

**School of Computer Information and Mathematical Sciences**

**Department of Computer Science and Engineering**

**One week Short Term Training Programme (STTP) - Online**

**On**

**Internet of Things – Everything Future**

**Sponsored by**

**AICTE**



**Slot -1: 24<sup>th</sup> August 2020 to 29<sup>th</sup> August 2020**

**Session – Report**

**Programme Co-ordinator**

Dr.S.Revathi, Professor,  
CSE, BSACIST  
Dr.Sabiyath Fatima, CSE  
Dr.V.Muthu Priya, CA

**Conveners**

Dr. Venkatesan Selvam, Dean, SCIMS  
Dr. E. Syed Mohamed, Prof.&Head, CSE

## **PREAMBLE**

The department of Computer Science and Engineering, B.S.Abdur Rahman Crescent Institute of Science and Technology, Chennai organized a Short Term Training Programme on Internet of Things – Everything Future in association with AICTE from 24<sup>th</sup> August 2020 to 29<sup>th</sup> August 2020. This programme was successfully conducted and coordinated through the online portal with dedicated sessions. The STTP program received an overwhelming response with 160 participants from various institutions/colleges approved by AICTE and affiliated to various Universities across India. This STTP is conducted for one week which comprised of technical session and hands on training session on different spectrum of IoT. Everyday three sessions were conducted to ensure the participants received the effective knowledge through this programme. Those people who develop the ability to continuously acquire new and better forms of knowledge that they can apply to their work and to their lives will be the movers and shakers in our society for the indefinite future.

### **Day-1 (24.08.2020)**

#### **Inauguration Session and Session 1 :**

STTP was inaugurated at 9.30 am on 24th August 2020 by Dr. A.Peer Mohamed, Pro Vice Chancellor and Dr. A. Azad, Registrar, BSACIST, Chennai along with Mr. Amirtha Swamy, Keynote speaker, Founder & CMD – Theju Technologies, Bangalore and Founder & CTO – Watt-On technologies, Hyderabad. Dr.S.Revathi, Professor & Co-ordinator of the STTP has briefed the objective of the Short Term Training Program and the overall schedule of the STTP. Dr.V.Muthu Priya, Asst. Professor(Sl. Gr.), Computer Applications Department, BSACIST has introduced the chief guest. Mr. Amirtha Swamy gave an introduction on how IoT interrelate with various devices and how it could be applied in real time applications along with case studies like smart farming, smart charging, etc. Vote of Thanks was delivered by Dr.N.Sabiyath Fatima, Associate Professor, CSE Department, BSACIST, in which she paid her gratitude towards all the dignitaries.

In early 2010, we are in faster world, It happens in few minutes

**IoT**

**4G NETWORK**

Thejutech  
AUTOMATION & DRIVE TECHNOLOGY

Amirtha Swamy N is presenting

Mute All Unmute All

MANOJ KUMAR D S - Org...  
 S. Padmavathi (Mobile)  
 Dr. H. JOSEPH PRABHAK...  
 Mahalakshmi alias Issakki...  
 Prabhu Chakkaravarthy A...  
 133 Moorthi C  
 Dhanalakshmi J (Mobile)  
 Om Prakash Singh  
 157 Dr V. Muralibhaskaran...  
 RAJESH MEPCO (Web)  
 DR.S.REVATHI (Web)  
 155 Dr G Gopu (Mobile)  
 101 & 102 Bharath Corpo...  
 129.INIYAVAN R (Web)  
 Manoj Kumar D s (Mobile)  
 39.SanthoshiKumari Gan...  
 40.-Ms.Jaipriya (Mobile)  
 Dr. N. SABIYATH FATIMA  
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**CASE study - 2** • Smart Charging station

Thejutech  
AUTOMATION & DRIVE TECHNOLOGY

Amirtha Swamy N is presenting

Mute All Unmute All

66 Jayavel Kumaran.C.G (...  
 MAREESWARI V (Web)  
 Revathi Sathiya  
 Vallepu Anil (Mobile)  
 116 R GAYATHRI (Mobile)  
 85 Palaniappan S  
 Ramesh Sivaprakasam (W...  
 Dr.A.Azad, Registrar (Web)  
 Dr. B.KAVITHA (Mobile)  
 Neetha Das (Mobile)  
 Sharon Priya (Web)  
 65 Bindhya Shree.S (Mobi...  
 DR.SYED MOHAMED (Web)  
 153 S PRAVEEN KAMAT...  
 33. CHANDAN KUMAR B...  
 Radhika A (Mobile)  
 137 PRISILLA  
 110. K. VIJAYALAKSHMI (...  
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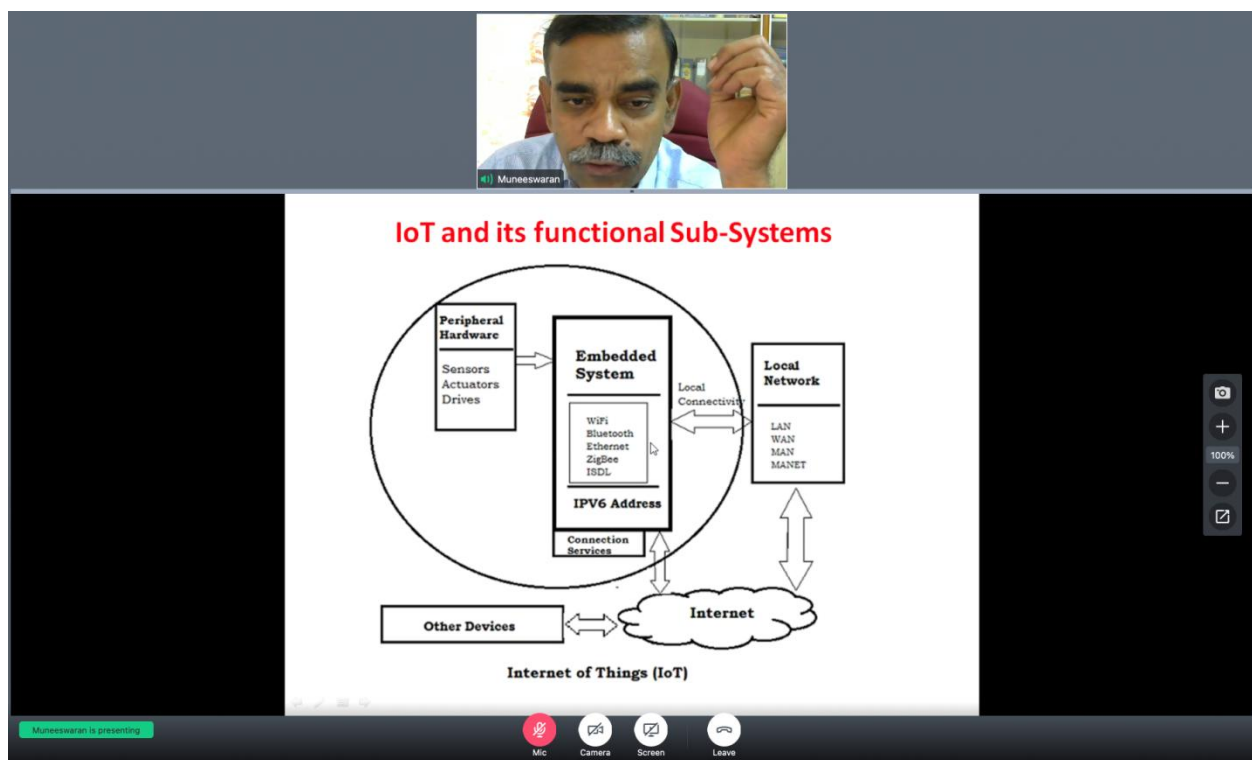
**STTP on Internet of Things – Everything Future:** STTP was inaugurated by Dr. A.Peer Mohamed, Pro Vice Chancellor and Dr. A. Azad, Registrar, BSACIST, Chennai along with Mr. Amirtha Swamy, Keynote speaker, Founder & CMD – Theju Technologies, Bangalore and Founder & CTO – Watt-On technologies, Hyderabad.

