FabImage Studio 5.3

Introduction

Created: 7/20/2023

Product version: 5.3.4.94467

Table of content:

- What's new in 5.0?
- Product Overview
- How to Learn?
- User Manual Conventions

What's new in 5.0?

Worker Tasks

Before 5.0, you could only have one main loop in the program and everything happened there. Now, it became possible to perform many computations in parallel! Read more at:

- Worker Tasks section of the Macrofilters article.
- Creating a Worker Task in the Project Explorer.
- Parallel Image Saving program example.
- Parallel Enumeration program example.

HMI Events

Event-based programming is now possible in our HMI Designer. You can easily create separate subprograms that will be executed when something happens—for example, when the user clicks a button, logs in or changes a specific parameter. Read more at:

- Handling HMI Events article.
- HMI Handling Events program example.

New, powerful formulas

Formulas have been here for years, but with version 5.0 they can replace the vast majority of data analysis tasks. This is possible with many new functions for arrays, geometry and with new array execution of expressions (also known as broadcasting). Read more at:

- Formulas article.
- Formulas Migration Guide to version 5.0.
- General Calculations article.

Program Editor Sections and Minimal View

Program Editor is now divided into fours sections: **INITIALIZE, ACQUIRE, PROCESS, FINALIZE**. This unified program structure greatly simplifies creation of the main program loop. We have also completely re-designed the editor and added the new Minimal View mode for easier use in basic applications. Read more at:

- Main Window Overview article.
- Data Flow Programming article.
- Button Presence program example.

Results control

This new power control is used for easy definitions of Pass/Fail criteria. You just select a filter and set the range for its numeric outputs. What is more, the Results control also collects statistics automatically. Read more at:

- Running and Analysing Programs article.
- Main Window Overview article.
- Bottle Inspector Part 1 tutorial.
- Bottle Inspector Part 2 tutorial.

Module encryption

Sometimes you need to hide the contents of some macrofilters or protect them against unauthorized access. You can achieve this by using our new module encryption function. Read more at:

- Locking Modules section of the Project Explorer article.

Product Overview

Welcome!

Thank you for choosing FabImage Studio. What you have bought is not only a software package and support, but a comprehensive access to the image analysis technology. Please keep in mind that machine vision is a highly specialized domain of knowledge and mastering it takes time. However, whenever you encounter any problem, do not hesitate to contact our support team for assistance (support@fab-image.com). We believe that working together we can solve any obstacles and make your projects highly successful. We wish you good time!

What is FabImage Studio?

FabImage Studio Professional is a dataflow-based visual programming environment designed for machine vision engineers. Together with its comprehensive library of highly optimized image analysis filters (tools) it allows the user to create both typical and highly customized algorithms for industrial vision systems. Furthermore, it is a complete solution as it also makes it possible to create custom graphical user interfaces (HMI).

The main design goal of FabImage Studio has been clearly defined at the very beginning. It was to be the product that removes the dilemma whether to choose a tool that is powerful, or one that is easy to use, or one that is not limited to any particular hardware or application. FabImage Studio has all of that – it is *intuitive*, and *powerful*, and *adaptable*.
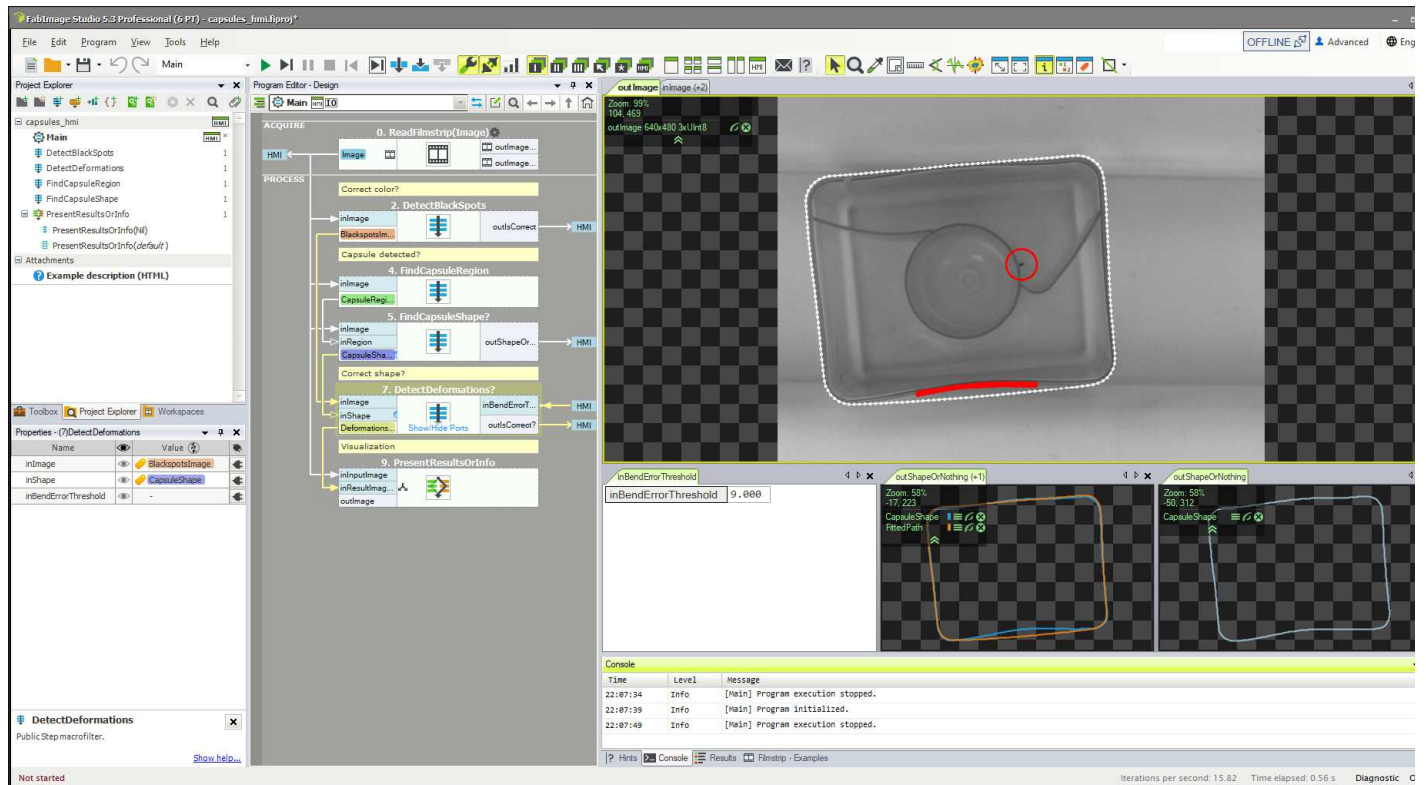
*The Main Window of FabImage Studio.*

