Image Processing using SoCs and Pynq

Course dates: 17ᵗʰ Dec to 18ᵗʰ Dec 2024 (10 am to 1 pm IST)

Course Description:
This course introduces fundamental concepts and practical applications of image processing using Python. It covers essential libraries such as OpenCV, Matplotlib, and PIL, providing a hands-on approach to working with images and developing image processing techniques.

Who can attend?
- Hardware, Software developers and anyone interested to implement image processing algorithms on AMD-Xilinx SoCs

Pre-requisites:
- A basic background of Vivado FPGA Design Flow
- Familiarity with any AMD Device Architecture

Course duration:
- 2 days (6 hours – 3 hours per day)

Key Takeaways:
- Review the architecture of PYNQ-Z2 SoC
- Describe the different PYNQ resources available in the ZYNQ architecture
- Understand basic concepts of image processing
- Grasp the basics of the Python Imaging Library (PIL) for image manipulation
- Introduce OpenCV functions for reading, displaying, and capturing images
- Understand the advantages of Image Processing using FPGA

Course Contents:
Day 1:
- Introduction to Image Processing
  - What is Image Processing?
  - Applications and use cases (e.g., face detection, edge detection)
- Setting up the Environment
  - Installation and introduction to Python libraries: OpenCV, Matplotlib, and PIL
  - Hands-on: Installing and importing necessary packages
- Colour Representation in Images
  - Understanding BGR vs. RGB in OpenCV
  - Converting between color spaces
- Geometric Transformations
  - Smoothing and Blurring:
    - Using cv2.medianBlur () and cv2.blur ()
    - Hands-on: Comparing original and processed images
- Image Gradients and Edge Detection
  - Understanding gradients: Sobel and Laplacian methods
  - Hands-on: Detecting edges using Sobel (X and Y gradients)

Day 2:
- Understanding the ease of interfacing Peripherals to the FPGA board using PYNQ Python Productivity and base overlay
- Real time data input from Webcam and applying OpenCV Filters on the same
- Using Matlab Plot libraries to display the outputs
- Analysing the advantages of image processing using FPGA
- Hands-on Examples to explore and understanding the various possibilities using FPGA and SoC using PYNQ

Course Fee: 2 days (6 hours): Rs. 5,000 (Inclusive of tax, Non-refundable)

Last date for confirmation: 16th Dec 2024

Registration link: Click here to register

For assistance, contact us: +91-9686690000, +91-6366238254