Image Processing in MATLAB, Implementation on FPGA

DESCRIPTION:

Digital image processing is the use of computer algorithms to create, process ,communicate, and display digital images. Digital image processing algorithms can be used to : convert signals from an image sensor into digital images ,improve clarity , and remove noise and other artifacts ,Extract the scale , size or number of objects in a and prepare images for display or printing and also compress images for communication across a network

DAY 1:

1. Introduction

2. Basic Video/Image Processing

- Digital Image/Video Fundamentals
- MathWorks HDL Coder Introduction

3. Color Correction

- Introduction
- Simulink Implementation
- FPGA Implementation

4. RGB2YUV

- Introduction

- Simulink Implementation
- FPGA Implementation

5. Gamma Correction

- Introduction
- Simulink Implementation
- FPGA Implementation

6. 2D FIR Filter

- Introduction
- Simulink Implementation
- FPGA Implementation

7. Median Filter

- Introduction
- Simulink Implementation
- FPGA Implementation

DAY 2:

1. Sobel Filter

- Introduction
- Simulink Implementation
- FPGA Implementation

2. Grayscale to Binary Image

- Introduction
- Simulink Implementation
- FPGA Implementation

3. Binary/Morphological Image Processing

- Introduction
- Simulink Implementation
- FPGA Implementation

4. Lane Departure warning system

- Introduction
- Approaches to Lane Departure Warning
- Hardware Implementation
- Experimental Results

5. Traffic Sign Detection System Using SURF

- Introduction
- SURF Algorithms
- FPGA Implementation of SURF
- Overall system architecture
- Integral image generation
- Interest points detector
- Memory management unit
- Interest point descriptor
- Descriptor Comparator

6. Traffic Sign Detection System Using SURF and FREAK

- FREAK Descriptor
- Overall System Architecture
- Integral Image Generator and Interest Point Detector
- Memory Management Unit
- FREAK Descriptor
- Descriptor Matching Module

Workshop highlights

- Simplifying signal processing, image processing and computer vision application development
- Applying machine learning and deep learning techniques for signal and image processing
- Speeding up MATLAB simulations – Best practices for MATLAB programming and multi-core/GPU computing
- Designing advanced wireless communication systems through joint simulation of baseband, RF and antenna models
- Prototyping and verifying signal processing systems on target hardware such as DSPs and FPGAs