



Ref. RVITM/ECE/ /2024-25

Date: 18.02.2024

# **Report on Five-Day Faculty Development Programme SPARC-AI: Signal Processing, Automation, and Real- Time Communication using AI in Electronics Design (10th – 14th February 2025)**

*The Department of Electronics and Communication Engineering, RVITM, Bengaluru organized FDP which was designed to provide faculty members with advanced expertise in applying Artificial Intelligence to electronics, signal processing, and communication systems. Participants explored cutting-edge AI techniques for system automation, real-time communication, and enhanced signal processing. Through interactive sessions and expert-led lectures, the programme encourages collaboration and innovation in these dynamic fields. The goal is to equip educators with the knowledge and tools to incorporate AI-driven solutions into their teaching and research.*

During the inaugural session, Prof. Nivedita S. Desai began with an invocation song, reflecting Bharath's rich cultural traditions. The FDP Coordinator, Prof. Prashant Patavardhan, extended a warm welcome to the esteemed guests, including the principal, vice-principal/HOD-ECE, and participants (both offline and online), as well as other heads of departments.

Dr. Manjunatha Prasad R, Vice-Principal and HOD-ECE, provided an insightful briefing on the objectives and significance of the five-day Faculty Development Programme (FDP). Dr. Biradar, Principal of RVITM, delivered the presidential address, emphasizing the valuable impact this FDP would have on the faculty community. The session concluded with a vote of thanks by Dr. Chethan K. S., Co-coordinator of the FDP.

Ms. Varshini, a 6th-semester ECE student, gracefully served as the Master of Ceremony for all five days of the event.

## **Day 1: Exploring AI in 6G and Energy Efficiency**

The inaugural session of the SPARC-AI program set the stage for an insightful week of discussions on AI in electronics design. The keynote address by **Dr. Sanjeev G** (Engineering Director, MMRFIC Technology Pvt. Ltd., IISc Bengaluru) explored **Technologies for 6G Communication Systems and AI/ML Potentials** in next-generation networks. Later, **Dr. Arulalan Rajan** (IISc Bengaluru) provided a deep dive into the **Mathematical Foundations for AI and discussed linear algebra, probability and eigen vectors**, essential for understanding the core of artificial intelligence. The final session of the



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day, led by **Dr. Vivek Tovinakere** (AMD, Bengaluru), focused on **Achieving Energy Efficiency in AI/ML Hardware**, emphasizing sustainable computing solutions developed by AMD.

### Day 2: AI in Electronic Design Automation (EDA)

The second day featured a series of technical sessions led by **Dr. Mamidi Nagaraju** (Technical Manager, Entuple Technologies, Bengaluru). The discussions revolved around **AI-driven transformations in Chip Design**, highlighting the role of AI in Electronic Design Automation (EDA). The sessions covered **Automated Design Optimization using AI**, demonstrating how AI can significantly enhance the efficiency of chip development processes at various stages of Tapeout.

### Day 3: AI for Verification, Validation, and Edge Computing

Building on previous discussions, the third day introduced **AI for Verification and Validation**, where **Dr. Mamidi Nagaraju** detailed the applications of AI in ensuring the reliability of electronic designs. Following this, he elaborated on the **AI-Assisted Physical Design Flow**, demonstrating how AI simplifies circuit layout optimizations. The day concluded with a thought-provoking session by **Namit Varma** (Co-founder & VP Engineering, SenseSemi Technologies), who presented **Novel AI Architectures for the Edge**, addressing AI implementations for edge computing.

### Day 4: Machine Learning Applications with MATLAB

The fourth day was dedicated to hands-on learning, led by **Rakshith B S** (Senior Application Engineer, CoreEL Technologies). The sessions focused on **Machine Learning using MATLAB**, covering supervised and unsupervised learning, classification, regression methods, and **Human Activity Recognition** using AI for signal processing applications.

### Day 5: Deep Learning, Industry Insights, and FPGA Architectures

The final day opened with an in-depth session on **Deep Learning using MATLAB** by **Avinash V** (Application Engineer - MATLAB, CoreEL Technologies India Pvt. Ltd.). covering **pre-trained networks, transfer learning, and speech command recognition**. This was followed by **Ms. Apoorva Raghunandan** (Cadence Design Systems), who shared valuable insights on **AI applications in the industry**. The concluding sessions by **Kartikay G** (AMD and Mentor Graphics) focused on **FPGA architectures and Smart Vision applications using Xilinx Kria KV260**, bringing practical exposure to AI-driven hardware innovations.

The program concluded with a **Valedictory Ceremony and Certificate Distribution**, marking the successful completion of a highly enriching Faculty Development Programme on AI in Electronics Design.



