India. Altogether, 48 Police Personnel from

different Police Stations of Thoubal District of Manipur attended the training.

Dr. S. Ibomcha Singh (IAS),SP Thoubal District along with Police Personnel

Shri T. P. Singh, Executive Director, NIELIT Imphal along with faculty members and participants.

One Day Awareness Training on Digital Forensics for Police Personnel was conducted at Thoubal District from 3rd May, 2021 to 7th May, 2021 under the project "Development of Cyber Forensic Training cum Investigation Lab in North Eastern-States", sponsored by MeitY , Govt. of India. Altogether, 96 Police Personnel from different Police Stations of Imphal West & East District of Manipur attended the training.

TRAINING PROGRAMS

Online Courses

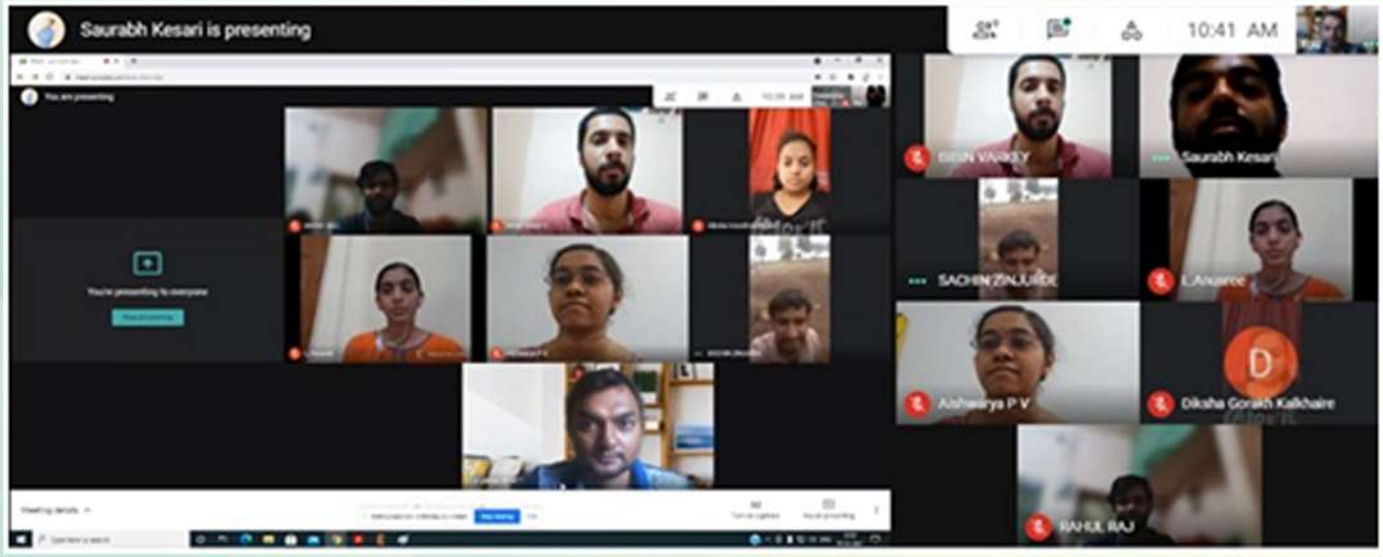
NIELIT Calicut has moved to eLearning due to the current COVID – 19 impact, and continues spreading knowledge with various online courses and has trained more than 1000 participants during April – June, 2021. Short duration courses ranging from 1 day to 5 days were conducted in Artificial Intelligence, System Design using Verilog HDL, Timing Fundamental, Timing Advanced, Industrial Controllers – PLC, Virtualization and Cloud Computing, Big Data Analytics Tools, Natural Language Processing, Speech Recognition, ARM Cortex Microcontrollers, LabVIEW for Industrial Applications and Solar Power System. Long-term course with a 12-week duration in Certified AI Professional is also being conducted. The courses are offered through Moodle server maintained by NIELIT Calicut (el.calicut.nielit.in). The courses include offline video content, live interactive sessions, and assignments.

TRAINING PROGRAMS

Introduction of New NSQF Course

NIELIT Shillong has introduced a new NSQF course during the month of June, 2021 known as "Solar- LED Lighting Product (Design and Manufacturing)". The course aims to bridge the skill gap and help in employment opportunities in the area of design and development of small LED based products along with installation and maintenance of small SPV systems to the youths. This targets upgradation of skills of 10th/ITI/12th students & Electricians working in the field of solar equipment & Wiring, design, supply, installation, Civil work, testing, commissioning of Solar LED Street Lighting System etc. The First batch has been rolled out with 30 students.

Online Short-Term Course in PCB Design & Manufacturing



Online Short-Term Certificate Course in PCB design & Manufacturing is being conducted at **NIELIT Aurangabad**. Two batches have successfully completed the course during the months of May and June, 2021 with a duration of two weeks each. Saurabh Kesari, Scientist 'C' is the Coordinator of the course.

SUMMER TRAINING/INTERNSHIPS

Webinar on 'Future of Artificial Intelligence and Machine Learning'

NIELIT Delhi, in collaboration with **Government Polytechnic College Jammu** conducted a webinar on **'Future of Artificial Intelligence and Machine Learning'** on 3rd June, 2021. Ms. Swapnali Naik, Joint Director delivered the expert lecture. Ms Naik discussed the future scope of Artificial Intelligence, Machine Learning and also the key skills required for being an AI/ML Specialist and also educated the students about the career and job opportunities in this rapidly growing field.

SUMMER TRAINING/INTERNSHIPS

A total of 100 participants joined the webinar from different Polytechnic colleges across J&K and Ladakh. HoD Computer Engineering & IT and Principal, Govt. Polytechnic College Jammu were among the attendees.

