




## **Report on the 5 Day Online Faculty Development Programme**

A 5 Day Online Faculty Development Program on “Machine Learning and IoT applications in VLSI Design” was organized by Department of Electronics and Communication Engineering, S.E.A College of Engineering and Technology, Bangalore from 10<sup>th</sup>-14<sup>th</sup> May, 2022. The timings for Morning Session was 10.30 am to 12.00 pm and afternoon Session was 2.00 to 3.30 pm. There were 150 enthusiastic participants from various Engineering colleges across India. Participants attended the FDP through online mode (Google Meet). The function was presided by Dr.B.Venkatanarayana, Principal, SEACET and introduction of resource persons were given by Dr. Pradeep Kumar N.S., HOD, ECE, SEACET.

### **About FDP:**

 <div style="display: inline-block; text-align: center;"> <b>S.E.A College of Engineering and Technology</b>  <b>K.R. Puram, Bangalore-49</b> </div> 	
<b>Department of Electronics and Communication Engineering Organizes</b>	
<b>5 Day Online Faculty Development Programme</b> <b>On</b> <b>“Machine Learning and IoT applications in VLSI Design”</b>	<b>10<sup>th</sup> -14<sup>th</sup></b> <b>May, 2022</b> <b>Morning Session:</b> <b>10.30 am-12.00 pm</b> <b>Afternoon Session:</b> <b>2.00 pm-3.30 pm</b>
<b>CHIEF PATRONS</b> Mrs. Manjula A. Krishnappa, Chairman, SEA Institutions  Mr. D.T. Srinivasa, Secretary, S.E.A.E.T  Mrs. Poornima K Srinivasa CEO, S.E.A.C.E.T  Mrs. Anupama K Jt. Secretary, S.E.A.C.E.T  <b>PATRON</b> Dr. B. Venkata Narayana Principal  <b>CONVENOR</b> Dr. Pradeep Kumar N S Professor and Head / ECE  <b>CO-ORDINATORS</b> Dr.P. Hosanna Princey Asso.Professor / ECE Dr. T. Cynthia Anbuselvi, Assistant Professor / ECE  <b>ORGANIZING COMMITTEE</b> Prof K. Revathi, Asst Prof / ECE Prof S. Dhivya Karunya, Asst Prof / ECE Prof K. Gayathri, Asst Prof / ECE Prof Asha VKR, Asst Prof / ECE Prof Deepa Gowda N Asst Prof / ECE Prof Suhas S K, Asst Prof / ECE	<b>ABOUT THE COLLEGE</b> SEACET is an institution that finely combines a great academic heritage with grand futuristic vision. Established in the year 2007, the institution stands as a lasting testimony to the success of private participation in higher education. Located in Bangalore City at Seta Nagar, (K.R. Puram) in a 16-acre sprawling campus, SEACET boasts of a modern infrastructure with state-of-art equipment and laboratory facilities, dedicated and well qualified teaching staff and an impressive academic and placement record with interactive relationship with industry. The objective of SEACET is to impart quality education to students and enable them to develop abilities of problem solving, creative thinking and adaptability in their chosen field.  <b>ABOUT THE DEPARTMENT</b> Electronics aims at making the life of human beings comfortable. Communication brings them together. The vast application of electronics and the rapid advancements in the field of communications makes the study of this branch a coveted option. The department's teaching and research areas include network, microprocessor, communications, signal and image processing, pattern recognition, electronics circuits, solid state electronics, microwave electronics, system and control, biomedical electronics, VLSI, CAD, Parallel and distributed processing. Development of non-technical skills such as communication and team work are also emphasized.
	

## Objective of the FDP:

The broad objective of this FDP is to introduce Machine learning concepts for implementation in VLSI Domain. ML techniques are widely used for many applications such as Biometrics, Medical Imaging, Signal Processing, NLP and so on. This FDP will give the basics of Machine Learning and deep learning concepts with applications to VLSI design. It will help to upgrade the expertise and capabilities of the faculty members and will generate a climate for research and enthusiasm for academic excellence.

- Introduction to IOT and Machine Learning
- VLSI Design Using IOT and Machine Learning
- Machine Learning Implementation using Tensor Flow

## Resource Persons of the FDP:

Resource Persons for the FDP were from various reputed institutions they briefed the concept in detail. The details about the resource persons are given below.