**On Session 2:**

Topic : Introduction to Internet of Things and Architecture

Resource Person : Dr.K.Muneeswaran,  
 Sr. Professor and HOD, Computer Science and Engineering, Mepco Schlenk Engineering College, Sivakasi.

Dr. Revathi, Professor, BSACIST, Chennai has commenced the session by welcoming the resource person. After that, the resource person of this session, Dr.K.Muneeswaran, equipped the participants with the objective, importance and various sources of literature collection relating to IoT. He delivered the introduction about IoT and clearly explained the concept that connects the devices to the internet and how they communicate with each other over the internet. He projected a clear understanding of the importance of IoT and its functional Sub-System. He discussed the basic concepts used in the technology relating with best suitable real life examples which are essential for the understanding of technology.



Dr.K.Muneeswaran, Sr. Professor and HOD, Computer Science and Engineering, Mepco Schlenk Engineering delivers the Internet of Things architecture, IoT advantages and disadvantages

### On Session 3:

Topic : Sensors, actuators & Interfacing

Resource Person : Dr.Malleswaran,  
Professor & Head incharge, ECE Department, Anna University, Kancheepuram.

The Speaker of the Session Dr.M.Malleswaran shared his knowledge on internal operations of sensors and need for it in IoT. Also, he presented more on different types of sensors and actuators for IoT application. He explained the architecture diagram of computer process control system. He further added to it, the importance of interfacing in IoT process where it involves the communication between the device and computer networks. He detailed the process of Analog to Digital convertor and Digital to Analog convertor in the interfacing process.



**STTP on Internet of Things – Everything Future:** Dr.M.Malleswaran, Professor & Head incharge, ECE Department, Anna University, Kancheepuram delivers the presentation on Sensors, actuators & Interfacing.

### Day-2 (25.08.2020)

#### On Session 1:

Topic : IoT Data Link Layer protocols & IoT Network Layer Protocols

Resource Person: Dr.Pushpalatha,  
Professor, SRM Institute of Science and Technology, Chennai.

The Speaker of the Session Dr.Pushpalatha presented topics related to “IoT Data Link Layer

protocols & IoT Network Layer Protocols”. She projected a clear understanding of the importance of LoRaWAN and future problems in the real world. She emphasized on Applications of Zigbee Technology through a hands-on project. She projected on comprehending the theoretical concepts and relating to the practical aspects of Industrial Automation, Home Automation, Smart Metering and Smart Grid monitoring. She insisted on Bluetooth Low Energy (BLE) which is a low power wireless technology used for connecting devices with each other. She also added on concepts relating to Network Layer- Encapsulation Protocols-LoWPAN.

The screenshot displays a Zoom meeting interface. The main content is a presentation slide with the following text:

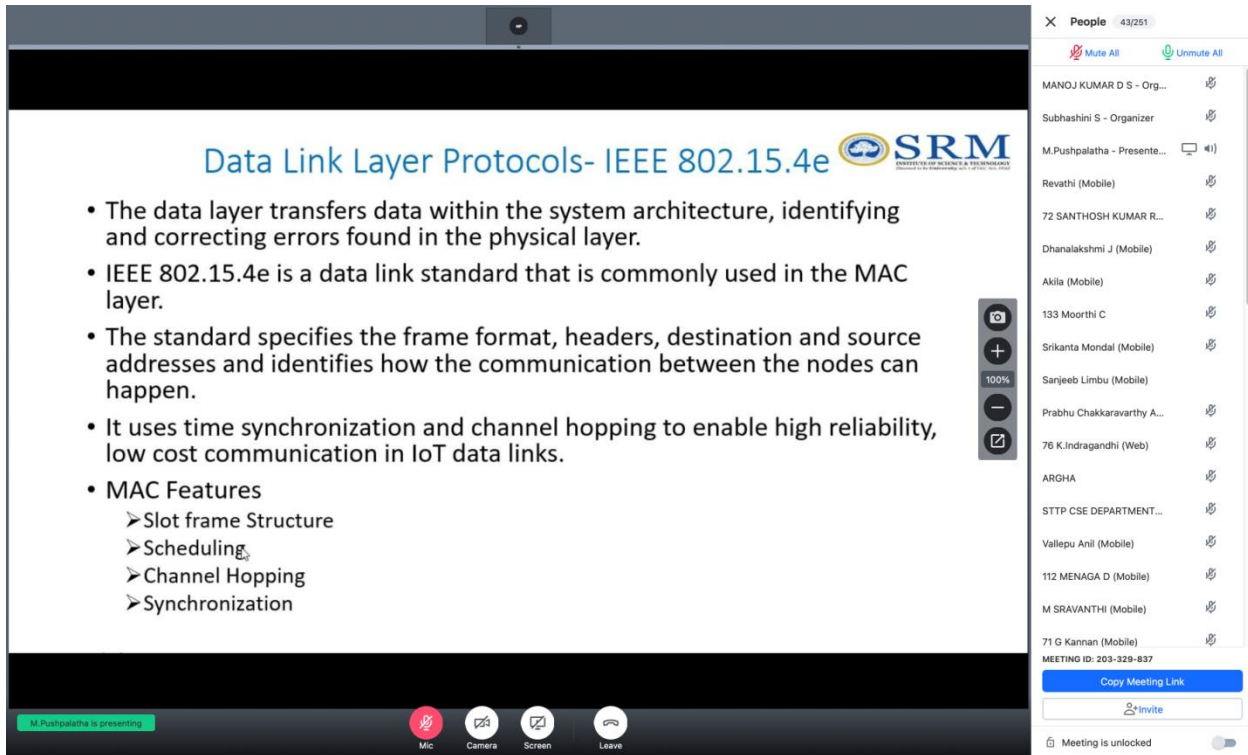
**Data Link Layer and Network Layer  
Protocols in Internet of Things (IOT)**


**Dr.M.Pushpalatha**  
**Professor, CSE**  
**SRMIST-KTR campus**  
**pushpalm@srmist.edu.in**

The slide also features the SRM Institute of Science & Technology logo in the top right corner. The Zoom interface includes a 'People' list on the right with 34/251 participants, meeting controls at the bottom (Mic, Camera, Screen, Leave), and a meeting ID of 203-329-837.