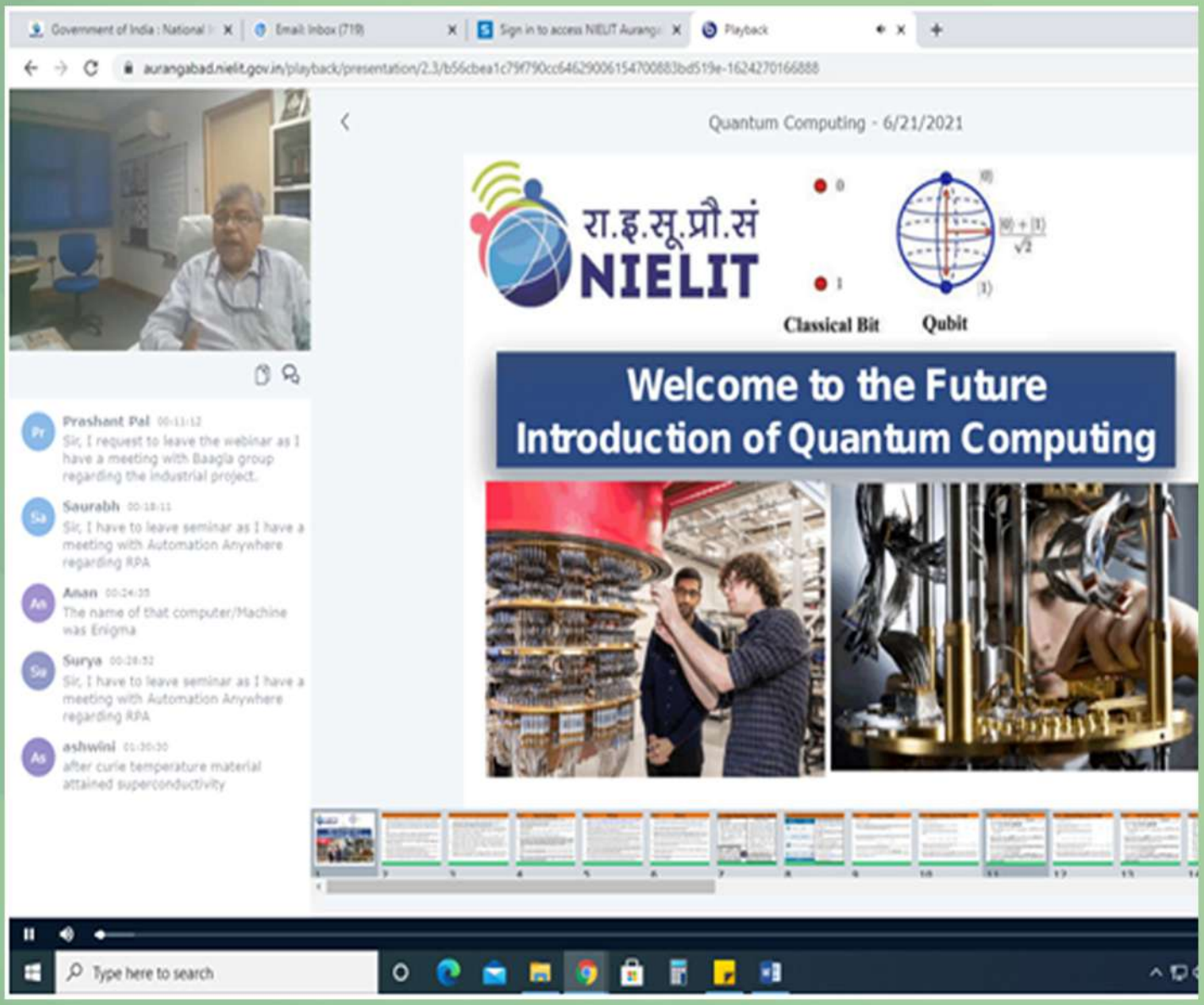
Summer Training in Emerging Technologies

NIELIT Delhi successfully conducted Summer Training on various emerging technologies in the field of IT & Electronics like Cloud Computing, Big Data, Digital Marketing, Data Science and Machine Learning, Deep Learning essentials using Python Web Designing, Computer Networks, IOT using Raspberry Pi, and Python Programming etc. A total of 194 students enrolled in various training courses.

Joint Program with VIT & NIT

NIELIT Calicut in association with **VIT** has conducted a two-week **Online Internship Training Program on Hardware for Computational Neuroscience** starting from 26th April, 2021. Also, another 2-week Online Summer Internship on **FPGA Based Embedded Systems for DSP Applications** jointly with **NIT Meghalaya** starting 10th May, 2021. Nearly 50 students benefited from these programs.

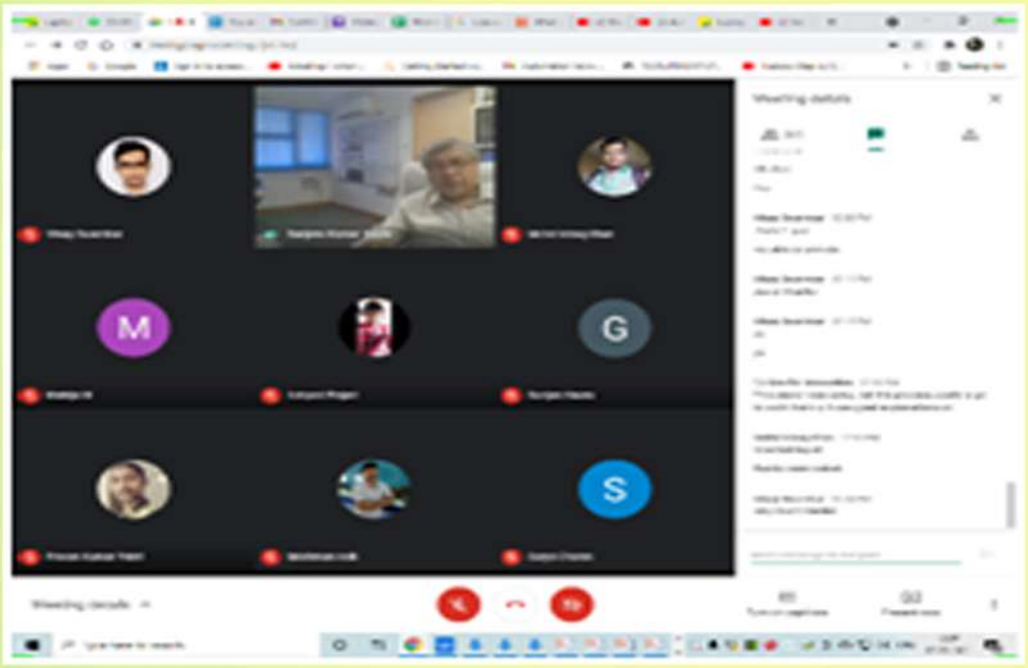
Online Session on Quantum Computing



An online session on 'Quantum Computing' was conducted at NIELIT Aurangabad on 21st June, 2021 by Dr. Sanjeev Kumar Gupta, Executive Director, **NIELIT Aurangabad.** During the session, Dr. Gupta introduced the concept of Quantum Computing as an emerging field and explained various aspects of Quantum Computing like history, how quantum computer works, Real world example of quantum computer, concept of qubit, Quantum logic gates etc. The session was highly informative and attended by staff members of NIELIT Aurangabad.

