



Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved; NAAC Accredited A++
Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING

RESEARCH & CONSULTANCY FACILITIES

(SIGNAL PROCESSING LAB)

SIGNAL PROCESSING LAB

- **JETSON NANO FANLESS INDUSTRIAL PC -N2:**

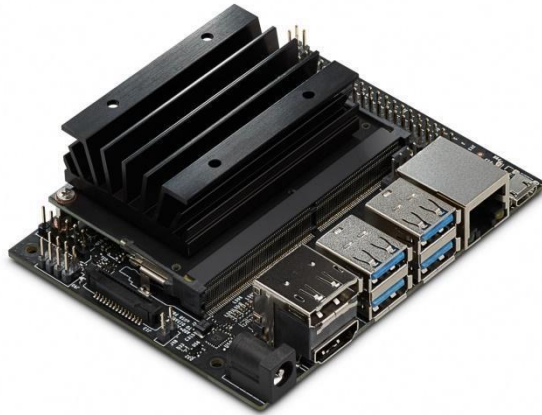


- System on Module (SOM) that delivers connected AI capabilities to devices at “the Edge across multiple industries – from smart cities to robotics to IV Sensors.
- Processor: Jetson Nano
- GPU: - NVIDIA Maxwell™ GPU with 128 with NVIDIA CUDA Cores
- Memory :- 4GB - 64 bit - LPDDR4
- Wireless Communication - Wi-Fi/Bluetooth/LTE/5G Connectivity by extension sockets
- Industrial IO options
- Fan less and robust design for 24/7 operations

Application/Research Projects / Consultancy Carried out in:

- ✓ Real World Applications Such as: Automatic Speech Recognition, Object Classification & Geo- Mapping.

- **JETSON NANO -4Gb Development Kit:**



- A small, powerful computer that run multiple neural networks in parallel
- GPU :- 128-core Maxwell
- Memory :- 4 GB 64-bit LPDDR4 25.6 GB/s
- CPU :- Quad-core ARM A57 @ 1.43 GHz

Application/Research Projects / Consultancy Carried out in:

- ✓ Image Classification
- ✓ Object Detection
- ✓ Segmentation
- ✓ Speech Processing

- **Intel Movidius Neural Network Compute stick:**



- USB Plug & play AI device for deep learning interface at the edge.
- Processor: Intel Movidius Myriad X Vision Processing Unit (VPU - low power VPU)
- Supported frameworks: Tensor Flow*, Caffe*, Apache MXNet*, Open Neural Network Exchange (ONNX*), PyTorch*, and Paddle via an ONNX conversion
- Connectivity:- USB 3.0 Type-A

Application/Research Projects / Consultancy Carried out in:

- ✓ Rapid prototyping, validation and deployment of Deep Neural Network (DNN) inference applications at the edge.

- OAK - D -AI- IoT 40:



- Processor - : MA2485 or MA2085 (512MB or 2GB)
- Has three on-board cameras which implement stereo and RGB vision, piped directly into the OAK-SoM-IoT for depth and AI processing
- Data output to a host via USB 3.1 Gen1 (Type-C) or via ESP32 Wi-Fi interface
- Quad SPI with 2 dedicated chip-selects

Application/Research Projects / Consultancy Carried out in:

- ✓ Computer vision: warp/de-warp, resize, crop, edge detection, feature tracking
- ✓ Object tracking: 2D and 3D tracking

- OAK - D Pro PoE (Auto Focus - 7.5 cm):



- IR laser dot projector (active stereo): improves depth perception, especially for low-visual-interest surfaces (little or no surface texture)
- IR illumination LED: For night vision - allows perceiving low-light and no-light environments
- M12 X-Coded Ethernet, 802.3af PoE, 1 Gbps Ethernet

Application/Research Projects / Consultancy Carried out in:

- ✓ Run any AI model, even custom architecture/built ones
- ✓ Computer vision: warp/de-warp, resize, crop, edge detection, feature tracking
- ✓ Object tracking: 2D and 3D tracking

- OAK - 1 - Auto focus:



- 4 Tops of Processing Power
- USB 3.1 Gen 1 Type -C for Data & Power
- USB Device Power with LED indicator
- Encoding:- H.264 , H.265, MJPEG, 4K/30FPS, 1080P/ 60FPS
- 3D stereo camera & On Board image processing.
- 12MP RGB camera
- Intel Base Clock: 700MHz
- Intel Lithography: 16nm

Application/Research Projects / Consultancy Carried out in:

- ✓ Run any AI model
- ✓ Computer vision: warp/de-warp, resize, crop, edge detection, feature tracking
- ✓ Stereo Depth :- perception at 120 FPS with filtering
- ✓ Object tracking: 2D and 3D tracking

- TMS 320C 6416 PROCESSOR:



- Highest Performance Fixed Point DSP
- 2-,1.67-,1.39-ns Instruction Cycle Time
- 500-,600-,720- MHz Clock Rate
- Eight 32 bit Instructions/Cycle
- Twenty Eight Operations/Cycle
- 4000,4800,5760 MIPS

Application/ Research Projects / Consultancy Carried out in:

- ✓ Audio Processing Applications
- ✓ Channel Modeling Applications

- **TMS 320C 6748 PROCESSOR:**



- TMS320C6748 DSP software and development kit to jump-start real-time signal processing innovation for biometric analytics applications, audio and more
- Reduces design work with downloadable and duplicable board schematics and design files.
- Fast and easy development of applications requiring fingerprint recognition and face detection with embedded analytics
- Low-power TMS320C6748 applications processor
- Scalable platform enables a variety of performance, power, peripheral and price options
- 128-MByte DDR2 SDRAM
- 128-MByte NAND Flash memory

Application/Research Projects / Consultancy Carried out in:

- ✓ Audio Processing Applications

- ✓ Channel Modeling Applications
- ✓ Biomedical Applications