Range of Applications

The library of image analysis filters (tools) that come with FabImage Studio can be described as composed of two sets:

1. a set of well-known general image processing and computer vision algorithms,
2. a set of ready-for-use tools specialized for industrial inspection systems.

In particular, these include:

- Image Processing
- Shape Fitting
- Barcode Reading
- 1D Measurements
- Histogram Analysis

- Blob Analysis
- Camera Calibration
- Data Code Reading
- 2D Measurements
- OCR

- Contour Analysis
- Fourier Analysis
- Corner Detection
- Gray-based Template Matching
- Machine Learning

- Planar Geometry
- Hough Transform
- 1D Profile Analysis
- Edge-based Template Matching
- GigE Vision and GenTL
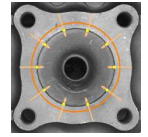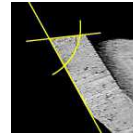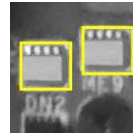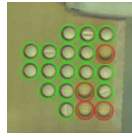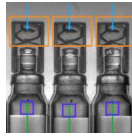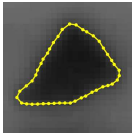
Other Products

FabImage Studio Runtime

FabImage Studio is the application that is installed on the developer's computer. Programs created with Studio can be later executed (with the HMI) on other machines by using another product, FabImage Studio Runtime, which includes the FabImage Executor application. This lightweight application does not allow for making changes to the program and is intended for use in the production environment.

FabImage Studio SMART

SMART is a simplified edition of FabImage Studio, intended for use mainly by industrial end users and whenever the application is simple enough to fit into a single screen. Two main changes to the Professional edition are: (1) The program editor uses the Minimal view which hides all the connections and is better suited for small programs; (2) the Results control becomes the primary place where the user sets inspection limits (instead of formulas).

FabImage Library (C++ and .NET)

Another product which is related to FabImage Studio is FabImage Library. While Studio is designed for rapid development, sometimes it is required to integrate the algorithms with bigger C++ or .NET projects. For that purpose the functionality of the filters of FabImage Studio is also available in the form of a C++ and .NET library.

FabImage Library is also worth considering for applications that require the highest possible performance. This is because there are some program optimization techniques, like in-place data processing, image memory re-use or performing initialization before the main loop, for which the complete control provided by the C++ or .NET programming languages is needed.

How to Learn?

Prerequisites

FabImage Studio Professional is a drag and drop environment which makes it possible to create advanced vision inspection algorithms without writing a single line of code. Nevertheless, as a sophisticated tool and a fully-fledged visual programming language, it requires some effort before you become a power user.

Typically, the prerequisites required to start learning FabImage Studio are:

- higher technical education,
- basic course in image processing and preferably also in computer vision,
- the ability to understand written technical documentation in English.

Learning Materials

The available materials for learning FabImage Studio are:

- This User Manual
  – contains detailed instructions how to use the features of FabImage Studio.
- E-mail Support
  – do not hesitate to contact us if anything still remains unclear.

Additionally, it is recommended to go through the entire content of the Toolbox control and make sure that you understand when and how you can use each of the tools. This might take some time but it assures that in your projects you will use the right tools for the right tasks.

Terms Checklist

When you are ready to create your first real-life application, please review the following article to make sure that you have not missed any important detail: Summary: Common Terms that Everyone Should Understand

User Manual Conventions

There are a few formatting conventions used in the User Manual to make it clear and convenient for the reader. Here is the list of the types of terms and how they are formatted:

- **Names of filters** (tools) are written in Pascal Casing as links to filter help pages - e.g. ThresholdToRegion.
- **Names of categories** in the filter library (including the name of category such as "Region" and subcategory such as "Region Global Transforms" if needed) are written in Pascal Casing as links to the list of filters in the category - e.g. Region :: Region Global Transforms.
- **Names of FabImage types** are written in Pascal Casing as links to filter help page - e.g. Point2D.
- **Values and other terms from FabImage Library** are written using Italics - e.g. *False*, *NearestNeighbour*.
- **Names of Machine Vision techniques** are written in Pascal Casing - e.g. Template Matching, Blob Analysis.
- **Macrofilter names** are written using quotation marks - e.g. "Main", "DetectCapsule".
- **GUI elements of FabImage Studio** are written in Pascal Casing - e.g. the Project Explorer, the Filter Catalog.
- **Paths** (to certain actions or files on disk) are written using Italics - e.g. *Start » All Programs » FabImage » FabImage Studio Professional » Uninstall* , *My Documents\FabImage Studio Professional\Filters*.
- **Port names** are written using Bold - e.g. **inA**, **outImage**.

This article is valid for version 5.3.4