

Centre of Excellence in Signal and Image Processing

A Short Report

Center of Excellence in Signal & Image Processing is an R & D establishment of all Circuit branches of the Institute, with Department of Electronics and Telecommunication driving the whole initiative. With the funds of Rs. 5.00 crores from MHRD-World bank under Project TEQIP-Phase-II, the Center has an objective of pursuing fundamental and applied research & development across wide spectrum of signal processing applications, with the focus on cutting edge technologies.

Specific Areas of Research & Development:

- Multimedia-Multidimensional Signal Processing spanning from text, document, graphics and animation through speech, audio, image and video signals
- Signal Analysis and Decision support systems for biological/biomedical/genomic, Automotive/industrial and metallographic signals
- Signal Processing Applications in RF/Microwave/Optical Communication
- DSP/Reconfigurable/Full custom VLSI Hardware Technologies for Signal/Image Processing Applications Development

Infrastructure:

An exclusive floor space of around 4000 sq. ft. is generated on the roof-top of existing Department's building, with FOUR laboratories each of 13 seats, thus making provision for 50 Masters' students/research scholars, two cabins, one conference room, library storage, equipment storage, waiting lounge, pantry, toilets, etc.

Human Resource:

Homogeneous groups (as per identified technical verticals) of faculty supervisors, PhD scholars, Research Associates and Masters' students have been formed with an Industry mentor attached to all such groups, to make the net outcome more result oriented, fruitful and conclusive in terms of publications, IP or transferable technology. Prof. Vikram Gadre from IITB is associated with the centre as Mentor. He guides ongoing projects & research work and procurement/up-gradation of equipment.

Industry Association:

The centre continues to receive contributions from eminent Industry experts in the form of guidance and assessment of ongoing projects. The list is as follows.

- Dr. Vishwas Udpikar - SCI-COM Software, Pune
- Mr. Manoj Soman - Silab Tech. Pvt. Ltd., Pune
- Mr. Sunil Desai – MosChip, Pune

Notable Projects (Completed and Ongoing):

- Audio Beam formation and Steering
- License Plate Detection and Recognition
- PCB Solder Paste Fault Detection
- Digital Video Stabilization
- Hand Wash Compliance using Computer Vision Approach
- Performance Improvement of UWA Channel
- Object Detection using Fast DNNs
- Performance Improvement of CNNs using Weight Initialization and Compression Strategies
- Biometric Analysis using DNNs
- Dynamic Texture Detection using DNNs
- Anomaly localization and detection using CNNs

List of Equipment:

- NVIDIA DGX Station (Intel Xeon E5-2698 v4 2.2 GHz (20-Core) and Four NVIDIA Tesla® V100-DGXS-32GB with 32 GB per GPU (128 GB total) of GPU memory)
- Benchmark Imaging System(SW/HW)
- DIPLAB 1.0 (SW/HW)
- TI Boards & Accessories (SW/HW)
- MATLAB & Simulink (SW)
- Cad Feko Software (SW)
- Handheld ECG machine (HW)
- Leica M80 Digital Stereo Microscope (SW/HW)
- Microwave office (SW)
- CEM Solutions (SW)
- NI- MIMO setup (SW/HW)
- NI Academic Site License-LabVIEW
- National Instruments' Audio Processing Kits and Evaluation Boards (SW/HW)
- Cadence VLSI Design Lab: For PG (SW)
- Near IR camera (SW/HW)
- High Speed Video Camera (SW/HW)
- Thermal Image Processor and Analyzer (SW/HW)
- Biometric Face Recognition System (SW/HW)
- CORTEX-M3 Development Kit (SW/HW)
- Electronic workbench Basic (HW)



Labs at the Centre



Equipment at the Centre



NVIDIA DGX Station

Up-gradation Planned:

- Development of a Smart Class Room for conduction of FDPs/Seminars, Remote meetings