SUMMER TRAINING/INTERNSHIPS

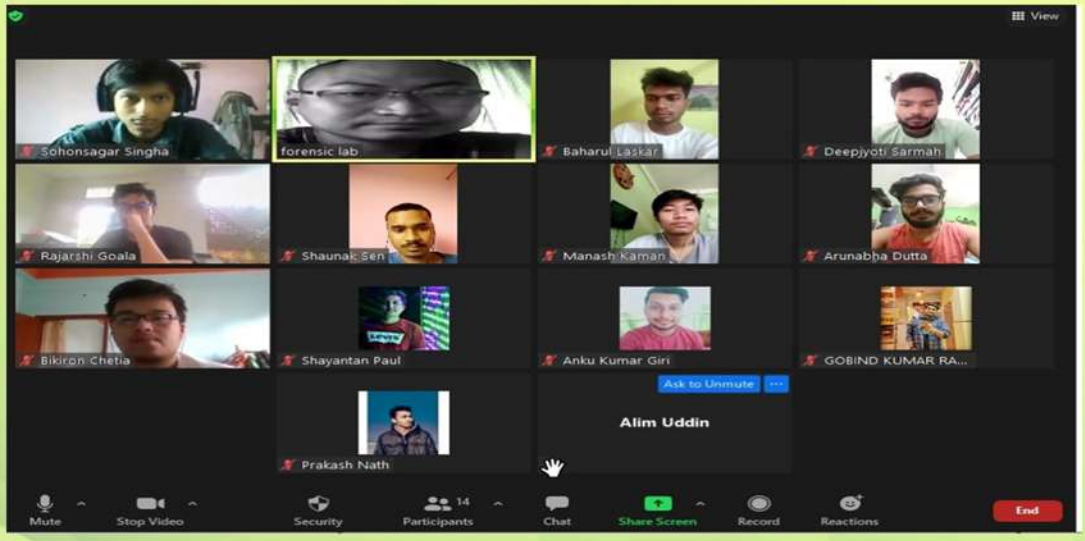
Webinar on Robotic Process Automation (RPA)



NIELIT Aurangabad conducted a webinar on **Robotic Process Automation (RPA)** on 07th May, 2021 under Future Skill PRIME Project. Around 70 participants attended the webinar. Dr. Sanjeev Kumar Gupta, Executive Director NIELIT Aurangabad provided an insight in to the RPA course. He elaborated the advantages of the course keeping in view the opportunities available in Government and Private Sector. **Shri. Sasi Kumar Gera,** Scientist/Engineer 'E' gave the introduction to RPA with its applications. Sessions were handled by faculty members of NIELIT Aurangabad.

Industrial Training Programme on Ethical Hacking

NIELIT Kohima conducted Training on **Ethical Hacking** for 16 students from the **Department of Computer Science & Engineering, Assam University, Silchar** from 14th to 29th June, 2021 as a part of their Industrial Training.



SUMMER TRAINING/INTERNSHIPS

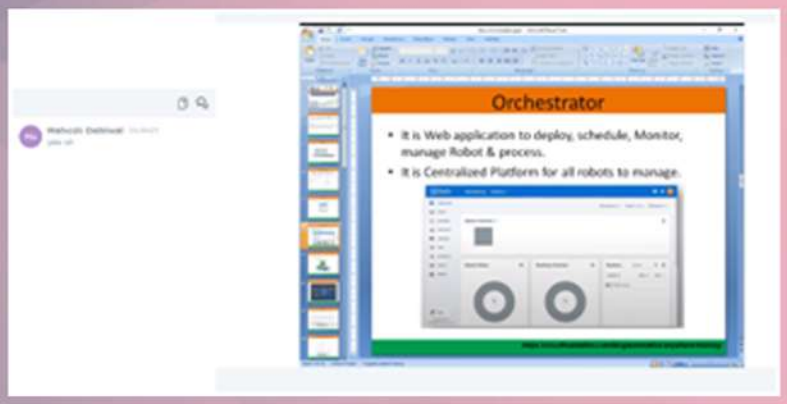
Short Term Courses for Students

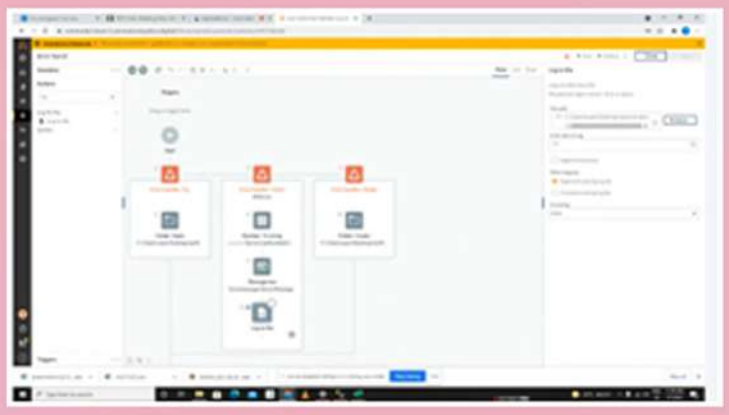
NIELIT Haridwar is offering Online Summer Industrial Training programme for young professionals on various advanced technologies. More than 40 batches were conducted during this quarter in which over 1000 students were trained.

Big Data Analytics	Cloud Computing
Machine Learning	Android Application Development
MATLAB Programming	Internet of Things (IoT)
AutoCAD	JAVA Programming
Arduino based Embedded System Design	Programming in Python
VLSI Design using Verilog	Financial Accounting using Tally
Web Application Development using Apache, MySQL and PHP	Web Designing
Building Python based Web Applications using Django	Digital Marketing

Future Skills PRIME -Robotic Process Automation (RPA) Training at Lead Centre, NIELIT Aurangabad

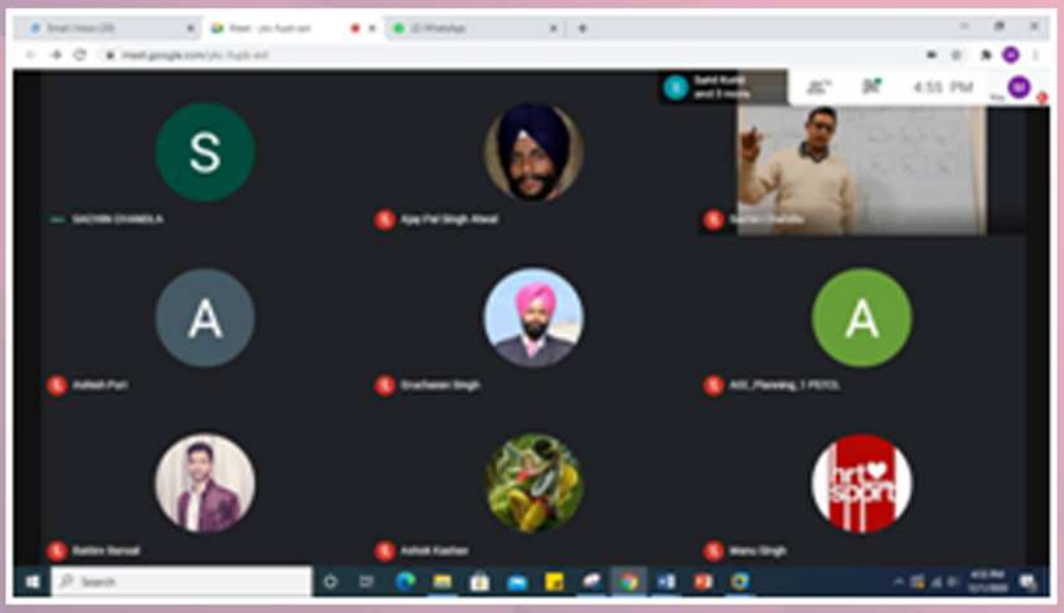
NIELIT Aurangabad is conducting online Training for Government Officials (GoT) on Robotic Process Automation (RPA) under Future Skill PRIME Project from 18th June onwards. The duration of training is one month. Around 33 participants from various Government Polytechnics in Maharashtra State and other Government Departments are being trained.





