• Introduction
  • What’s a smart camera?
  • Where to use it?
  • Why use it?

• Smart Cameras vs. Standard Smart Vision Systems

Standard Smart Vision System
(120x50x35 mm)
(250g)

Smart Camera System

- Smart Cameras vs. Standard Smart Vision Systems
  - PC-Based Vision Systems Advantages:
    - Flexibility
    - Power
  - Smart Cameras Advantages:
    - Cost
    - Simplicity
    - Integration

- Smart Camera Architecture - Block Diagram
- Analog to Digital Conversion Electronics
  - Sub-divides CCD analog output into 8 CH x 256 pixel each
  - ADC is performed at a 8 CH x 20 MHz

- Image Processing Architecture Block Diagram (Basic processing architecture for each channel)
  - The processing algorithm is embedded in the processing PLD

- Microprocessor/FIFO Readout Control Circuit Board Block Diagram
• Image Processing Algorithms
• Example: Static Gray Scale Thresholding

- The static thresholding algorithm is expressed as follows:

IF (PIXEL GRAY IS > (CENTER + UPPER)) OR (PIXEL GRAY IS < (CENTER – LOWER)) THEN
   TRANSMIT PIXEL
ELSE
   IGNORE PIXEL

• Smart Camera Vision System for web inspection with a maximum of twenty smart cameras

• Looking Ahead…
  • Real-time, pixel-data extraction and processing operations within the camera at extremely high speeds and at a low cost
  • Eventually, complete vision-processing-systems-on-a-sensor-chip will be available
  • Higher resolution, megapixel sensors
  • Standard CCD based camera - 480,000 pixels \ New megapixel cameras 1 million pixels \ Some manufacturers already offer cameras of 2 million pixels
• Future Applications…
  • Security and access control markets
  • Automotive industry, for collision avoidance
  • Even – one day – for the toy industry
  • For intelligent lifts