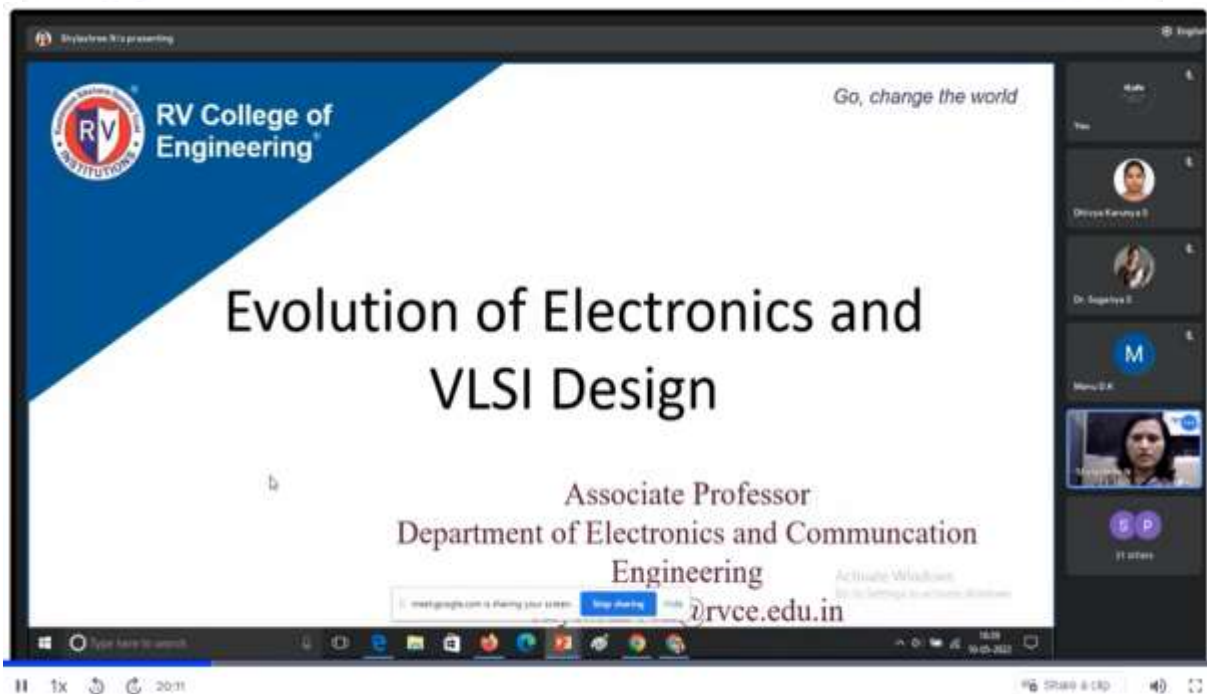
### Resource Persons

 <p>Dr. Shylashree N Associate Professor, R.V. College of Engineering, Bengaluru</p>	 <p>Ms. Chinmaye Ramamurthy Assistant Professor, R.V. College of Engineering, Bengaluru</p>	 <p>Dr. Girish H Associate Professor, Cambridge Institute of Technology, Bengaluru</p>	
 <p>Dr. Rajlakshmi Ghatkamble Associate Professor, East Point College of Engineering and Technology, Bengaluru</p>	 <p>Mrs. Navaneetha Velammal Associate Professor, Francis Xavier Engineering College, Tirunelveli</p>	 <p>Dr. A. Andrew Roobert Associate Professor, Francis Xavier Engineering College, Tirunelveli</p>	 <p>Dr. T. Ruso Advisory System Analyst IBM India Private Limited Bangalore</p>

## First day 10.5.22

The First day 10.5.22 Forenoon session lecture was delivered by Dr.Shylashree N, Associate Professor, R.V College of Engineering, Bengaluru in the topic 'Evolution of Electronics and VLSI Design'. The digital hardware design flow was explained in detail. She briefed about timing analysis about digital circuits and the need for low power VLSI chips.

Screen Shots for First day 10.5.22 Forenoon session





RV College of Engineering

Go, change the world

## Overview of Digital Hardware Design Flow

- Introduction to Digital
- Introduction to Analog
- Difference between Digital and Analog

Link-<https://www.youtube.com/watch?v=XsdGr49UVTg>

Activate Windows  
Go to Settings to activate Windows.