Training of Trainers (ToT) on Robotic Process Automation (RPA) was conducted under Future Skill PRIME Project from 27th May, 2021 to 17th June, 2021. Around 30 Officials of NIELIT Aurangabad and other NIELIT Centres participated in the training program. Training sessions were handled by **Dr. Sanjeev Kumar Gupta**, Executive Director, **Shri. Sasi Kumar Gera**, Sc/E 'E', **Shri. Lakshman Korra**, Sc/E 'D', **Shri. Saurabh Bansod**, Sc/E 'B', **Shri. Surya charan**, STA, and other faculty members of NIELIT Aurangabad.

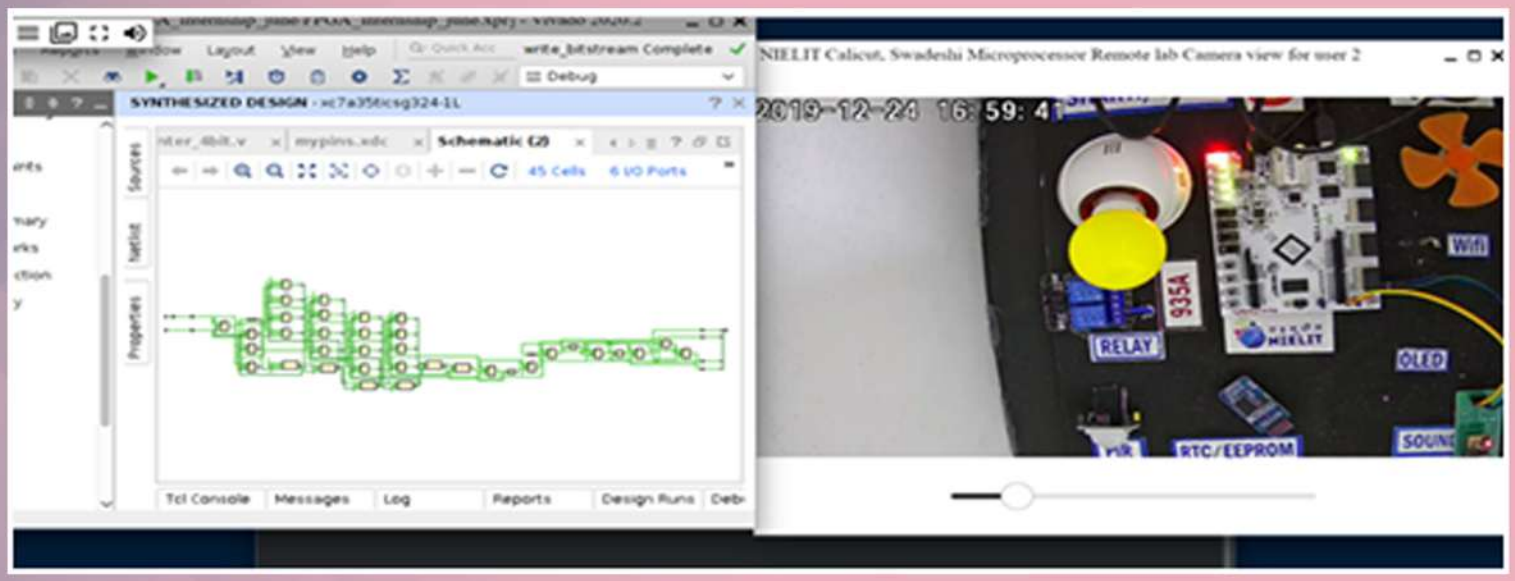
Training for Government Officials



NIELIT Chandigarh conducted two batches of government officials training under FutureSkills Prime project. The training was conducted for two weeks each in Big Data Analytics and Augmented Reality-Virtual Reality.

CAPACITY BUILDING PROJECTS/ SERVICES

Instruction Enhancement Programme (IEP) under SMDP-III by NIELIT Calicut



Online Training on **Embedded System Design using Swadeshi Processor on FPGA** was funded by the **Ministry of Electronics and Information Technology(MeitY), Government of India** under **Special Manpower Development Programme Chips to System Design (SMDP-C2SD)** was successfully completed with 159 candidates and certificates were awarded. Remote Lab was utilized by the students, the hardware located at NIELIT Calicut was made available for all candidates. The program started on 7th April for one week duration.

Project for Digitization of Death and Birth Registers

NIELIT Chandigarh has been awarded the project by the **Department of Health, Punjab** for digitization of Death and Birth Registers for the district of Patiala and Nawan Shahar. The digitization is from the year 1989 to 2004. Subsequently more districts will be taken up for digitization

"The internet is no longer a web that we connect to. Instead, it's a computerized, networked, and interconnected world that we live in. This is the future, and what we're calling the Internet of Things."

- Bruce Schneier

Security Technologist & Author

Developed Online Booking Portal for J&K Forest Department

NIELIT J&K, JAMMU developed an **online booking portal for Jammu & Kashmir Forest Department**. The Portal was inaugurated by **Hon'ble Lieutenant Governor, Union Territory of Jammu and Kashmir, Shri. Manoj Sinha** on 27th of June, 2021.

