

# **TEQIP III Sponsored Faculty Development Program on Emerging Technologies for Industry 4.0**

**From 11th January to 15th January 2021.**

By

**Techno India NJR Institute of Technology, Udaipur**

## **Technical and Feedback Report**

The main objective of Emerging technologies for Industry 4.0 was to introduce everyone to the current techniques or future techniques that are going to be used in industries to increase productivity and to generating efficient solutions.

Participants were introduced with several techniques used in making industry process more fluent than current process. Topics like big data, Cloud, AI, ML, AR & VR, IOT, Robotics & smart manufacturing were taught in this 5-day workshop and valuable information regarding current and upcoming methodology were shared. Keynotes speakers were from very reputed companies/ industries/ institutions with a vast experience in engineering field and production. They shared their knowledge in a very elaborate and interesting way, Participants too asked questions and got the answers. The sessions were more of interacting than usual ones.

### **What are Emerging Technologies for Industry 4.0?**

Industry 4.0 has been defined as “a name for the current trend of automation and data exchange in manufacturing technologies, including cyber-physical systems, the Internet of things, cloud computing and cognitive computing and creating the smart factory”.

Industry 4.0 is often used interchangeably with the notion of the fourth industrial revolution. It is characterized by, among others, 1) even more automation than in the third industrial revolution, 2) the bridging of the physical and digital world through cyber-physical systems, enabled by Industrial IOT, 3) a shift from a central industrial control system to one where smart products define the production steps, 4) closed-loop data models and control systems and 4) personalization/customization of products.

The goal is to enable autonomous decision-making processes, monitor assets and processes in real-time, and enable equally real-time connected value creation networks through early involvement of stakeholders, and vertical and horizontal integration.

## **Topics to be covered:**

- Introduction to Digital technologies like Big Data, Cloud, Artificial Intelligence & Machine Learning
- Applications of Internet of things in industry 4.0.
- Introduction to Smart manufacturing and IOT in industry 4.0
- AR/VR Technologies for industry 4.0 were introduced to get an idea of the product in real prior to manufacturing stage.
- Robotic and Automation was taught to increase the productivity in industry.
- Supply chain and logistics management for Industry 4.0

## **Profile and Contact Details of the Expert Speakers**

### **Mr. Lalit Yagnik**

Managing Director, Asia Pacific, Unify Cloud, Formerly Technology Director, IBM  
(Singapore, India, Australia)

### **Prof. Praadeep Kumar**

Professor, Mechanical and Industrial Engineering, IIT Roorkee

### **Dr. Jonathan Joshi**

**C.E.O., Eduvance**

### **Prof. R.S. Walia**

Professor & Head, Punjab Engineering College

### **Mr. Sridhar Sukand**

Managing Director, EON Reality

### **Prof. (Dr.) N.N Sharma**

Pro President, Manipal University Jaipur

### **Mr. Kamal Pagaria**

Deputy General Manager (Supply Chain & Logistics), Secure Meters Limited, Udaipur

# Photos Day 1

## Growth in Internet traffic (PCs, smartphones, IoT,...) >> Creating More Data

### Global devices and connections growth

**10% CAGR 2015-2020**

2015 2016 2017 2018 2019 2020

- Other (3.4%, 3%)
- Tablets (3%, 3%)
- PCs (9%, 5%)
- TVs (11%, 12%)
- Non-Smartphones (24%, 9%)
- Smartphones (19%, 21%)
- M2M (30%, 46%)

- **Manufacturing**
- **Science**
- **Astronomy**
- **Atmospheric science**
- **Genomics**
- **Biogeochemical**
- **Biological**
  - and other complex / interdisciplinary scientific research
- **Social**
- **Social networks**
- **Social data**
  - :
    - Twitter
    - Facebook
    - LinkedIn

- Machines & products data
- Commercial
- Web / event / database logs
- "Digital exhaust" - result of human interaction with the Internet
- Sensor networks
- RFID
- Internet text and documents
- Internet search indexing
- Call detail records (CDR)
- Photographic archives
- Video / audio archives
- Large scale eCommerce
- Government
- Regular government business and commerce needs
- Military and homeland security surveillance
- Inter-connected factory components