RV College of Engineering

Go, change the world

## VLSI Design Flow

```

graph TD
    subgraph First_End_Part [First End Part]
        A[Design related Specifications] --> B[RTL Coding in Verilog/VHDL]
        B --> C[Functional Simulation without delay (SDFs)]
        C --> D[Synthesis (convert RTL code and Logic Gates)]
        D --> E[Formal Verification (RTL v/s Logic Gates)]
        E --> F{Static Timing Analysis (Pre-layout)}
        F -- "Timing is not OK" --> D
        F -- "Timing is OK" --> G
    end
    subgraph Back_End_Part [Back End Part]
        G[Floorplanning] --> H[Placement]
        H --> I[Routing]
        I --> J{Static Timing Analysis (Post layout) with SPEFs}
        J -- "Timing is not OK" --> I
        J -- "Timing is OK" --> K[Functional Simulation with delay (SDFs)]
        K --> L[Formal Verification (Synthesis result v/s Layout result)]
        L --> M[DRC and LVC Checking]
    end
    F -- "Timing is OK" --> G
  
```

The First day 10.5.22 Afternoon session lecture was delivered by Ms.Chinmaye Ramamurthy, Assistant Professor, R.V College of Engineering, Bengaluru in the topic ‘Applications and Challenges in VLSI Design’. The applications of Integrated circuits in everyday activities was explained in detail. She elaborated about challenges faced in IC design which concentrated on power and speed of Integrated circuits.

Screen Shots for First day 10.5.22 Afternoon session

SEACET Bangalore is presenting

Press Esc to exit full screen

5 Day Online Faculty Development Programme  
On  
**"Machine Learning and IoT applications in VLSI Design"**



**Ms. Chinmaye Ramamurthy**  
Assistant Professor,  
R.V College of Engineering,  
Bengaluru

Day 1: 10.05.2022, Afternoon Session: 2.00 pm-3.30 pm  
**Topic : Applications and Challenges in VLSI Design**

SEACET Bangalore (joined)

11 1x 0:03 Share a clip

Chinmaye Ramamurthy is presenting

English

Applications and Challenges in  
VLSI Design

Chinmaye Ramamurthy  
Asst Prof, ECE, RVCE

SEACET Bangalore

Deepa Girelli

Chinmaye Ramamurthy

Bhagyashree K

25 others

11 1x 16:35 Share a clip

Chinmaya Ramamurthy is presenting

## Technology Scaling - Challenges

- Velocity Saturation
- Mobility degradation
- Channel length Modulation
- Body effect
- Sub Threshold conduction
- High Electric fields
- Gate oxide tunnelling
- Parasitics
- Randomness in dopant distribution

0:33:58

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Chinmaya Ramamurthy is presenting

## Parallelism

- In an M-parallel system, the charging capacitance does not change, but the total capacitance is increased by L times
- $P \propto C.F.V_{DD}^2$

0:58:54

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## Second day 11.5.22

The Second day 11.5.22 Forenoon and Afternoon sessions lecture was delivered by Dr.Girish H, Associate Professor, Cambridge Institute of Technology, Bengaluru in the topics 'Introduction and Technologies of IoT' and 'Applications and Challenges of IoT'. Participants gained a brief explanation about IoT functionalities and how it is associated with our everyday



life. How to configure Arduino for hardware and software environment which enables IoT and how IoT is used in sensors was explained.

Screen Shots for Second day 11.5.22 Forenoon session

SEACET Bangalore is presenting

5 Day Online Faculty Development Programme  
On  
**"Machine Learning and IoT applications in VLSI Design"**

  
**Dr. Girish H**  
Associate Professor,  
Cambridge Institute of Technology, Bengaluru

Day 2: 11.05.2022, Morning Session: 10.30 am-12.00 pm  
**Topic : Introduction and Technologies of IoT**

11:33

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Mr. Girish is presenting

**CONTENTS**

- What is IoT
- Key functions of IoT
- IoT – Data and Control Flow
- Terminologies
- IoT Market – Number of connected devices
- Growth Drivers
- Interesting IoT Products
- IoT Architecture
- Sensors
- Actuators
- Advantages of IoT
- Disadvantages of IoT

18:46

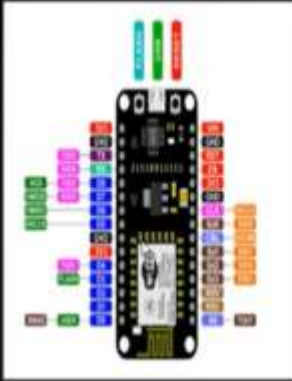
Share & Copy

Mr girish is presenting

English

## Node MCU Architecture

- The Node MCU (ESP8266 ) is an open source firmware and development kit that helps to prototype IoT product with Arduino IDE .
- It includes firmware which runs on the ESP8266 Wi-Fi SoC and hardware which is based on the ESP-12 module.
- The ESP8266 is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol.
- Node MCU Dev Kit has **Arduino like** Analog (i.e. A0) and Digital (D0-D8) pins on its board.
- It supports serial communication protocols i.e. UART, SPI, I2C etc.
- Using such serial protocols we can connect it with serial devices like I2C enabled LCD display, Magnetometer HMC5883, MPU-6050 Gyro meter + Accelerometer, RTC chips, GPS modules, touch screen displays, SD cards etc.