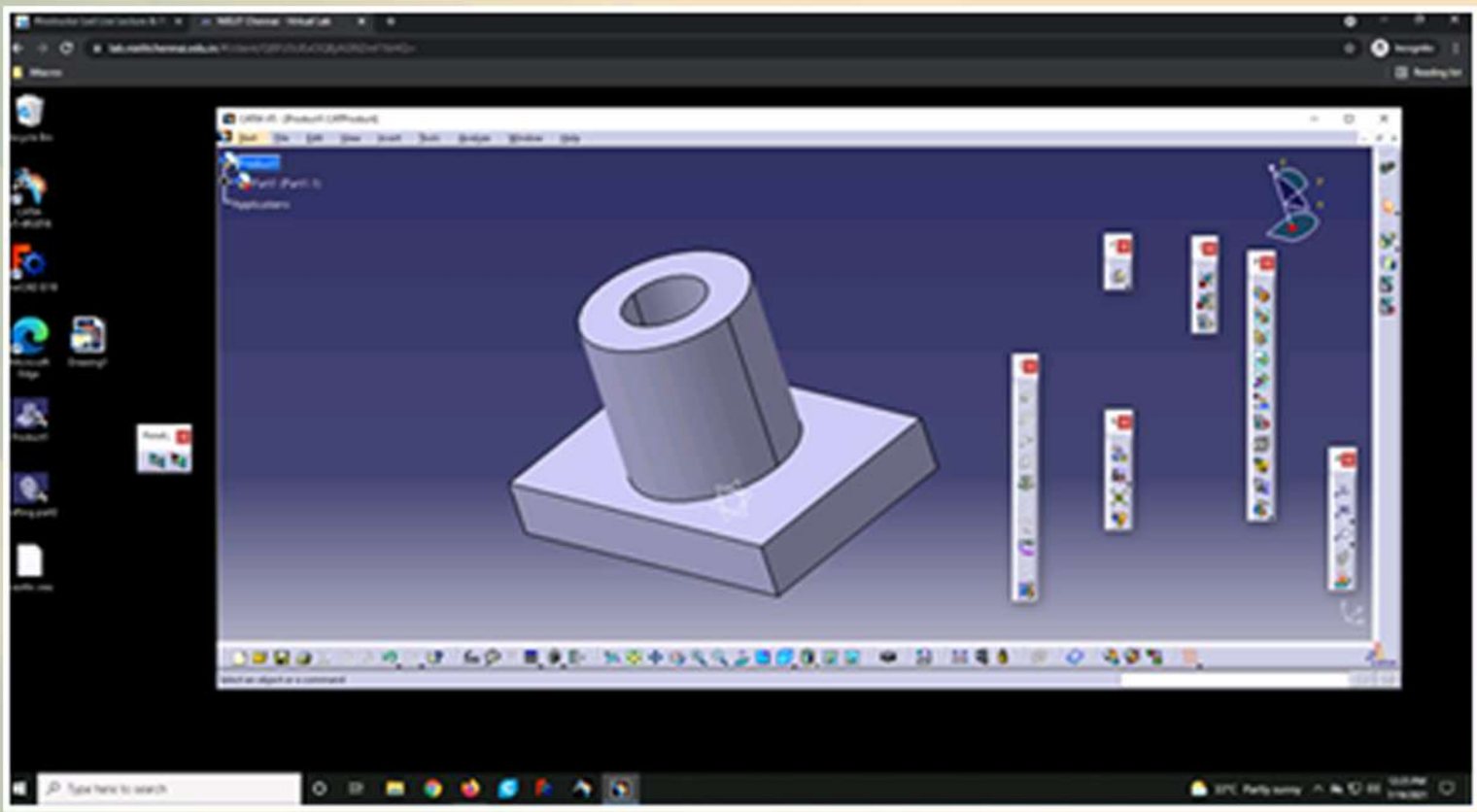
PRSG Meeting of Indigenous Color Doppler Ultrasound Scanner with PNDT Compliance

The seventh/closure meeting of Project Review and Steering Group (PRSG) for the project **Indigenous Color Doppler Ultrasound Scanner with PNDT Compliance** being implemented by **NIELIT, Calicut** was held on 17th June, 2021 on Video Conferencing Platform. **Shri. Rashid Shaban, Scientist 'D',** MeitY and Member Convener welcomed the Chairman **Dr. P. Balakrishnan, Scientist-G, NPOL, DRDO** and the members. Chairman appreciated the NIELIT Calicut team for developing the Lab model prototype of the indigenous color Doppler ultrasound scanner and suggested that the market-ready productionisation activity and achieving Technology Readiness Level-9 (TRL-9) may be taken up as Phase-2 of the project. Chief Investigator of the project, **Dr. Jayaraj U Kidav** made a detailed presentation on the progress made in the project activities and detailed the system performance.

NIELIT Calicut bags the R & D Project under CARS Scheme of DRDO

NIELIT Calicut has bagged the R & D project **"Study and development of platform-independent memory-centric scheduler for multi-core processors"** by **Naval Physical and Oceanographic Laboratory (NPOL) Cochin (DRDO Lab).** The budget outlay of the project is Rs. 25.15 Lakhs for 18 months. The project aims to develop multi-core schedulers for embedded SONAR signal processing systems. The project is awarded based on earlier development works carried out by NIELIT Calicut in multi-core scheduling algorithm developments. The proposed multi-core scheduling algorithm will enable the efficient parallel pipelined realization of complex signal processing algorithms on a multi-core platform.

NIELIT Chennai Develops Virtual Lab for CATIA-V5



NIELIT Chennai has developed a novel **hybrid virtual Lab Facility** using licenced VMware vSphere Std Ed. and Apache open source software. This Virtual Desktop Infrastructure (VDI) concept can deliver even HPC performance like facility to students to do their lab over end user browser, Also, based on lab exercise or student requirements CPU, RAM & Storage can be increased on-demand basis (Eg.: 128GB or more RAM, 94 core vCPU, multi virtual NIC, etc. to each student), where the students registered for the Course can remotely access the **CATIA-V5** Software from anywhere via browser.

AWARDS AND RECOGNITION

Won Third Prize in Annual Rajbhasha Shield Pratiyogita

Nagar Raajbhasha Karyanvayan Samiti, Roopnagar, published the first edition of a hindi magazine, Roopsagar. Ms. Sunita Goyle, Director, NIELIT Chandigarh also gave guidance for publication of the first edition. **NIELIT Chandigarh won the third prize in Annual Rajbhasha Shield Pratiyogita** for the year 2020-21.

PAPERS PUBLISHED

Jayaraj Kidav, Perumal M. Pillai, Deepak V, Sreejeesh SG,**"Design of a 128-channel transceiver hardware for medical ultrasound imaging systems"IET Circuits, Devices & Systems,** https://doi.org/10.1049/cds2.12087

Sreejeesh SG, R Sakthivel, **"An Efficient Parallel Architecture for Sub Band Processor in Broad Band MVDR Beamformer for Medical Ultrasound Applications"International Journal of Emerging Technology and Advanced Engineering,** Vol 11, Issue 06, June 2021

INDUSTRY ACADEMIA COLLABORATION

MoU Signed with Punjab Technical University

Dr. Ajay K Sharma, Vice Chancellor, IKG PTU and Ms. Sunita Goyle, Director NIELIT Chandigarh signed an MoU between IKG PTU (Punjab Technical University) and NIELIT Chandigarh. Training of students of IKGPTU campuses / affiliated colleges and joint FDPs will be the key deliverables under this collaboration which will be focused on Entrepreneurship & Latest technical trends. Students will be offered training programmes, jointly designed and undertaken by NIELIT & IIT Ropar to make the students industry ready.