**STTP on Internet of Things – Everything Future:** Dr.Pushpalatha, Professor, SRM Institute of Science and Technology, delivers the data link layer and network layer protocols in Internet of Things(IoT)





**Data Link Layer Protocols- IEEE 802.15.4e** 

- The data layer transfers data within the system architecture, identifying and correcting errors found in the physical layer.
- IEEE 802.15.4e is a data link standard that is commonly used in the MAC layer.
- The standard specifies the frame format, headers, destination and source addresses and identifies how the communication between the nodes can happen.
- It uses time synchronization and channel hopping to enable high reliability, low cost communication in IoT data links.
- MAC Features
  - Slot frame Structure
  - Scheduling
  - Channel Hopping
  - Synchronization

**On Session 2 & 3:**

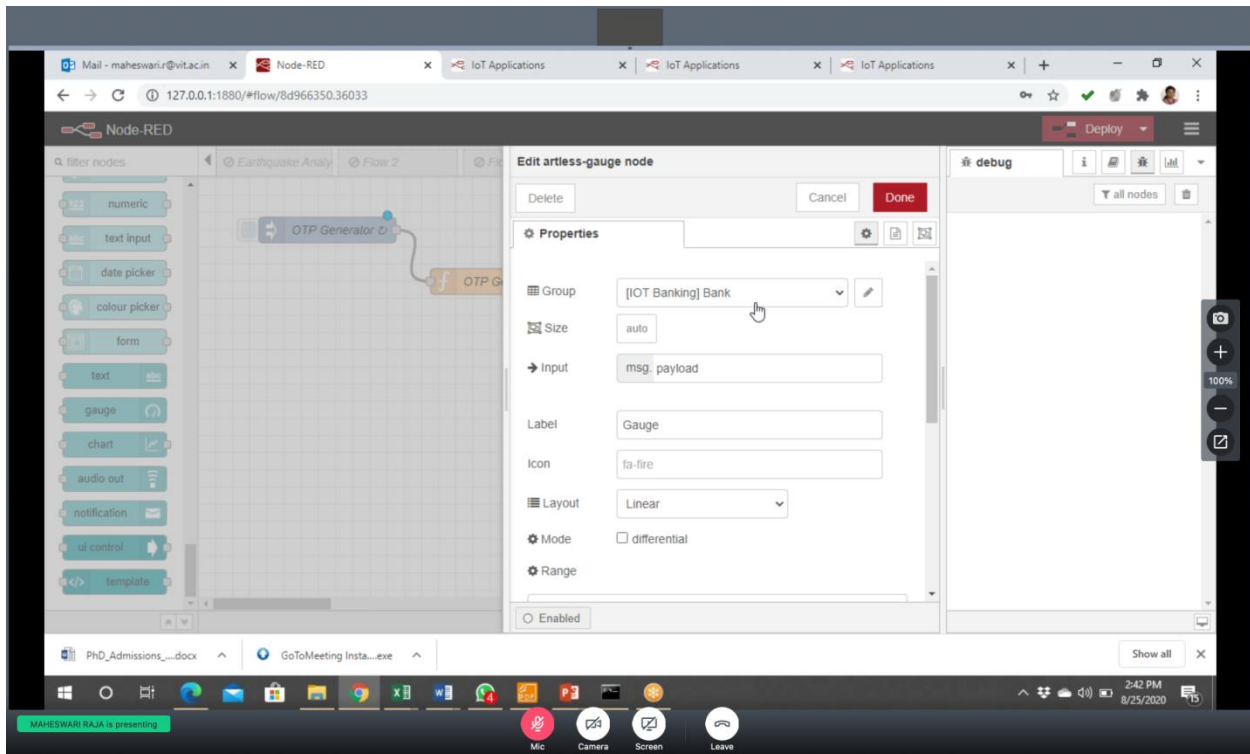
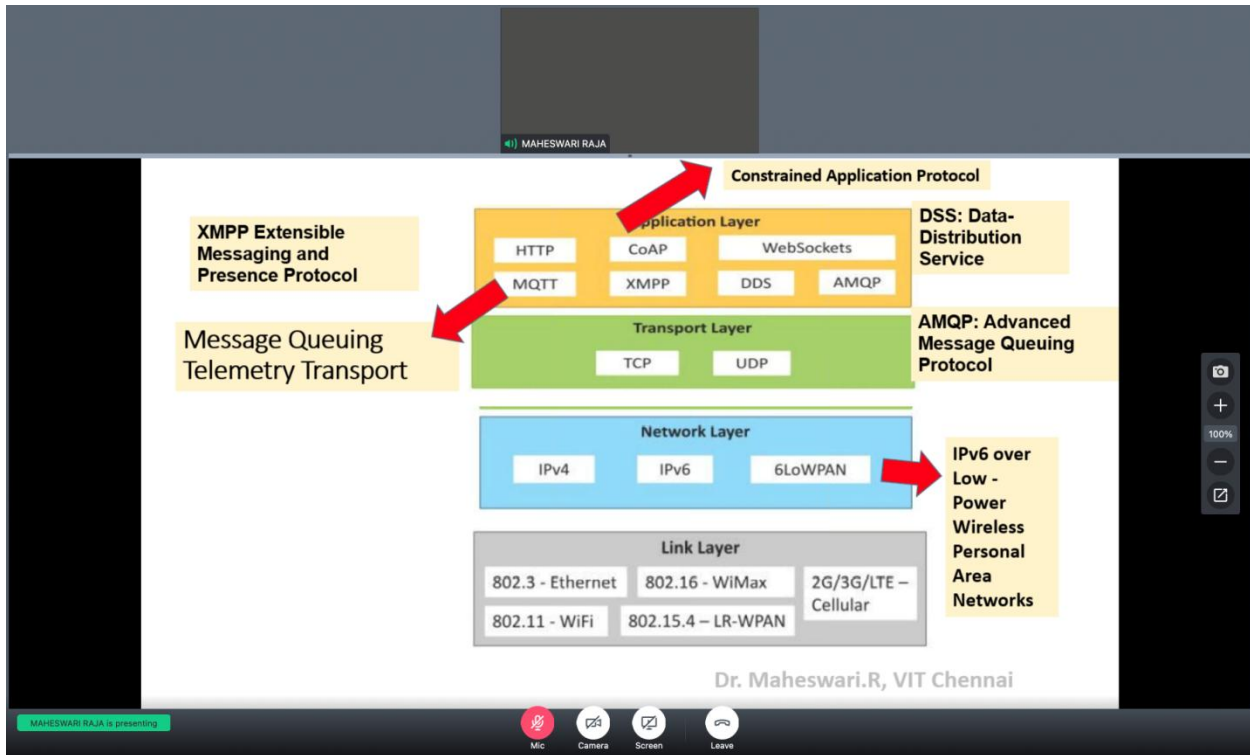
Topics :