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Full

Mr girish

B Bhagyashree K

M Manu D K

S SRAJEE BANGSORE

Mr S

34 others

11

1x

55:57




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Mr girish is presenting

English

## Sensors

Senses a physical phenomenon and converts to an electrical signal

 Ultrasonic Sensors	 Temperature Sensor	 Soil moisture sensor	 Gyroscope
 Light sensor	 Pressure sensor	 Accelerometer	 Hall effect sensor
 Humidity Sensor	 Gas sensor	 PIR Sensor	 IR Receiver

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Full

Mr girish

B Bhagyashree K

M Manu D K

M Mangala Puri

Mr S

30 others

11

1x

1:11:23


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Screen Shots for Second day 11.5.22 Afternoon session

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5 Day Online Faculty Development Programme  
On  
**"Machine Learning and IoT applications in VLSI Design"**



**Dr. Girish H**  
Associate Professor,  
Cambridge Institute of Technology, Bengaluru

Day 2: 11.05.2022, Afternoon Session: 2.00 pm-3.30 pm  
**Topic : Applications and Challenges of IoT**

10:46

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SEACET Bangalore is presenting

10:46

Share a clip

Dr. girish is presenting

# Applications and Challenges of IoT

Dr. Girish H  
Associate Professor  
Department of ECE  
Cambridge Institute of Technology  
Email: [girish.ece@cambridge.edu.in](mailto:girish.ece@cambridge.edu.in)  
Phone: 9741122667

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1

20:52

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Dr. girish is presenting

20:52

Share a clip

## DHT11 Interfacing Code

- ☐ Read temperature and send it to Serial monitor
- ☐ Read temperature and send it to Serial monitor
- ☐ Do this every 3 seconds

```

void loop()
{
  Serial.print("Temperature: ");
  Serial.print(dht.readTemperature());
  Serial.print(" C");

  Serial.print("Humidity: ");
  Serial.print(dht.readHumidity());
  Serial.println(" %");

  delay(3000);
}

```

38

ThingSpeak

MathWorks

Serial

DATA ACQUISITION AND ANALYTICS

ThingSpeak

MATLAB

SMART CONNECTED DEVICES

ACQUISITION DEVELOPMENT SENSOR ANALYTICS

### Third day 12.5.22

The Third day 12.5.22 Forenoon and Afternoon sessions lecture was delivered by Dr.Rajlakshmi Ghatkamble, Associate Professor, East Point College of Engineering and Technology, Bengaluru in the topics 'Broad Types of Problems in Machine Learning' and 'Applications , Challenges and Issues in ML'. Participants gained a brief explanation about ML

functionalities and how it is associated with our everyday life. She explained about her research work which was very informative to the participants.

Screen Shots for Third day 12.5.22 Forenoon session

SEACET Bangalore is presenting

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**5 Day Online Faculty Development Programme**  
On  
**"Machine Learning and IoT applications in VLSI Design"**

  
**Dr. Rajlakshmi Ghatkamble**  
Associate Professor,  
East Point College of Engineering and Technology, Bengaluru

**Day 3: 12.05.2022, Morning Session: 10.30 am-12.00 pm**  
**Topic : Broad Types of Problems in Machine Learning**

Dr. S. Karthick joined

1x 8:38 Share a clip

Dr. Rajlakshmi Ghatkamble is presenting

**Broad Types of Problems in Machine Learning**

  
**EAST POINT**  
COLLEGE OF ENGINEERING & TECHNOLOGY

Present By:  
**Dr. Rajlakshmi Ghatkamble**  
Associate Professor at Dept. of ISE,  
East Point College of Engineering and Technology

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Dr. Rajlakshmi Ghatkamble

1x 17:58 Share a clip



Dr. Rajalakshmi Chakraborty is presenting

## The right Machine Learning solution?




**Classification**

Used when the output is categorical like 'YES' or 'NO'


**Algorithms used**

- Decision Tree
- Naive Bayes
- Random Forest
- Logistic regression
- KNN



**Clustering**

Used when the data needs to be organized to find patterns in the case of 'product recommendation'



**Regression**

Used when a value needs to be predicted like the 'stock prices'

**Algorithms used**

- Linear Regression
- Logistic Regression

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0:52:50

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Dr. Rajalakshmi Chakraborty is presenting