MoU Signed with Dr. H. Gordon Robert Hospital, Shillong

In connection with the **Medical Electronics Lab** established at **NIELIT Shillong** under the Medical Electronics Project sponsored/funded by **MeitY** (Ministry of Electronics and IT), an MoU was signed between NIELIT Shillong and Dr.H. Gordon Robert Hospital, Shillong on 19th February, 2021 for Testing, Calibration, Repairing and Maintenance of Hospital Equipment. The MoU was signed by **Dr. Y. Jayanta Singh, Director, NIELIT Guwahati & Shillong** and Dr. Roken Nongrum, Medical Superintendent Robert Hospital in presence of Shri K.W. Marbaniang, IAS (Retd.) (former Health Secretary to Govt of Meghalaya), Administrative Officer of Dr. H Gordon Roberts Hospital, Shillong and Sri Santanu Borgohain, Sc-D, NIELIT Shillong.

MoU with Shillong Polytechnic

An MoU was signed on 25th March, 2021 between **NIELIT Shillong** and **Shillong Polytechnic**. The objective of the MoU is to build a relationship between technical students of the institute and NIELIT for enhancing industry institute interaction.

Industrial Training in "AI and Machine Learning"

NIELIT Chandigarh in Joint certification with **IIT Ropar** is conducting 6 months Industrial Training in "Artificial Intelligence and Machine Learning". The course has four modules "Python Associate", "Data Analyst", "AI and ML Expert" and "Neural Networks and Deep Learning Professional" along with a Project Work. IIT Professors are also delivering lectures from time to time.

INDUSTRY ACADEMIA COLLABORATION

STUDENT SECTION

IEEE- NIELIT Calicut Student Branch Programs

NIELIT Calicut in association with various Chapters of IEEE, conducted 5 Webinars on the latest topics during the period April – June, 2021

- Layout Automation: Criticality & Challenges
- Basics of Writing and Getting Published A Quality Technical Paper'
- VLSI Verification: What the Industry Wants?'
- Cybersecurity and Resilience
- Basic Metrology and Standards used in Electrical Calibration.

Around 600 participants from across industry and academia were benefitted.

Innovative Projects by Industrial Training Students

Students of 6 months industrial training in "AI and ML" at **NIELIT Chandigarh** in joint certification with **IIT Ropar** developed innovative projects and gave demonstrations of the projects

- Face recognition with and without mask
- Live Sentiment Analyzer AI (Twitter)
- Health care Smart Application
- Price Prediction App (Used Car Price)
- Price Prediction App (Flight Fare)
- Exploratory Analysis of Geolocational Data
- Heart Attack Prediction
- Crime Analysis and Prediction

Figure 47 Flight Fare Prediction Page

CSR ACTIVITIES

COVID – 19 Care @ NIELIT Calicut

NIELIT Calicut has handed over the APJK Hostel to the District Disaster Management Authority to convert it as CFLTC (COVID First Line Treatment Centre). Additionally, as part of social commitment the Recreation Club of NIELIT Calicut has sponsored 5 units of Nebulizer to CFLTC.

Release of Information Booklet for Empowerment of Senior Citizens in E-Services

Release of Information Booklet prepared by **NIELIT Aurangabad** as part of Awareness Campaigns/Events for Empowerment of Senior Citizens In E-Services Through ICT Tools was done by **Honourable Rajya Sabha MP, Dr. Bhagwat Karad**, on 23rd June, 2021 at Government Medical College & Hospital, Aurangabad. **Dr. Sanjeev Kumar Gupta, Executive Director, NIELIT Aurangabad**, Dr. Kanan Yelikar, Dean, Government Medical College & Dr. Mangala Borkar, Head of Department, Geriatrics were present during the function.

Awareness Programme for "Senior Citizens/Women" on "Use of Mobile Applications for Digital Payment and e-Governance services"

During this time of anxiety and uncertainty caused due to the second wave of COVID -19 pandemic, people are facing various socio-economic barriers and to overcome this, digital literacy is a good way out. Adhering to the thought that "Contributing to the Society is our duty not charity", **NIELIT Haridwar** has continued to conduct "One Week online Awareness Programme" on "Use of Mobile Applications for Digital Payment and e-Governance services" absolutely free-of-cost for "Senior Citizens/Women".

Dr. Jaideep Kumar Mishra, Joint Secretary, Ministry of Electronics & Information Technology, Govt of India & Director General, NIELIT addressed the participants.

Maharashtra Times dated 24-06-2021

विभागीय वार्धक्यशास्त्र केंद्रासाठी प्रयत्न

म. टा. प्रतिनिधी, औरंगाबाद

केंद्र सरकारच्या माध्यमातून पाटीअंतर्गत विभागीय वार्धक्यशास्त्र केंद्र (रिजनल जेरियाट्रिक्स सेंटर) सुरू करण्यासाठी प्रयत्न सुरू असून, लवकरच केंद्राचा प्रस्ताव मार्गी लागेल आणि हे केंद्र पाटीत सुरू होईल, अशी अपेक्षा खासदार भागवत कराड यांनी ज्येष्ठांच्या सक्षमीकरणासाठी नाईलिट संस्थेमार्फत विकसित करण्यात आलेल्या पुस्तिकेच्या उद्घाटनप्रसंगी बुधवारी (२३ जून) व्यक्त केली.

शासकीय वैद्यकीय महाविद्यालय व रुग्णालयाच्या (पाटी) रिजिओनॉलॉजी हॉलमध्ये झालेल्या कार्यक्रमात प्रमुख पाहुणे म्हणून ते होते. या प्रसंगी नाईलिटचे कार्यकारी संचालक डॉ. संजीव कुमार गुप्ता, पाटीच्या अधिष्ठाता डॉ. कानन येळीकर, पाटीतील वार्धक्यशास्त्र विभागाच्या प्रमुख डॉ. मंगला बोरकर आदींची उपस्थिती होती. ज्येष्ठ नागरिकांना स्मार्ट फोनसह इतर तंत्रविषयक प्रशिक्षण देण्यात येणार आहे आणि याच अनुषंगाने ज्येष्ठांसाठी मार्गदर्शक पुस्तिका तयार करण्यात आली. या पुस्तिकेच्या उद्घाटनप्रसंगी डॉ. कराड यांनी सीएसआरअंतर्गत गोरगरीब ज्येष्ठ नागरिकांसाठी स्मार्ट फोन उपलब्ध करून देण्याची ग्वाही दिली. तसेच पाटीतील ओपीडी परिसरातही ज्येष्ठ नागरिकांना प्रशिक्षण देण्याची सोय करण्यात यावी, अशी सूचना केली. तर, आयटी विभागामार्फत डॉक्टरांच्या प्रशिक्षणाचे नियोजन करता येऊ शकेल आणि त्याचा डॉक्टरांनी लाभ घ्यावा, अशी सूचना डॉ. गुप्ता यांनी या प्रसंगी केली. ज्येष्ठ नागरिकांना स्मार्ट फोनचा खूप उपयोग होऊ शकतो आणि त्यांना स्मार्ट फोनच्या माध्यमातून विविध प्रकारची उपयुक्त माहिती मिळू शकते, असे डॉ. येळीकर म्हणाल्या.