- Virtual Hands on Training session of IoT Applications Automation
- IoT devices, dashboard automation using Node Red simulation

Resource Person: Dr.Maheswari R,  
 Associate Professor, School of Computer Science and Engineering, VIT, Chennai.

The Speaker of the Session Dr.Maheswari R presented topics related to Virtual Hands on Training Session on IoT Applications Automation. She gave a brief introduction about the IoT Protocol Contained application protocol (CoAP), Message Queuing Telemetry Transport MQTT, Extensible Messaging and Presence Protocol (XMPP), Advanced Message Queuing Protocol (AMQP). Step by step installation guidance on Node Red was given by Dr. Maheswari to all the participants, during which lot of queries asked by the participants were addressed by her then and there.

On session 3, she explained the key features and benefits of Node Red. Followed by which she explained how to access the editor in a web browser, how to drag one node on to the workspace from the palette, how to add debug node, function node deployment. She also showed how to connect the wire from the output port of one to input port of another.



**STTP on Internet of Things – Everything Future:** Dr.Maheswari R, Associate Professor, School of Computer Science and Engineering, VIT, Chennai delivers the presentation on Virtual Hands on Training session of IoT Applications Automation.



**Day-3 (26.08.2020)**

**On Session 1,2 &3:**

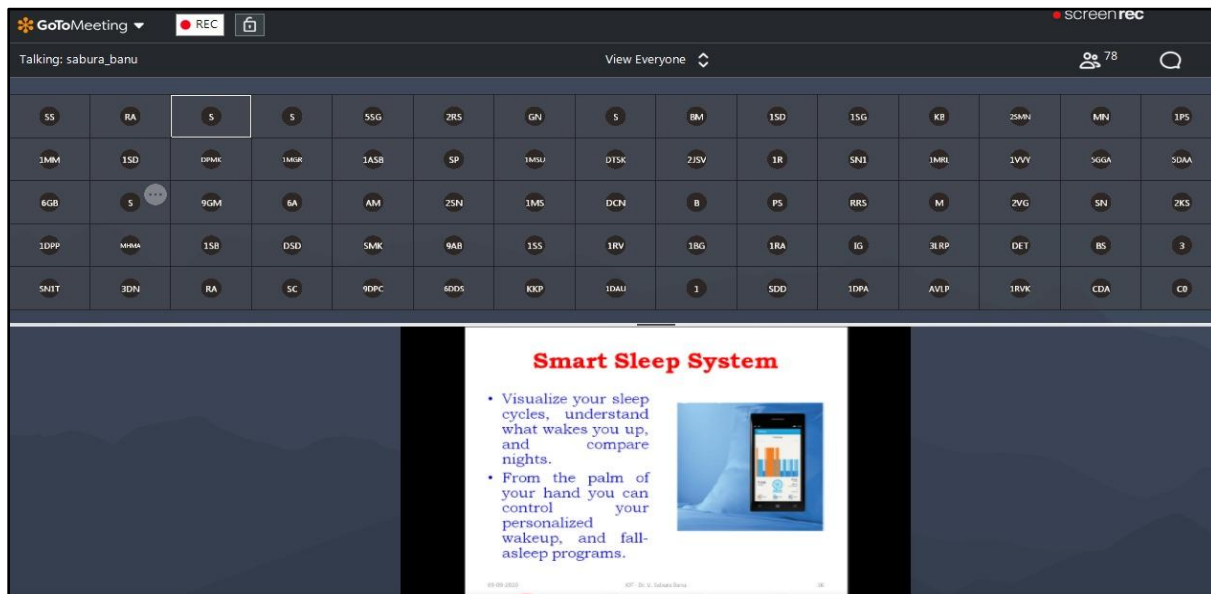
Topics Covered :