## Major Problem Types

- 1) **Regression:** When the need is to predict numerical values, such kinds of problems are called regression problems. For example, house price prediction
- 2) **Classification:** When there is a need to classify the data in different classes, it is called a classification problem. If there are two classes, it is called a binary classification problem. When it is multiple classes, it is multi-nomial classification. For example, classify whether a person is suffering from a disease or otherwise. Classify whether a stock is "buy", "sell", or "hold".
- 3) **Clustering:** When there is a need to categorize the data points in similar groupings or clusters, this is called a clustering problem.
- 4) **Time-series forecasting:** Time series data means that data is in a series of particular time periods or intervals. For example, a time-series forecasting problem is about forecasting the sales demand for a product, based on a set of input data such as previous sales figures, consumer sentiment, and weather.
- 5) **Anomaly detection:** if a given record can be classified as an outlier or unexpected event/item, this can be called an anomaly detection problem. For example, credit card fraud transactions detection is an anomaly detection problem.

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1:09:47 [Share a clip](#)

Screen Shots for Third day 12.5.22 Afternoon session

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5 Day Online Faculty Development Programme  
On  
**"Machine Learning and IoT applications in VLSI Design"**



**Dr. Rajlakshmi Ghatkamble**  
Associate Professor,  
East Point College of Engineering and Technology, Bengaluru

**Day 3: 12.05.2022, Afternoon Session: 2.00 pm-3.30 pm**  
**Topic : Applications , Challenges and Issues in ML**

10:24:19

11 1x 24:18

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17

Participants: 17 others

Dr. Rajlakshmi Ghatkamble is presenting

# Applications, Challenges and Issues in Machine Learning



Present By:  
**Dr. Rajlakshmi Ghatkamble**  
Associate Professor at Dept. of ISE,  
East Point College of Engineering and Technology

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11 1x 38:16

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17

Participants: 17 others

Dr. Rajalakshmi Gopalakrishnan is presenting

## Challenges in Machine Learning (Continued)

**Poor Quality Data**

60%

**Irrelevant Features**

**Overfitting**

**Underfitting**

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11 1x 1:10:24   Share a clip

Dr. Rajalakshmi Gopalakrishnan is presenting

## Challenges in Machine Learning (Continued)

- Software Integration**
- Offline Learning / Deployment**
- Cost Involved**
  - => MLops
  - => Devops

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11 1x 1:10:44   Share a clip

### Fourth day 13.5.22

The Fourth day 13.5.22 Forenoon session lecture was delivered by Mrs Navaneetha Velammal, Associate Professor, Francis Xavier Engineering College , Tirunelveli in the topic 'Machine Learning Approaches for VLSI Hardware Implementation'. The brief explanation was delivered how ML and AI is associated with VLSI design. Various ML approaches with practical examples were briefed. In addition orange tool to implement ML algorithm in VLSI was taught.



## Screen Shots for Fourth day 13.5.22 Forenoon session

5 Day Online Faculty Development Programme  
On  
**"Machine Learning and IoT applications in VLSI Design"**



**Mrs Navaneetha Velammal**  
Associate Professor,  
Francis Xavier Engineering College, Tirunelveli.

**Day 4: 13.05.2022, Morning Session: 10.30 am-12.00 pm**  
**Topic : Machine Learning Approaches for VLSI Hardware Implementation**

Zoom interface details: Top bar shows "SIACET Bangalore is presenting". Right sidebar shows a list of participants including "SIACET Bangalore", "Mangala Padi", "Surya S", "Adithi S", and "Divya Ramana S". Bottom status bar shows "15:36" and "Share a clip".