पुस्तिकेच्या उद्घाटनावेळी बोलताना खासदार डॉ. कराड

ज्येष्ठांना प्रशिक्षण

नाईलिटअंतर्गत देण्यात येणारे प्रशिक्षण विनामूल्य असून, सहभागी महाराष्ट्रातील ज्येष्ठ नागरिकांना प्रशिक्षण यशस्वीरीत्या पूर्ण केल्यास सहभागिता प्रमाणपत्र देण्यात येईल. http://nielit.gov.in/aurangabad/content/senior-citizen या वेबसाइटवर संस्थेची माहिती, व्हिडिओ उपलब्ध असून, ज्येष्ठांनी वेबसाइटवर संपर्क करावा.

लोकमत

आय विटनेस

माहिती पुस्तिकेचे प्रकाशन

ज्येष्ठांच्या सक्षमीकरणासाठी तयार करण्यात आलेल्या माहिती पुस्तिकेच्या प्रकाशनप्रसंगी वार्धक्यशास्त्र विभागाच्या प्राध्यापक डॉ. मंगला बोरकर, अधिष्ठाता डॉ. कानन येळीकर, खा. डॉ. भागवत कराड, डॉ. संजीवकुमार गुप्ता.

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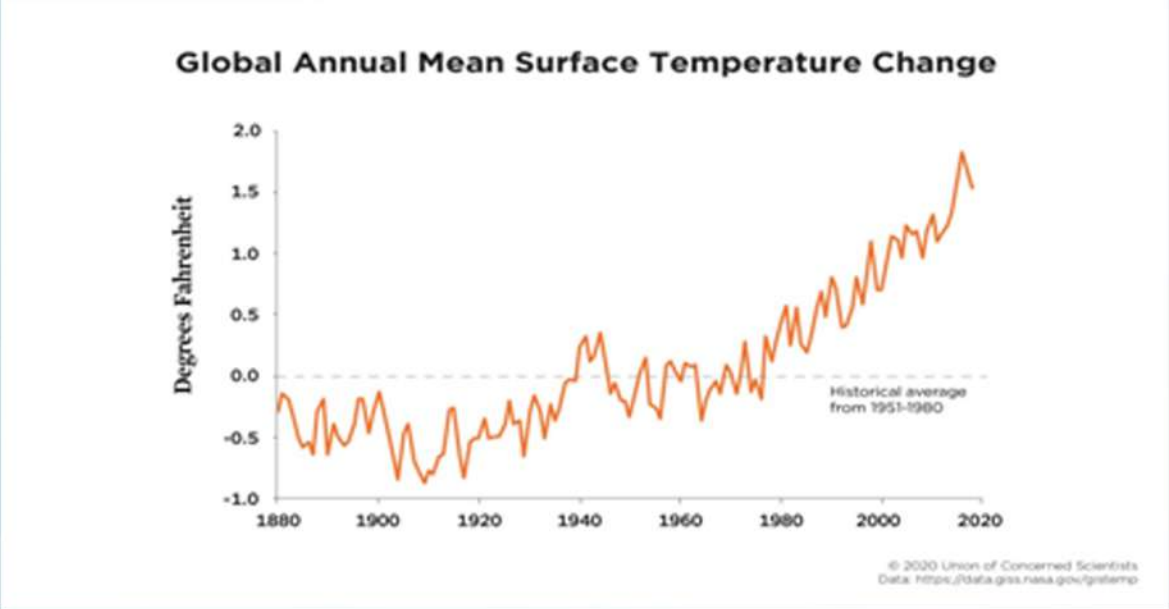
Quantum Computing and its Impact on Global Warming

Introduction

Quantum computing is an exciting branch of physics which includes an intersection of mathematics and computer science, speeding up the computing capability of machines. The journey from the qubits to entering into the chemical industry (generating quantum chemicals), the quantum world has taken a significant leap.

Current Status

Global warming has become a serious issue which is damaging the atmosphere and the ozone layer of the earth. The increasing surface temperature of earth has led to melting of polar ice which may lead to the submerging of low level areas. Studies have revealed that nearly 23% of the global warming has been contributed by the chemical industry. The greenhouse gases like CO_2, NO_2 & SO_2 produced by these industries are mainly due to burning of fossils and also due to inappropriate composition of chemicals .The following figure visibly explains how the annual temperature of the earth's surface is increasing year by year.



Problem:To devise new methodologies for reducing the amount of greenhouse gases released by chemical industry.

Global warming is pushing the earth to the brink of disaster in every possible way and also causing loss of human lives in a large number. Unless it is tackled soon the following scenarios are going to be enacted very frequently with more ferocity:

i) **Rising Sea Level**
ii) **Shrinking of glaciers**
iii) **Heat Waves**
iv) **Storms and floods**
v) **Drought**
vi) **Loss in Agricultural production leading to economic hardship**
vii) **Loss of Bio-Diversity**
viii) **Destruction of Eco-System**

But the issue causing global warming can be understood relatively simply: there is too much carbon dioxide in our atmosphere. To address that issue, we focus largely on how we can reduce the amount of carbon that we are emitting or remove the carbon that is already in the atmosphere. Accomplishing that task is currently costly and more theoretical than it is practical, but breakthroughs in **quantum computing may hold the key** to quickly, efficiently and effectively sucking pollution right out of the sky. The main reason is emission of CO by a host of human activities which causes hole in earth's ozone layer leading to a warmer earth and consequent global warming. The world must find ways to

take collective action now against climate change. Looking down the road, quantum computer could represent the kind of step change in capability that the world needs. When applied to current low-emission technologies, quantum computing could revolutionise how we generate and store power; how we build houses, cars, ships, and airplanes; how we power transportation; and even how we design long-standing industrial processes such as cement, steel, and fertilizer manufacturing. Add it all up and **quantum computing–enabled technologies** could one day help reduce a majority of emissions.

Suggestions

We may broadly categorize the following factors which will have impact in reducing global warming:

a) Green-Ammonia: The current method of producing fertilisers consumes around 3% to 5% of all natural gas generated globally. Using quantum computing a new "green" production technology for cheap ammonia would not only bring down emissions in one of the most CO_2-intensive chemical processes worldwide but also enable the use of ammonia as a carbon-neutral fuel (in shipping, for example).

b) Green Hydrogen Power: By devising better catalysts, using quantum computing for the production of synthetic hydrocarbons (often synthesized from hydrogen) we will be able to produce more-affordable emission-free fuels for aviation, shipping, and heavy transport, and thus help solve the long-term storage challenge in renewable power systems.

c) Carbon Capture: Better catalysts could substantially improve the efficiency and lower the cost of binding carbon—both at the source and from the atmosphere. This could help in **industrial carbon-capture-and-storage** applications and make captured CO_2 more attractive as a feedstock in the circular carbon economy.

d) New Materials: Quantum Computing will help in material science optimization. Lighter, stronger, and better-insulating materials that require less carbon to produce can reduce emissions from buildings, transportation, and the production of materials such as cement which account for 25.2%, 17.6%, and 5.5% of global CO_2 emissions, respectively.