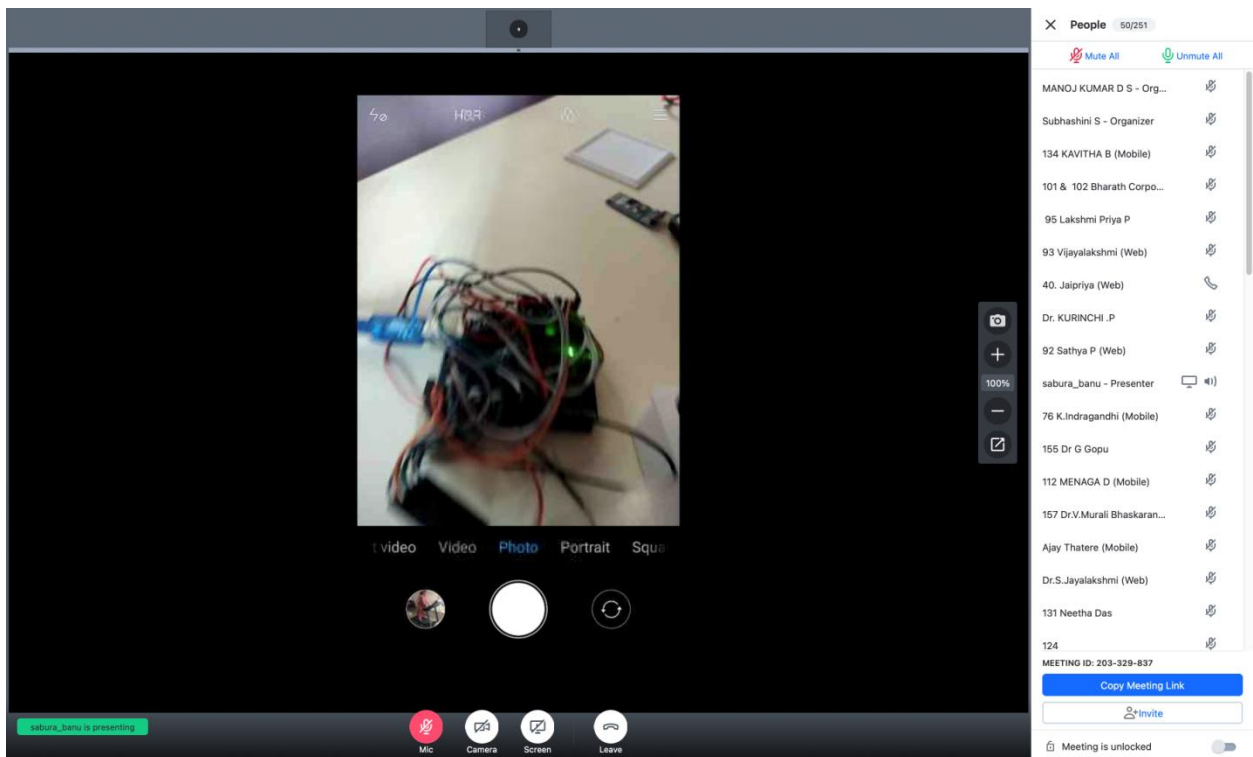
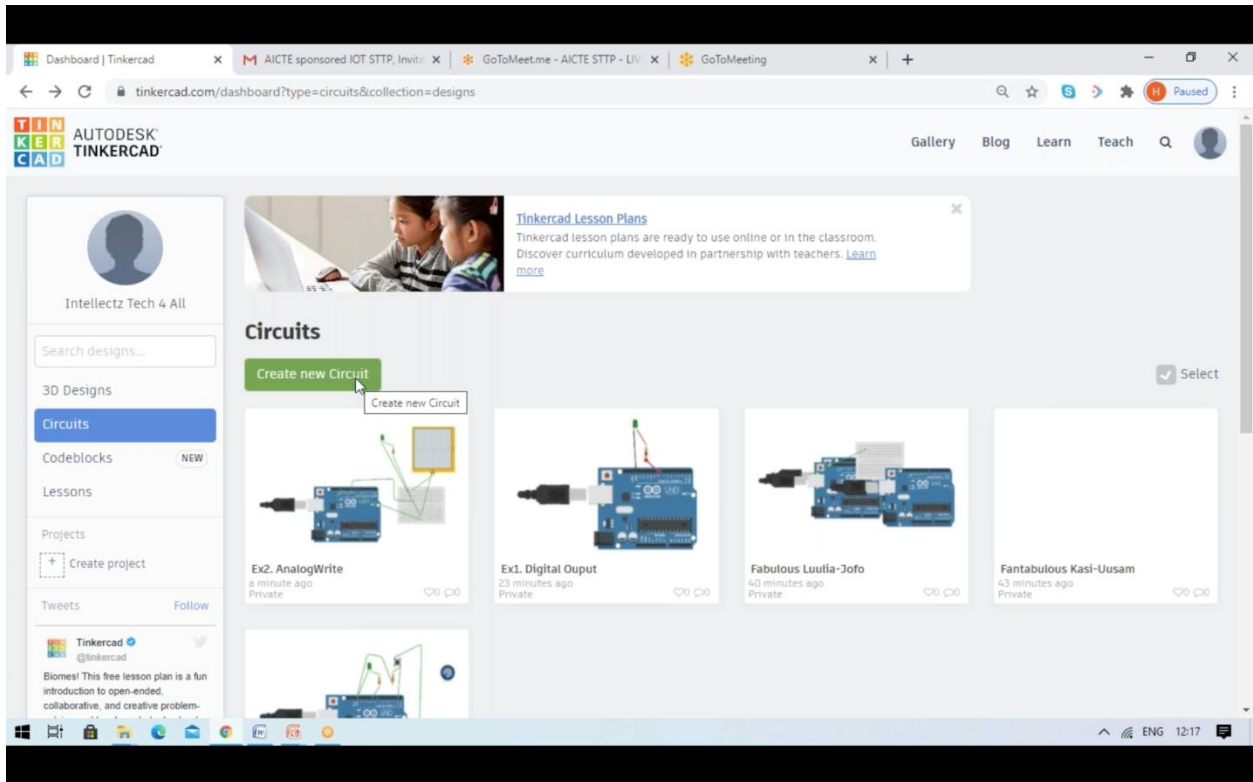
- Applications of IoT
- Hands on Training using Tinker card- Arduino Programming and Sensors interfacing
- Hands on Training using Tinker card

Resource Person : : Dr.Sabura Banu,  
 Founder & CEO, Intellectz Tech For All, Chennai.

The speaker of the session Dr. Sabura Banu started with brief introduction of IoT. How IoT works and the structure of the IoT. She forecasted the Global IoT Market. She clearly discussed the massive potential of IoT. And then listed out the application of IoT. The ultimate goal of IoT is to automate human Life has explained briefly. She gave many interesting applications of IoT like smart Garbage Cans and smart mirror. She focused with Technological challenges of IoT, Criticisms and controversies of IoT.

On Session 2 and 3, Dr. Sabura Banu started Hands on Training using Tinker card- Arduino Programming and Sensors interfacing. Few latest addition of ARDUINO projects were demonstrated and described about ARDUINO and discussed about its features in detail. She gave hands on session on Tinker card and how to use the features and tools in it. It was a very interactive session and all the faculties and the research scholars were involved with real interest in the hands on session.





**STTP on Internet of Things – Everything Future:** Dr. Sabura Banu, Founder & CEO, Intellectz Tech For All, Chennai delivers the hands on training on Tinker card- Arduino Programming and Sensors interfacing.

## Day-4 (27.08.2020)

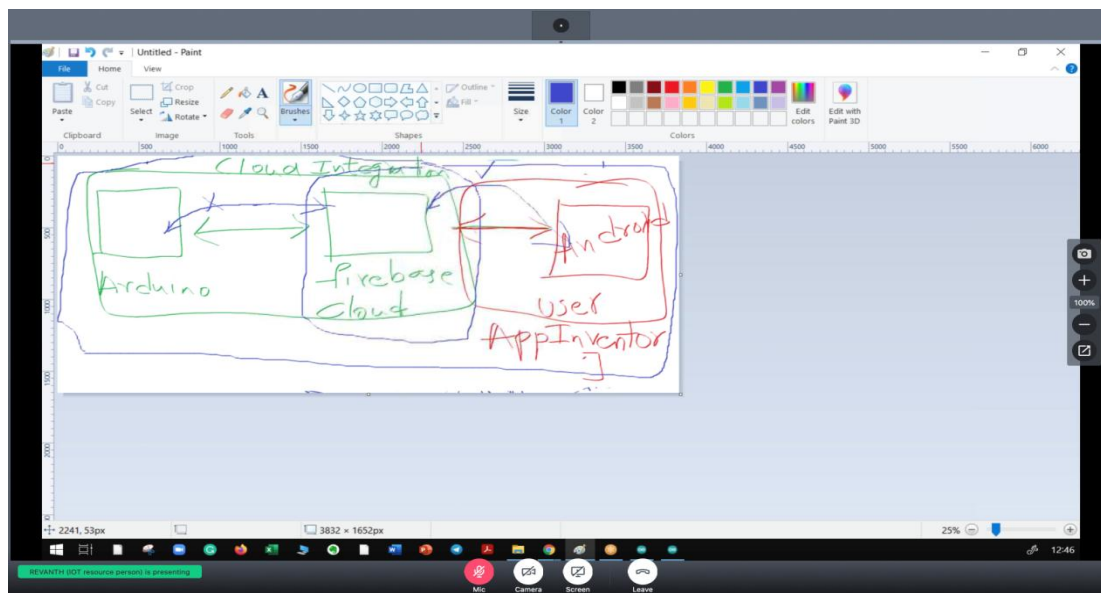
### On Session 1 & 2:

Topic : Internet of Things – Cloud Integration

Resource Person: Mr.Revanth Kumar,  
CEO, Unturtle Technologies,Hyderabad.

The Speaker of the Session Mr.Revanth Kumar presented topics related to “IoT Cloud Integration”. He projected a clear understanding of the Greater usage of the IoT in cloud that has acted as a catalyst for the development and deployment of scalable Internet of Things applications and business models. He clearly explained that the cloud computing and IoT have become two very closely affiliated future internet technologies with one providing the other a platform for success. He explained IoT in cloud offers public cloud services which can easily help the IoT area, by providing third party access to the infrastructure. He explained IoT devices need a lot of storage to share information for valuable purposes.

He described that IoT in cloud, like the StoneFly, Cloud Connect to Microsoft Azure can provide customers with greater space which can increase as per the users demand, helping to resolve the storage needs of customers. He described that IoT in cloud provides the connectivity which is necessary to share information between the devices and make meaning from it at a fast pace. He insisted that Internet Cloud Computing infrastructures help IoT to give meaning to the greater amount of data generated.



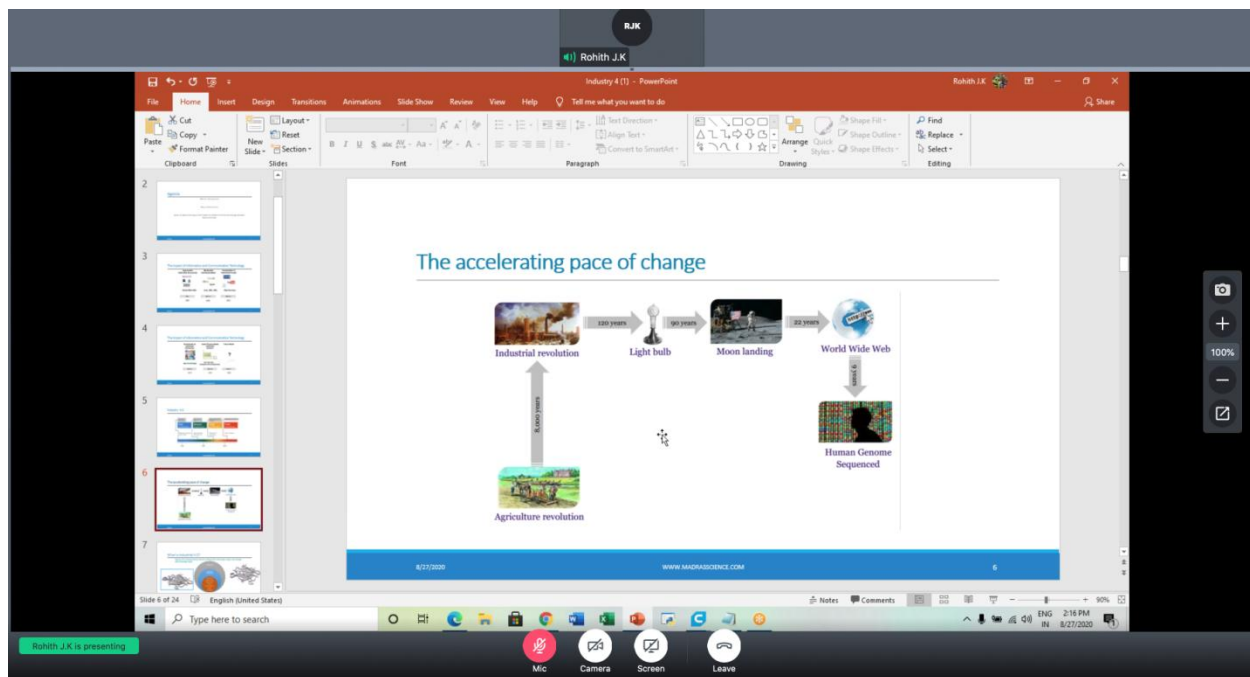
**STTP on Internet of Things – Everything Future:** Mr.Revanth Kumar delivers the cloud integration of Internet of Things

### On Session 3:

Topic : Industrial 4.0 with additive manufacturing

Resource Person : Mr.J.K.Rohith,  
Director, Madras Scientific Research Foundation, Chennai.

The Speaker of the Session Mr.J.K.Rohith presented topics related to “Industry 4.0 Additive Manufacturing”. He explained how the Fourth Industrial Revolution (or **Industry 4.0**) is changing the traditional manufacturing and industrial practices, using modern smart technology. He discussed the concept of additive manufacturing relating with best suitable real life examples with the 3D printing which are essential for the understanding of technology. He projected a live demo on manufacturing of face shield for COVID -19 protection through additive manufacturing technology.



**STTP on Internet of Things – Everything Future:** Mr.J.K.Rohith, Director, Madras Scientific Research Foundation, Chennai delivers Industry 4.0 Additive Manufacturing

### Day-5 (28.08.2020)

#### On Session 1 :

Topic : Road ahead on the connected vehicles with IoT

Resource Person: Mr.S. Vijay Anand,  
Director, aLTRAN, Chennai.

He started with today's transportation challenges and need of connected vehicles. He

explained how digital transformation takes place from M2M to Internet of Vehicle (IoV). Next he explained the different use cases/applications of car and bike. Apple car play, Google android auto, mirror link - car connectivity consortium, connected car concepts(in-car connectivity, in-car scenarios), digital License Plate for connected Car, Mobile phone Centric Telematics were discussed by him. He also explained what Amazon Alexa can do for connected car. He also explain how Kia Motors India become the leader in connected cars.