## Agenda

- What is Industry 4.0 – a Journey!
- Digital Technologies powering Industry 4.0
  - Big Data Analytics, AI/ML
  - Cloud
  - IOT
  - AR (Augmented Reality)
  - CPS (Cyber Physical Systems)
- Opportunities & Challenges:
  - 7 Jan2021 News below (:

**Rich lists**

**Elon Musk becomes world's richest person**

Tesla co-founder overtakes Amazon's Jeff Bezos as car firm's shares soar after 'blue-senator' victory

**Big Data flows worldwide**

- 300+ Million users posting 500 Million tweets every day
- 1.65+ Billion active Facebook users 1016 spending average of 20 mins per visit
- 30 billion RFID tags today (1.3B sold in 2006)
- 4.6 Billion camera phones world wide
- 100s of millions of GPS enabled devices sold annually
- 3+ billion people on the Web by end 2015
- 76 million smart meters in 2009, 113M in 2013, 1 billion by 2022

**Unbundling The Automobile**

# Photos Day 2

Ravinder Walia is presenting

3:53 PM

Product quality and defect tracking

Real-time supply chain management

Process improvement and predictive maintenance

Improved contract negotiations through supplier performance data

Output and demand forecasting

Faster and cheaper product prototyping

## SMART MANUFACTURING & IIOT

Dr R S Walia  
PIED, PEC Chandigarh

Zoom

meet.google.com/vi-styy-rtg

Ravinder Walia is presenting

4:37 PM

Technology is bringing significant oppo... Factory Ecosystem would change with advances in technology and inter-connectivity

Real Time Monitoring & Advanced Log Analysis

Smart Maintenance & Intelligent Sensors

Autonomous Mobile Robots

Additive Manufacturing

IoT-Cloud

Enterprise Network

Factory Network

IoT Platform Server (e.g. OPC UA) on premise

Logistics, Supply Chain

Factories, Contract Manufacturers, Suppliers

IoT Cloud II Logical Integration Layer

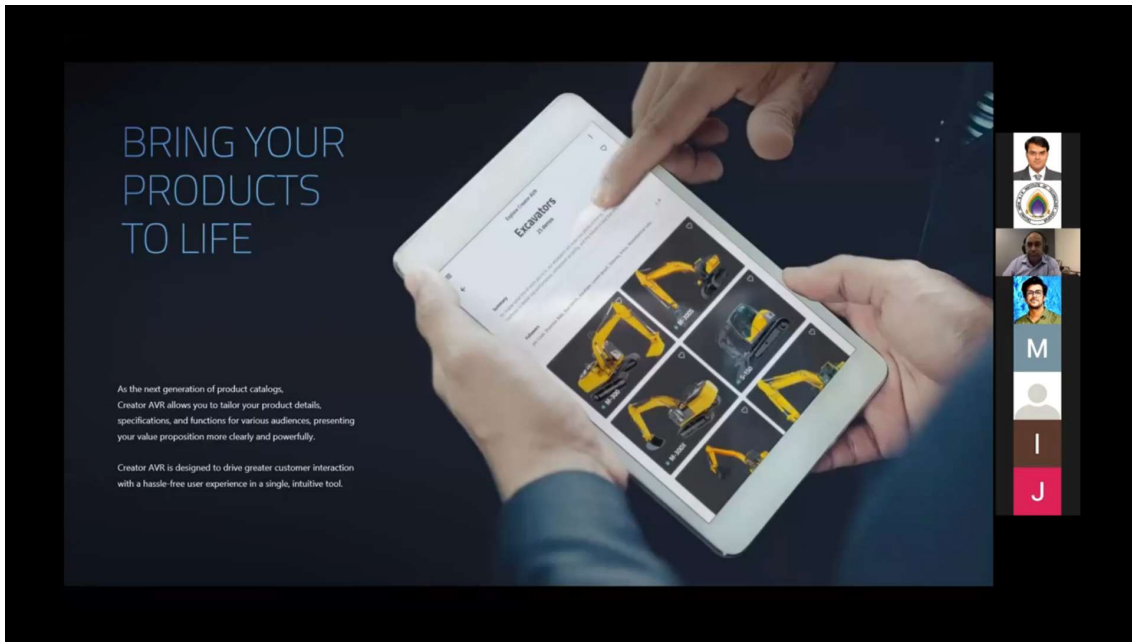
Embedded IIOT platform services (e.g. OPC UA) embedded in the machine

