mvIMPACT Configuration Studio: Smart Software for Smart Cameras


"Modern methods of recognition and processing of image information"
5th annual workshop, Technical University of Liberec, 2017

Ingo Boesnach – MATRIX VISION GmbH – Germany

MATRIX VISION

- manufacturer of industrial cameras, frame grabbers & imaging software
- located in Oppenweiler, 35 km northeast of Stuttgart
- approx. 90 employees
- approx. 40 developers (hardware & software)
- over 30 years in the computer vision industry
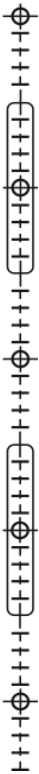
Products

mvBlueGEMINI

- 1/1.8" CMOS (grey/color) 1280x1024
- ARM dual-core CPU (800 MHz)
  - 1 GB DDR3 SDRAM
  - 4 FB FLASH memory
  - embedded Linux
- Altera FPGA
- MV I/O Board
  - power supply 12-24 V (< 5 W)
  - 6x I/O (trigger, flash, …)
  - Gigabit Ethernet
  - Fieldbus (e.g. ProfiNET)
  - RS-232
- IP67 housing (lenses up to Ø38mm)
- size 99.5 x 65 x 39.6 mm

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Software Design

multi-platform

  » run on smart camera, Windows/Linux PC
  » access via PC, tablet, smart phone

intuitive

  » only a few steps to make an inspection

efficient

  » high performance
  » high accuracy

extendable

  » allows to include custom tools

Configuration Mode
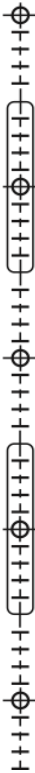

flow control

sequence of tools

image view and configuration of selected tool

results of selected tool

Find Multiple Objects

Measure

Read Text & DataMatrix

original size   zoomed

Read DataMatrix

Read & Verify Text

Monitor Mode

timeline of inspections

results of selected inspection

Monitor & Reports

Statistics Mode

statistics of all inspections

history of the last 1000 inspections

Monitor & Statistics

Tools & Applications

- setup of camera
- find
- check
  - variation
  - brightness
  - focus
  - color
- measure
- read
  - code
  - text
- digital I/O
- data input
- result output

Identification

Quality assurance

Pick & Place

20 px
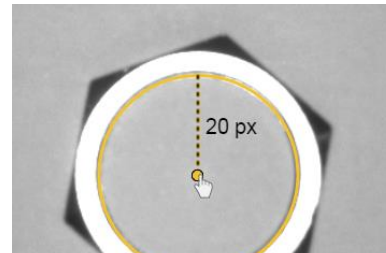
Measuring
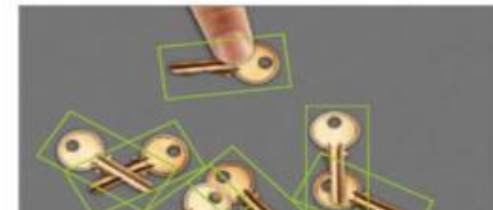
Sorting & Counting
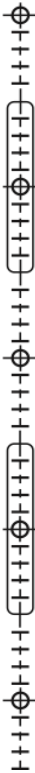
Communication

- ## HTTP / TCP
  - network discovery via Avahi / Bonjour
  - configuration via web browser (multi-client)
- ## I/Os
  - e.g. trigger, flash and real-time control of actors
- ## Fieldbus, UDP & RS-232
  - send/receive results of an inspection (customizable)
- ## FTP reports
  - send results as XML + images (customizable)
  - human readable and printable (e.g. PDF)
- ## Upload
  - new firmware
  - custom tools

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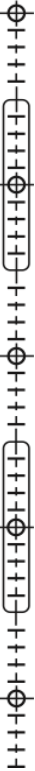
Simplicity

- **Easy and intuitive access**
  - web browser only, no installation required
  - runs on PCs and mobile devices

- **Easy to use and understand configuration**
  - high-level tools (e.g. find, measure, read, check, count …)
  - simple UI, only a couple of parameters
  - complex algorithms automatically find best parameters

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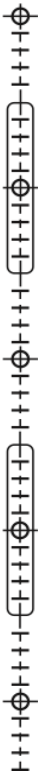
Efficient Hardware

- CPU with NEON® Advanced SIMD extension
- FPGA with
  - debayering (color sensor)
  - lens calibration (rectification)
  - automatic white balance
  - JPEG compression (web browser)
  - realtime I/Os
- SoC with fast internal data transfer
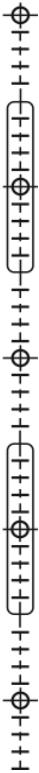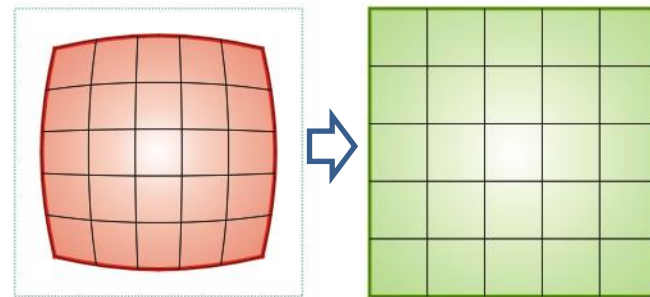
Efficient Software

HALCON imaging library by MVTec

- comprehensive, fast and stable algorithms
- optimized for mvBlueGEMINI
  i.e. multi-core and SIMD

powered by
HALCON

Algorithms by Matrix Vision

- implement wizards
- automatically decide on suitable parameters
- perform smart imaging based on *Halcon* library
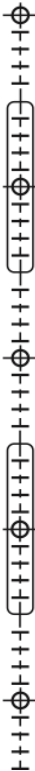
Expandability

- Use arithmetic & logic operations to combine results from different tools as a new input
- Create custom tools to add features
  - imaging algorithms
  - new communication
- Connect custom tools to existing tools
  - create new results
  - use results from previous tools
  - write results to build-in statistics and/or to FTP server
- Integrate with third-party systems
  - add your own C/C++ libraries
  - support new communication protocols
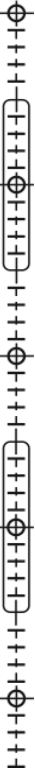
Expandability

- ## Use the mvIMPACT-CS framework for custom tools

  - data structures

  - server-client communication

  - user interface

  - …

- ## Use the included *HALCON* library for custom tools

  - image preprocessing

  - Matching

  - blob analysis

  - 3D vision

  - …
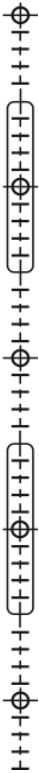
Thank you – Questions?

Further information

http://www.matrix-vision.com

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