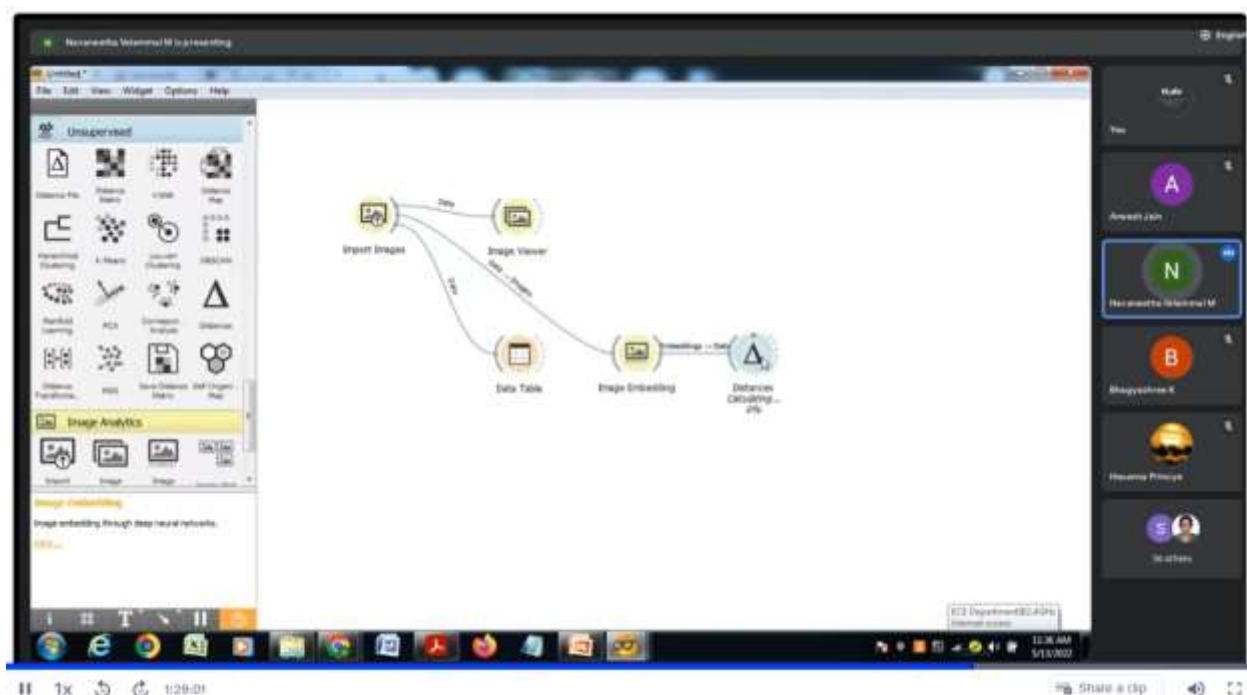
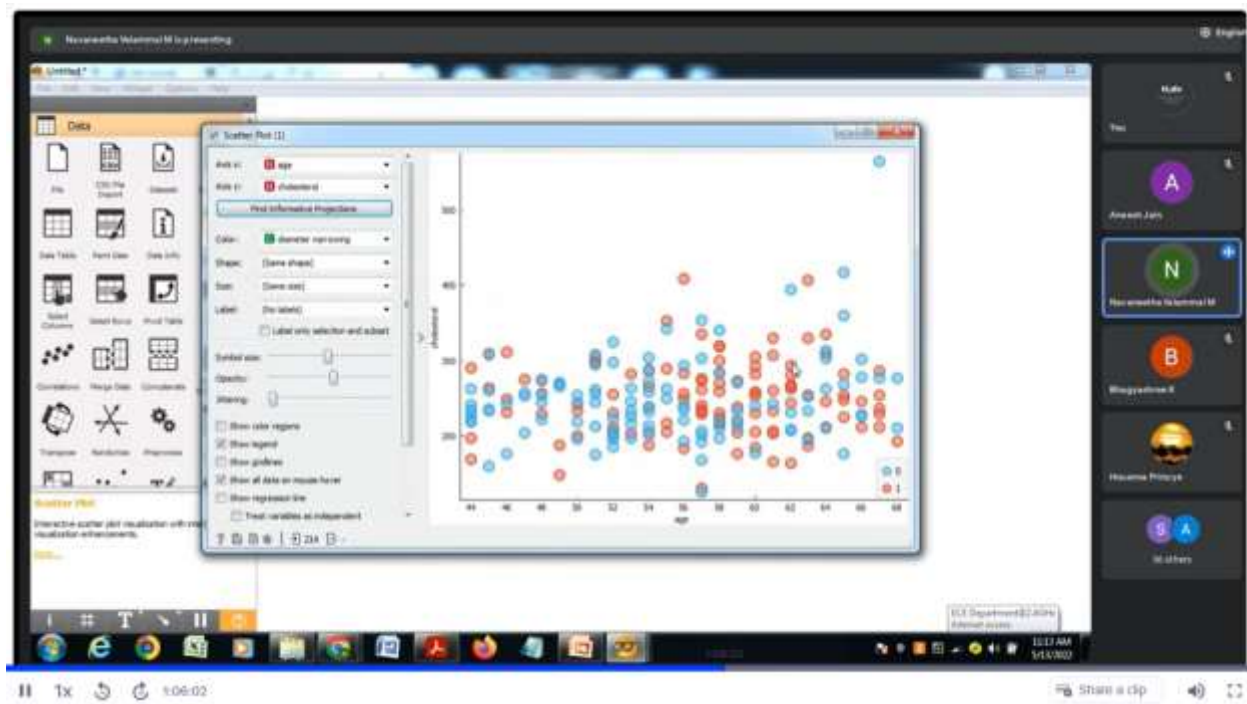
**Machine Learning Approaches for VLSI Hardware Implementation**

**NAVANEETHA VELAMMAL.M. M.E.,(Ph.D)**  
Associate Professor,  
Francis Xavier Engineering College, Tirunelveli  
Tamilnadu.