Lighter and stronger materials could also increase the energy yield in cars, aircraft, trucks, and maritime vessels, as well as displace emission- or energy-intensive materials such as steel and aluminium.

Current photovoltaic cells have a 30% to 50% yield only. With the help of quantum computing electrical energy storage density could be improved with new battery materials (electrodes and electrolytes) .

e) Fluid Dynamics and Logistics: Manufacturers of automotives, aeroplanes and others rely on computational fluid dynamics in the design of their products. With quantum computers, engineers could explore better designs that optimize both drag and lift and therefore reduce emissions. The same logic applies to maritime transport, which, like aviation, accounts for as much as 2% of global emissions.

• By 2025, quantum computing "will have outgrown its infancy", with commercialization spurring a new generation of technologies .
• Quantum computers hold the key in realizing green solutions that can accelerate the goal of carbon neutrality by 2050.

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The World of Generative Networks

With recent advances in computing, we're at a stage where computers are able to faithfully generate new content as per our needs. Traditionally, to create new images from existing set of images, you would require the services of a professional editor, who works on an extensive set of software to complete the task. But now, we can train our computers and mobile devices to do the same! A disruptive technology called Generative Networks, which are a category of neural networks are being used to create entirely new data samples from existing ones. These samples may be images, videos, text and other similar modalities that closely match the distribution of the input provided to the network.

Types of Generative Networks

There are three major categories of generative networks, Generative Adversarial Networks (GANs) which pose the network's training process as a game between two separate networks: a generator network that creates new data and a second discriminative network that tries to classify samples as either coming from the true distribution (real life data) or fake data generated by the generator network. Every time the discriminator notices a difference between the two (real and fake data), the generator adjusts its parameters slightly to make it go away, until at the end the generator exactly reproduces the true data and the discriminator is unable to find a difference. The output, hence, is lifelike images that one may not be able to identify visually as synthetic or fakes. These are called Deepfakes.

Similarly, VariationalAutoencoders (VAEs) comprises of a two-part network, the encoder part transforms the input into an alternative low dimensional representation. Collection of all samples in this alternate space is called as latent space. The decoder part selects a new point in this latent space and decodes (generative part of the network) the sample to generate a new image.

The third kind of generative networks are Autoregressive networks. They are a compelling challenger to Deep Recurrent Networks, that are state-of-the-art networks when it comes to predicting sequences, such as predicting weather conditions considering the past observations, projecting the active COVID cases in the country, predicting the prices of your favorite stocks from the stock market or cryptocurrency exchanges!

The Consequences of Generation

You may provide an image (let's say a selfie) as the input and the generative model will return a modified image that looks almost the same, but some critical part of the image will be modified. It may replace human ears with ones from an animal, such as a dog, or add cat whiskers to your face. It can also replace the entire face with someone else's and keep rest of the image same. The possibilities are endless! Many social media platforms such as Instagram and Snapchat have generative models deployed in their applications that allow you to modify or edit your images in unimaginable ways. However, generative networks are a double edged sword, i.e. the output may have both, favorable and unfavorable outcomes.

The Good

If you've ever trained a deep neural network, you might be knowing that it requires a significant amount of labelled data. Also, the complexity of your networks might be so high that you may need specialized computers and a lot of time to develop. Thus, the resources such as the data utilized for training a network is quite expensive by nature. Labelling the data is another aspect that requires significant manpower to create. Generative networks are coming to the rescue! Creating new training data is emerging as one of the most used application of generative networks. They are also being used to add minor variations (changing facial attributes) to existing images, like the ones you see in popular social media apps, improving the image quality by increasing its resolution and removing the blurriness. Generative networks also find application in cleaning noise from an image taken in low-light conditions, image in-painting (which is adding missing parts to an image so that observers

are unable to tell that these regions have undergone restoration, or removing existing data from an image), Face Ageing, Pose estimation and many more.

The Bad

Now that we know how generative networks identify minute level of details and create new content which is hard to classify as fake, let us see how this feature is being actively exploited to create discriminatory content all over the world.

Let's say you're famished and decide to order food from a popular food aggregator platform. You open their website and start browsing through various restaurants, checking their ratings and reviews. The restaurant owner however has hired services of a third party that uses generative networks to create good looking reviews and submit fake food images.The net result is that they fool you into spending your hard earned cash by presenting a good opinion of themselves.

Adversaries are disseminating fake news articles along with videos and images in their support. Such videos are used to incite violence and erode trust of governments and famous personalities, blackmail people and steal money. Applying this technology could result in fake images and videos of political figures, other persons of interest, or even you. This poses a threat to national and personal security if photo realistic fake images and videos are trivially generated. In this day and age seeing is no longer believing.

The problem is not limited to fake images, text and video anymore. Generative networks are actively being used to create malicious versions of popular software like MS Office, Adobe Acrobat PDF Reader, which have embedded Trojan viruses. Upon activation, these viruses evade your system and start monitoring the user. They silently record your webcam feed (without activating the camera's notification light), your keystrokes and capture personal information like usernames, passwords, bank account details!

Many workplaces use biometric systems for manpower management. Generative networks are being leveraged to fool facial recognition systems into thinking that you're present, meanwhile you could be relaxing at the comfort of your home. Such systems are also being utilized by forensic agencies to unlock smartphones locked through a biometric system such as fingerprint or facial lock by brute forcing it with millions of variations per second.
This calls for an immediate need to develop detection systems and identify what is real and what is fake.

Detection and Response

We would love to say there is an easy trick or one quick fix or program you can run, but unfortunately, this is not the case. As you have seen from this article that the techniques of a generative network are quite sophisticated and capable of fooling advanced systems. Each solution to detect and respond to an adversarial generative network is unique to the context, but it is critical to understand theinner-workings of a generative network and prepare for the worst. In order to detect and respond to such attacks it is critical to engineer your systems with generative networks in mind, and don't assume the machine learning detection is without vulnerabilities. Several governments have started funding research that allows you to identify fake images generated through these technologies. The US Department of Defense has created a tool to identify fake news and pornographic material created with AI. They focus on unnatural scenarios like video of people created with a deep fake rarely blink their eyes, observing strange head movements, odd eye color, and so on. Cutting edge research is being performed for identifying these unnatural scenarios and mechanisms to counter such adversarial attacks before they happen. It's a game of cat and mouse considering the recent advancements in the field of generative networks and adversarial attacks.

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