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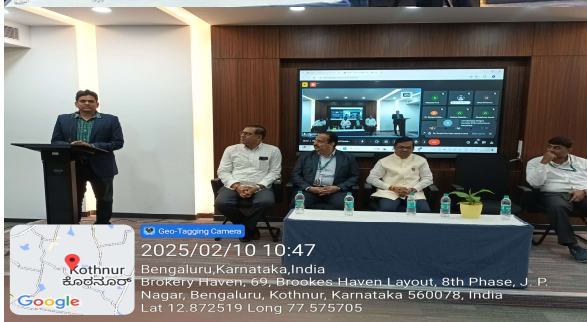
Dr. Manjunatha Prasad R gave a thoughtful acknowledgment to the speakers and expressed gratitude to the principal and other organizational heads for their support. This recognition would likely strengthen the collaboration and encourage future participation in similar initiatives.



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### FDP SESSION PHOTOS

Day 1 : Monday, 10<sup>th</sup> February 2025  
Inaugural







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### Session 1:

Technologies for 6G Communication Systems and Potentials of AI/ML Solutions

Dr. Sanjeev G, Engineering Director of AI/software, MMRFIC Technology Private Limited, Indian Institute of Science, Bangalore



### Session 2:

Mathematical Foundations for AI

Dr. Arulalan Rajan, Faculty of Proficiency Programme, Indian Institute of Science, Bangalore





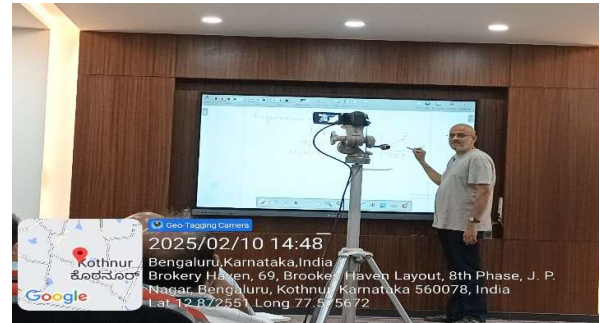
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### Session 3:

#### Achieving Energy Efficiency in AI/ML Hardware

Dr. Vivek, Principal Member of Technical Staff (Silicon Design), Advanced Micro Devices AMD, Bangalore



Day 2: Tuesday, 11<sup>th</sup> February 2025

### Session 1:

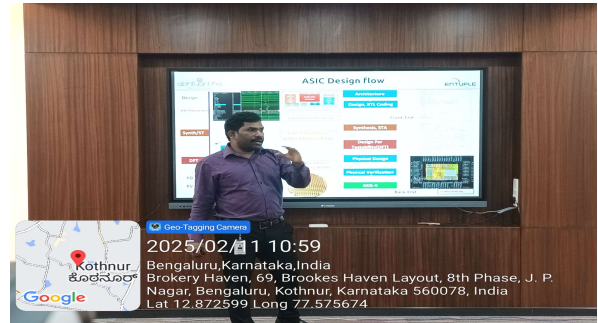
#### AI in EDA: Transforming Chip Design

Dr. Mamidi Nagaraju, Technical Manager, Entuple Technologies - Bangalore





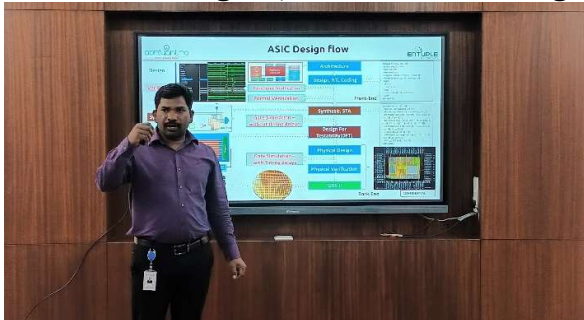
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### Session 2:

### Automated Design Optimization using AI

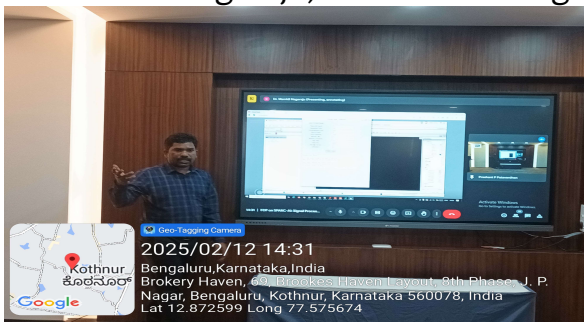
Dr. Mamidi Nagaraju, Technical Manager, Entuple Technologies - Bangalore