Equipment, SCADA, PLC, MES, Quality, Personnel, Intra Logistics...

Abir Choudhary has left the meeting


Zoom

# Photos Day 3

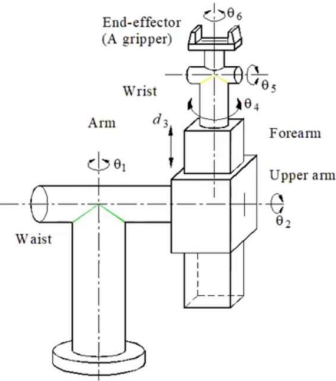


# Photos Day 4


Robot Anatomy



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Pranjal paliwal



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Problem Solving



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**1.** The coordinates of point  $P$  in frame  $\{1\}$  are  $[3.0 \ 2.0 \ 1.0]^T$   
 The position vector  $P$  is rotated about the  $z$ -axis by  $45^\circ$   
 Find the coordinates of point  $Q$ , the new position of point  $P$ .


$$R_z(45^\circ) = \begin{bmatrix} \cos 45^\circ & -\sin 45^\circ & 0 \\ \sin 45^\circ & \cos 45^\circ & 0 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 0.707 & -0.707 & 0 \\ 0.707 & 0.707 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$${}^1Q = \begin{bmatrix} 0.707 & -0.707 & 0 \\ 0.707 & 0.707 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 3.0 \\ 2.0 \\ 1.0 \end{bmatrix} = \begin{bmatrix} 0.707 \\ 3.535 \\ 1 \end{bmatrix}$$