He also make clear the Adaptive Media Streaming” from cloud Network. He took example for the connected car meets home. He took an example of Ethernet AVB for connected car. In the title “Edge computing “ vehicle telematics, how the different sensors are used in connected car. He also gave details of need of edge computing in connected vehicles. He explained the data management and security risk foreseen in the connected car. Vehicle Data Analytics at Edge with Machine learning concept was dealt by him with challenges and key features of data analytics.

**Ethernet AVB for Connected Car**

- Infotainment system is becoming a **key differentiator** for car manufacturers which are commonly referred as **Ethernet AVB (audio video bridging)** for reliable delivery of media data.
  - In short, it is a quality of service (QoS) solution that provides seamless Audio/video delivery throughout the network.
  - AVB data is around 75Mbit/s
- Futuristic reqt for 'always on for connected car' to have higher bandwidth / throughput available for in-vehicle data communications.
  - OEM's are turning to Ethernet – a proven technology that not only supports the high data rates demanded by next-generation infotainment systems,
    - and further simplifies cabling; network interfaces and drive down costs.

• Automotive infotainment system will have

- HD displays
- Some in-car use cases may involve
  - Streaming different HD content to the front and back-seat displays, with common Internet streaming services enabling access to online content.
  - Enable on-vehicle camera views, and
- Automotive cameras capturing both external and in-car views for surveillance/safety.

• Currently, Ethernet offers up to 100Mbit/s in automotive applications

- but a 1Gbit/s standard is about to be finalized by the IEEE and speeds of up to 10Gbit/s are being discussed.

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**STTP on Internet of Things – Everything Future** : Mr.Vijay Anand, Vice President, aLTran, Chennai, delivers the presentation on Road ahead on the connected vehicles with IoE

### On Session 2 & 3:

Topics :

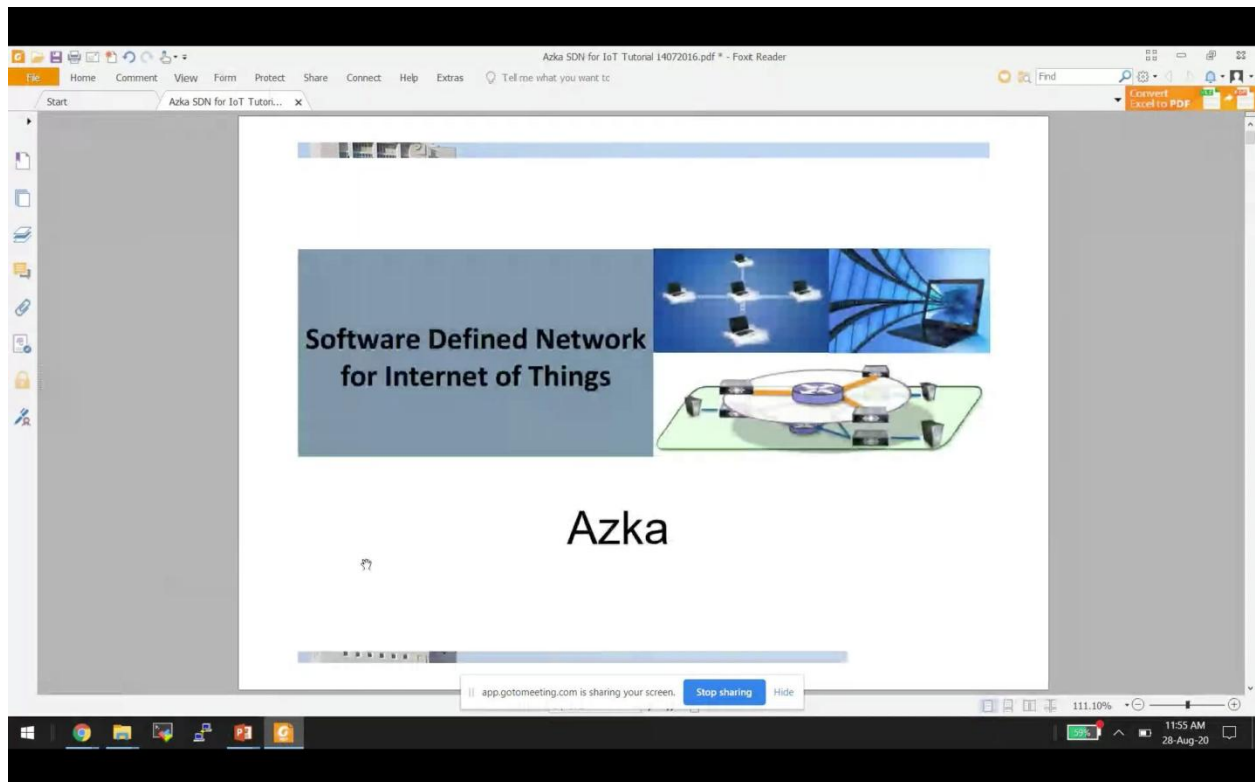
- Software Defined Networking (SDN)
- Software Defined Networking(SDN) based IoT

Resource Person : Dr.Azka Wani,



Wani Systems, Dubai.

The Speaker of the Session Dr.Azka Wani presented topics related to “Software Defined Networking(SDN) based IoT”. She inspired the audience by explaining an environment where each object is having an unique identifier and has ability to transfer data over a network without the need of human-to-human or human-to-computer interaction. She discussed about the borderless system architecture which raises extra threat to the system access control. She emphasized on the new systems administration, the Software Defined Networking (SDN), offers numerous chances to secure the system in a more productive and adaptable way. She added that a SDN based model is also proposed for securing the IoT against the identified attacks. She described that the Security mechanism is contained in the control plane or Controller and the security policies are enforced in to the IoT gateways as flow rules.







**STTP on Internet of Things – Everything Future:** Dr.Azka, MNAF Research scholar in security issues in SDB based IoT delivers the presentation on Software Defined Networking(SDN) based IoT.

### **Day-6 (29.08.2020)**

#### **On Session 1 & 2:**

Topics:

- MQTT protocol overview
- Blockchain Overview and its adoption in IoT

Resource Person: Mr.Manikandan,  
Principal Systems Engineer, Aricent Technology, Chennai.

The Speaker of the Session Mr.Manikandan presented topics related to "MQTT protocol overview and Blockchain Overview and its adoption in IoT". He explained how to work on assets –range from tangible to intangible, Chaincode – software for business logic, Ledger features, Privacy through channels, Security and membership services.