**Date of Discussion:**  
**13<sup>th</sup> May 2022**

**Session - 10.30 a.m**

Zoom interface details: Top bar shows "Navaneetha Velammal M is presenting". Right sidebar shows a list of participants including "SIACET Bangalore", "Naveenitha Velammal M", "Suhani S", and "22 others". Bottom status bar shows "20:29" and "Share a clip". A notification box from "mail.google.com" is visible in the bottom right corner, stating "You're presenting to everyone. Click here to return to the video call when you're ready to stop presenting".



The Fourth day 13.5.22 Afternoon session lecture was delivered Dr.A.Andrew Roobert, Associate Professor, Francis Xavier Engineering College , Tirunelveli in the topic ‘Applications of AI and ML in VLSI for IoT Circuits’. The brief explanation was delivered how ML and AI is associated with VLSI design for IoT circuits. How logic circuits is linked with neural networks and how modern VLSI layout is designed and implemented with AI and ML is briefed with practical examples.

### Screen Shots for Fourth day 13.5.22 Afternoon session

SEACET Bangalore is presenting

## 5 Day Online Faculty Development Programme On "Machine Learning and IoT applications in VLSI Design"



**Dr.A.Andrew Roobert**  
Associate Professor,  
Francis Xavier Engineering College, Tirunelveli

**Day 4: 13.05.2022, Afternoon Session: 1.45 pm-3.15 pm**  
**Topic : Applications of AI and ML in VLSI for IoT Circuits**

Participants: Hala, Dr. T. Cynthia Anandavel, SEACET Bangalore, Divya Kalanya S.

2:04

A screenshot of a Google Meet window. The main area displays a presentation slide with a network diagram background. The slide title is "APPLICATIONS OF AI AND ML IN VLSI FOR IOT CIRCUITS". Below the title, it says "Dr.A.Andrew Robert, Incharge of Advanced Electronic System Design Lab, Francis Xavier Engineering College, Tirunelveli - 627003". On the right side of the Meet window, there is a vertical list of participants: "You" (with a profile icon), "Bhagyashree K." (with a red circle icon containing 'B'), "SEACET Bangalore" (with a purple circle icon containing 'S'), "Anesh Jain" (with a black square icon), and "Dr.A.Andrew Robert" (with a circular video feed of him). At the bottom of the Meet window, there are controls for play/pause, volume, and a timer showing "19:37". A "Share a clip" button is also visible at the bottom right.



**Placement Example**

The slide displays two diagrams: a 'Floorplan' on the left and a 'Placement' on the right. The 'Placement' diagram shows a blue circuit layout on a grid. A small inset image shows a dark, textured surface. Below the diagrams, the text 'Curtis NTU team' is visible.

**Optimization targets**

- Satisfy timing constraints?
- Satisfy power constraints?
- 100% routable?
- Wirelength minimized?
- ...

The slide is part of a video presentation. The video player interface at the bottom shows a progress bar at 45:01 and a 'Share a clip' button. The right sidebar shows a list of participants, including Dr. A. Andrew Roobert.

**Opportunities for machine learning in IC physical implementation**

- ML applications aimed at removing unnecessary design and modeling margins through new correlation mechanisms.
- ML applications that seek faster design convergence through predictors of downstream flow outcomes.
- ML to help the IC design and EDA fields escape the current "local minimum" of coevolution in design methodology and design tools.

**Four Stages for ML insertion in Physical Design**

- First stage of ML insertion into IC will entail creating robots: mechanizing and automating (via expert systems, perhaps) 24/7 replacements for human engineers that reliably execute a given flow to completion. "Multi-armed bandit" (MAB) sampling can achieve resource-adaptive commercial synthesis, place and route with no human involvement – in a "robotic" manner that is distinct from expert systems approaches

The slide is part of a video presentation. The video player interface at the bottom shows a progress bar at 1:03:42 and a 'Share a clip' button. The right sidebar shows a list of participants, including Dr. A. Andrew Roobert.

## Fifth day 14.5.22

The Fifth day 14.5.22 Forenoon session lecture was delivered Dr.A.Andrew Roobert, Associate Professor, Francis Xavier Engineering College , Tirunelveli in the topic 'Optimization of complex circuits using Cadence Virtuoso ADE XL tool and Machine Learning Methods'. Participants learned to implement ML techniques in IC designing using cadence software.