Day 3: Wednesday, 12<sup>th</sup> February 2025

AI for Verification and Validation and AI-Assisted Physical Design Flow

Dr. Mamidi Nagaraju, Technical Manager, Entuple Technologies - Bangalore



Day 4: Thursday, 13<sup>th</sup> February 2025

Machine Learning using MATLAB

- Introduction to Machine Learning, Overview of Supervised and Unsupervised Learning, Classification Methods, Regression Methods

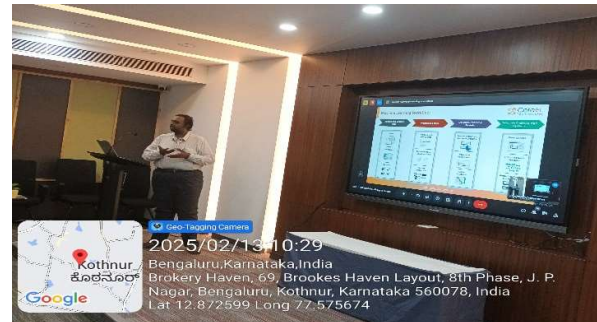
Machine Learning using MATLAB



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- Curve Fitting the Data, Using Apps to Automate Workflow, Feature Extraction for data
- Demo Application: -Human Activity Recognition (Signal Processing + AI)

Rakshith B S, Senior Application Engineer MATLAB, Bangalore



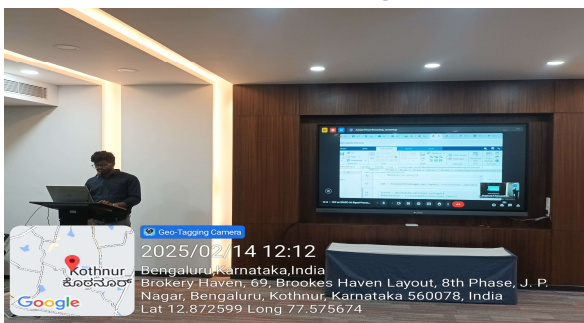
Day 5: Friday, 14<sup>th</sup> February 2025

Session 1:

Deep Learning using MATLAB

- Introduction to Deep Learning, Working with Pre-trained networks, Working with collections of data, Creating networks from scratch, Transfer Learning Workflow, Using Apps to Automate Workflow, Feature Extraction for Machine Learning
- Demo Applications:
  - Speech Command Recognition (Signal + AI)
  - Modulation Classification (Communication + AI)

Avinash V, Application Engineer, MATLAB



Session 2:

AI in the Industry: A Perspective

Ms. Apoorva Raghunandan, Design Engineer, Cadence Design Systems, Bangalore

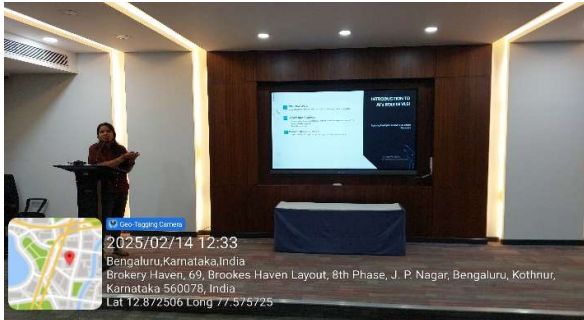




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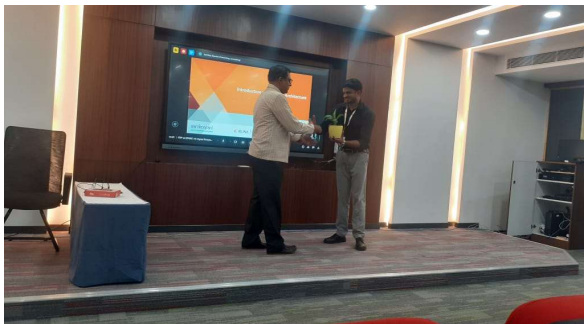


### Session 3:

Architecture of Xilinx 7 series FPGA, SoC, Zynq Ultrascale + MPSoC and Smart Vision application using Xilinx kria KV 260

- Introduction to FPGA, What is SoC, Showcase of PYNQz2 development board, Difference between PS and PL, What is Zynq Ultrascale+ MPSoC, Introduction to Xilinx Kria KV 260, Showcase of the board (SOM + Carrier card), Demonstration of Smart Vision application

Kartikay G, Application Engineer, AMD and Mentor Graphics, Bangalore





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**-Dr. PRASHANT P PATAVARDHAN**  
CO-ORDINATOR, FDP: SPARC-AI