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Java Camera

Simple to use Image Processing System

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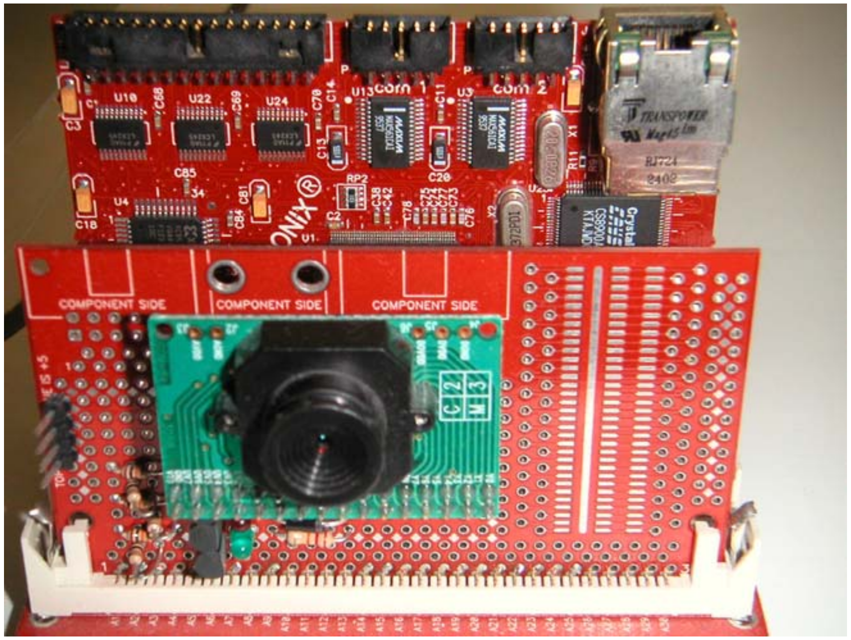
Image Processing

- Most Image processing is done with:
  - C++
  - Dedicated hardware
- Hard to use and program for beginners and students
- Goal is to develop an intelligent camera that:
  - Is programmable in Java
  - Is easy to use
  - Has a performance comparable to dedicated systems
  - Is affordable
- Project was inspired by the CMU camera project
  - More recently the AVR camera extended this project
  - Camera is low resolution and allows tracking
  - Cost < $ 100
  - CMU not programmable, AVR programmable in C

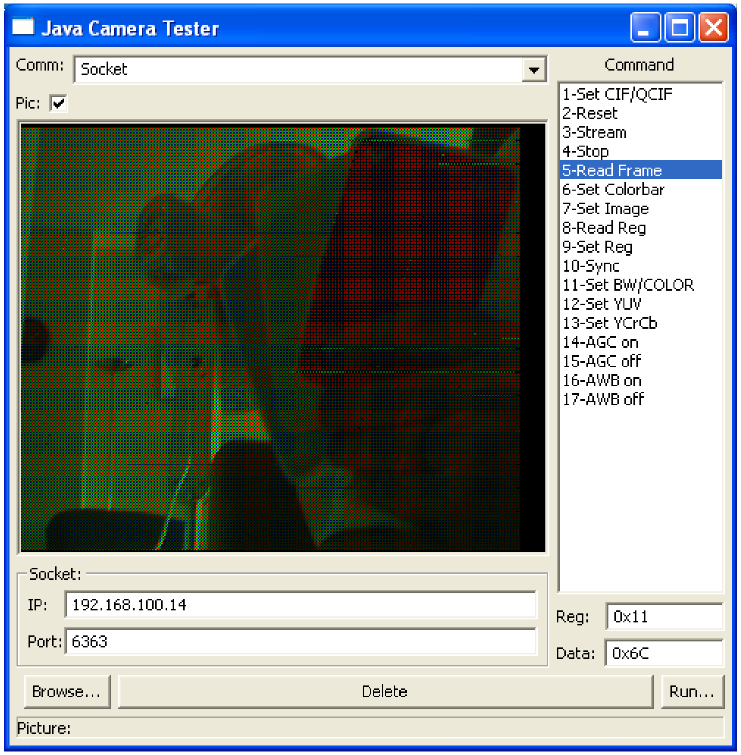
The camera unit

- Consists of a camera chip
- Interface to Java processor
- Special hardware in FPGA to accellerate processing
- Java processor is hardware implementation of Java and directly executes Java Byte Code
- Interface with software based on library of generalized pixel operations



The simulator

- An existing JavaCam simulator allows testing of all system functions using a standard USB camera
- All low-level functions are coded as if they are implemented in FPGA
- Camera Tester built in previous projects
- Basic library of functions is available



Comm: Socket

Pic: ☑

Socket:

IP: 192.168.100.14

Port: 6363

Reg: 0x11

Data: 0x6C

Picture:

The Project

- Add new functionality to JavaCam tester
- To be used in Combined project
- Working together with the Simulator
- New functions are:
  - Calculating flow in an image
    - Use existing optical flow functions
    - Decide how much percentage movement is present
    - Movement in what direction
    - Used to give indication of people- or traffic flow
    - Convert to world data based on GPS and orientation
      - E.g. 10% flow in westerly direction
  - Count number of people
    - Indicate an area in the image
    - When the area is crossed, count as one person
    - Indicate every crossing
    - Calculate number of people in each direction

Additional Possibilities

- Determine the center of a cabbage
- Used to build a machine that has to remove the core of the cabbage
- Some work has already been done
- All programmed in Java
- Integrate with the JavaCam environment.