Screen Shots for Fifth day 14.5.22 Forenoon session

SEACET Bangalore is presenting

5 Day Online Faculty Development Programme  
On  
**"Machine Learning and IoT applications in VLSI Design"**



**Dr.A.Andrew Roobert**  
Associate Professor,  
Francis Xavier Engineering College, Tirunelveli

**Day 5: 14.05.2022, Morning Session: 10.30 am-12.00 pm**  
**Topic : Optimization of complex circuits using Cadence Virtuoso ADE XL tool and Machine Learning Methods**

SEACET Bangalore is presenting

1x 5:25 Share a clip

Dr.A.Andrew Roobert is presenting

Dr.A.Andrew Roobert is presenting

Optimization of complex circuits using Cadence Virtuoso ADE XL tool and machine learning methods

DR.A.ANDREW ROOBERT,  
FRANCIS XAVIER ENGINEERING COLLEGE

Dr.A.Andrew Roobert

1x 28:01 Share a clip

Dr. A. Andrew Rubbert is presenting

# Hybrid technique

```

graph LR
    A[Previously-optimized Circuits  
(Data-set)] --> D[Performance Estimator  
(multivariate poly. Regression optimization)]
    B[New Context  
(supply voltage, load)] --> D
    D -- "Performance figures & trade-off" --> C[NN]
    C --> E[Design Parameters (Wk, Lk)]
  
```

Figure 6. Conceptual block diagram of the hybrid technique used in [33].

1x 0:01:37

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Dr. A. Andrew Rubbert is presenting

# Elephant Herding Optimization (EHO)

Table 1. The optimal performance parameters of the LNA with different optimization algorithms

Performance Parameter	EHO	GA	PSO	FA
$S_{11}$ (dB)	-28.1	-26.9	-27.2	-27.8
NP (dB)	0.9	1.24	1.18	1.07
$P_{out}$ (dBm)	8.9	9.25	9.18	9.12
IP3 (dBm)	-9.2	-11.4	-10.7	-10.1
$S_{12}$ (dB)	-19	-18.1	-18.3	-18.7
$S_{22}$ (dB)	-10	-13.8	-14.7	-15.2

Fig. 7. Improvement in performance parameters

1x 1:20:37

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The Fifth day 14.5.22 Afternoon session lecture was delivered by Dr.T Ruso, Advisory System Analyst, IBM India Private Limited, Bangalore in the topic ‘Machine Learning using Tensorflow’. Participants learned to implement ML techniques using Tensorflow software.



Screen Shots for Fifth day 14.5.22 Afternoon session

SEACET Bangalore is presenting

5 Day Online Faculty Development Programme  
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**"Machine Learning and IoT applications in VLSI Design"**



**Dr. T Ruso**  
Advisory System Analyst  
IBM India Private Limited  
Bangalore

Day 5: 14.05.2022, Afternoon Session: 2.00 pm-3.30 pm  
**Topic : Machine Learning using Tensorflow**

SEACET Bangalore is presenting

SEACET Bangalore  
Sujatha Engineering College  
Jeevitha S

11 1x 8:25 Share a clip

Dr. A. Anandha Subramanian is presenting

**Machine Learning using  
Tensorflow**

**Dr. T. Ruso**  
Advisory System Analyst  
IBM  
9841492810

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Dr. A. Anandha Subramanian  
Anandha Subramanian  
SEACET Bangalore  
Dr. A. Anandha Subramanian  
Bhagya Lakshmi  
S. J. Arora  
Dr. T. Ruso is presenting

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Dr. A. Andrew Robert is presenting

## Machine Learning...

- Machine learning (ML) is a field of inquiry devoted to understanding and building methods that 'learn', that is, methods that leverage data to improve performance on some set of tasks.
- It is seen as a part of artificial intelligence. Machine learning algorithms build a model based on sample data, known as training data, in order to make predictions or decisions without being explicitly programmed to do so.

11 1x 37:22 Share a clip

Dr. A. Andrew Robert is presenting

Top 15 open-source artificial intelligence tools to learn in 2020

11 1x 51:06 Share a clip

The FDP was concluded at 3.30pm. The workshop ended with the vote of thanks by Dr. Pradeep Kumar N.S., HOD, ECE, SEACET. Online submission of feedback form was collected at the end of all sessions. The FDP was highly informative to staffs. Thus FDP provided valuable awareness and insights on the various aspects of Machine Learning and IoT applications in VLSI Design.