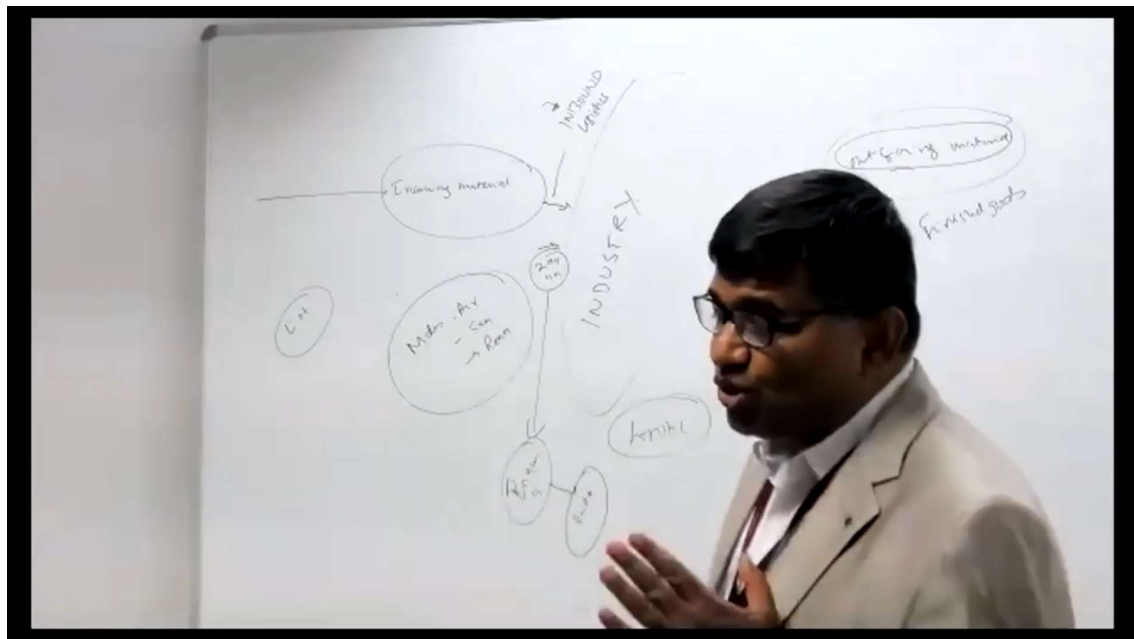
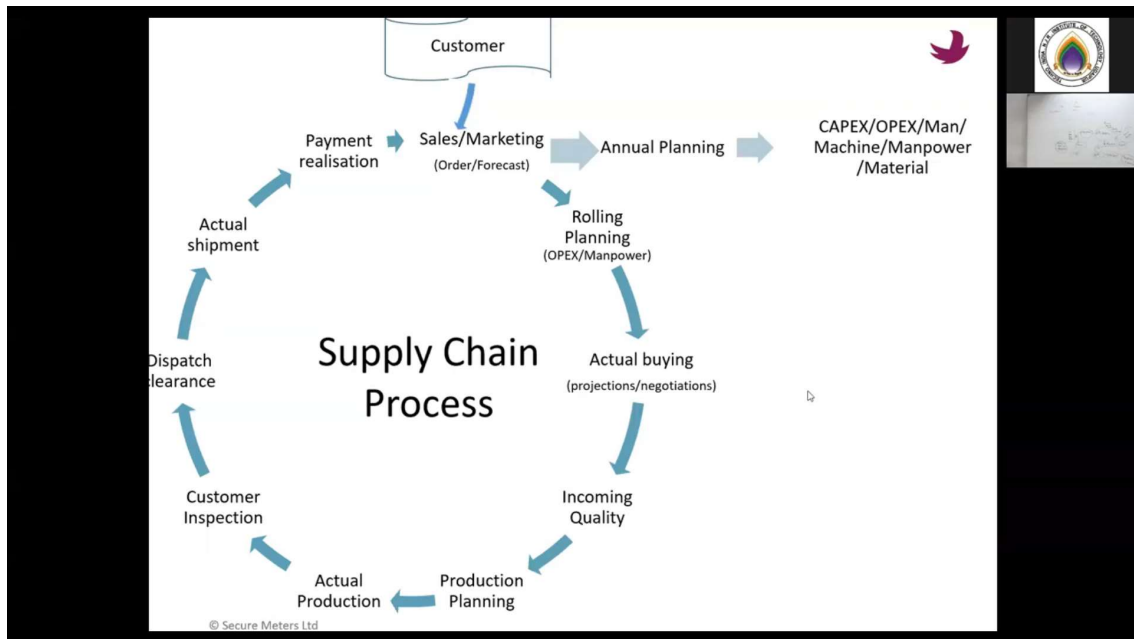
$$Q = [0.707 \ 3.535 \ 1.0]^T$$

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Pranjal paliwal



# Photos Day 5



**It is expected and will be ensured that participants shall be able to address these at the end of the workshop,**

- Current industry trends regarding use of Big Data, Artificial Intelligence & Machine Learning.
- Efficient use of IOT in industry 4.0.
- Need of AR/VR technologies in training, education and production for Industries.
- Using of Smart technologies in industries to popup the productions.
- Use of robotics and its design and dependencies at the product manufacturing stage in Industries.
- Working of the process if supply chain and logistics management.

### **Session Recording Links**

Day 1: <https://www.youtube.com/watch?v=Kp3uq674cPI>

Day 2: [https://www.youtube.com/watch?v=LBQm\\_Wz5WTo](https://www.youtube.com/watch?v=LBQm_Wz5WTo)

Day 3: <https://www.youtube.com/watch?v=mJLa-iscNWw>

Day 4: <https://www.youtube.com/watch?v=5O2QEkIoV4c>

Day 5: [https://www.youtube.com/watch?v=\\_nexsaQEGTY](https://www.youtube.com/watch?v=_nexsaQEGTY)