### Cryptography Concepts

#### Public Key Cryptography

**PRIVATE KEY**     **PUBLIC KEY**

##     #

a very large secret prime number     the product of these two very large prime numbers called to make the private key, which is very very hard to reverse back

→

**Bob**

Bob: Hello Alice! → Encrypt (Alice's public key) → 6E869570 08E03CE4

**Alice**

Alice: Hello Alice! ← Decrypt (Alice's private key)

#### Hashing

### Cryptographic hash function

Input	Digest
Fox	0F0D 2A54 888A 740A 751A 454C 542D 705D 0248 2057
The red fox jumps over the blue dog	5088 4838 3F7D C8E2 423C AC07 6C31 3E81 880E 3A8C
The red fox jumps over the blue dog	6F0F 7534 7831 4F32 01C9 7543 7843 0244 4828 4618
The red fox jumps over the blue dog	7C03 7F08 3AF2 C4FF 813F 0A51 C3A3 7D5A 4E4F 7BA3
The red fox jumps over the blue dog	8A24 0B82 0588 4C75 4894 2739 7046 8CF8 0288 484C

https://en.wikipedia.org/wiki/File:Cryptographic\_Hash\_Function.svg

Transformation of string of characters into a shorter fixed-length value.  
 Used as key index to retrieve items in databases.  
 Used in many cryptographic algorithms.  
 MD5 – used for shorter hash  
 SHA/SHA256/SHA3 – Provides complex hashing mechanism  
<https://mdShashing.net/hash>

altran

### Chain of Things: Integrating Blockchain + IoT to solve IoT Issues (Identity, Security, and Interoperability)

Chain of Things (CoT) is developing Maru, an integrated blockchain and IoT hardware solution to solve issues with identity, security and interoperability of IoT networks. <https://www.chainofthings.com/home/maru/>

**UNIVERSAL IDENTITY FROM BIRTH**

MESSAGE: "Please deliver this to 2008 engineer cochin@111"

Carrier checks and corrects 2008

Seller → Buyer

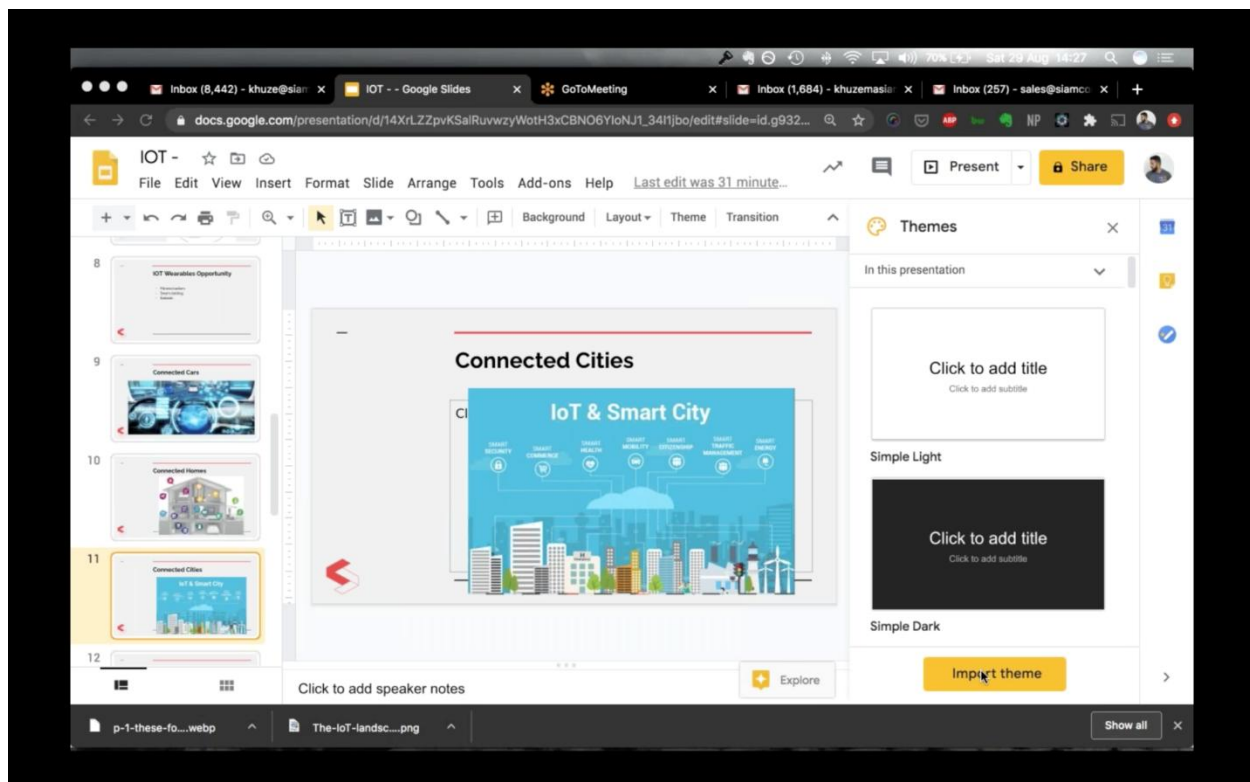
Bank (seller) → Bank (buyer)

30° UNACCEPTABLE  
 20° ACCEPTABLE

**STTP on Internet of Things – Everything Future:** Mr.Manikandan, Principal Systems Engineer, Aricent Technology, Chennai delivers the presentation on Blockchain Overview and its adoption in IoT.

### Valedictory Session & Session III :

Receiving an overwhelming response from participants, a week long short term training programme STTP on Internet of Things – Everything Future came to an end with the Valedictory Session. Dr. S. Revathi, Professor CSE Department, BSACIST explained the outcome of STTP Programme and introduced the chief guest of valedictory session Mr.Khuzema Siam Wala, Director, Siam Computing, Chennai. He delivered the speech related to IoT and its applications. He explained how The Internet of Things (IoT) works as a network of physical objects or “things” embedded with – Electronics – Software – Sensors – Network connectivity which enables these objects to collect and exchange data. He enumerated few applications of IoT like building and home automation, manufacturing, medical and healthcare systems.



**STTP on Internet of Things – Everything Future:** Mr.Khuzema Siam Wala, Director, Siam Computing, Chennai delivered the speech related to IoT and its applications.

This distinctive user friendly programme cumulates together the real-world industry experience, practical hands-on session and exposed faculties and researchers to the Internet of Things. The technological update on this topic helped the institution in updating the curriculum according to the disciplines of subjects. B.Tech CSE with specialization in IoT educates the students about

the effective use of Internet of Things (IoT) technology for solving real-life multi-disciplinary problems that cater to the need of society and are economically feasible.

The oral feedback received from the audience and online link was posted for collecting the participants' observation/feedback which is critical in improving the quality of the future session. Vote of Thanks was delivered by Dr.E.Syed Mohamed, Professor & HOD, CSE Department, BSACIST, in which he paid his gratitude towards all the dignitaries who has spared their time to share their expertise with the participants. Nevertheless, he has given thanks to AICTE for their continuous support and financial assistance to successfully organize this short term training programme.

-----**END OF REPORT**-----