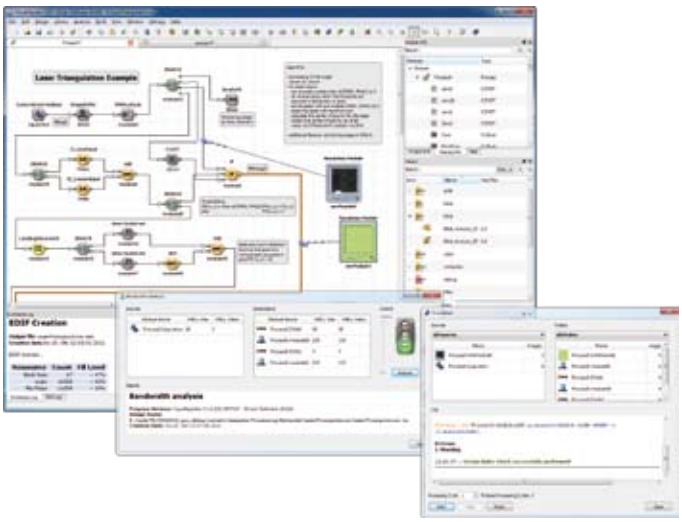
SILICONSOFTWARE

VisualApplets 2.0

Graphical programming of Machine Vision applications on FPGAs for hardware programmers and software engineers

Distributed computing offers significant advantages in the design of an image processing system. Each processor type has its individual strengths. While FPGAs are operating with a high parallelism and are ideal for processing of large amounts of image data, the CPU has its particular strength in decision trees. The GPU shows its high operating speed at geometric image operations such as rotations, scaling, or linear transformations. To integrate the strengths of the individual processors, all technologies must be mastered. The programming of the FPGA is considered to be particularly complicate. In addition, the number of hardware programmer is very limited.

VisualApplets was developed by Silicon software to inspire hardware programmer and also software engineers for the issue of hardware-based image processing. The graphical approach by data flow models simplifies FPGA programming and the creation of image processing procedures. Many analysis errors and corrections are performed automatically. Parameter changes are automatically corrected in the overall design by inheritance. The resources of the FPGA are recalculated after every design change. Bandwidth bottlenecks are analyzed in the design, which can be solved e.g.by a graphical configuration to increase the parallelism. The high-level simulation is calculated a visual result at each link of the design with bit accuracy and can also be used for visual debugging. VisualApplets provides analysis tools that allows an uncomplicated handling of the hardware programming and focuses the user on the functional image processing application.



Extended GUI of VisualApplets

The image processing library with over 200 operators in 14 sub-libraries is the base for the designs. Additional libraries can be enabled to enhance the functionality. The complexity of the operators in the libraries is very different. Basic operators provide supporting functions, but can also be used for visual programming in order to obtain new functionalities. Operators with more complex functionality can be integrated and must only be parameterized.

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The access by the SDK software is determined during the parametrization of the operators in the design. By setting a register in the FPGA, an interface for software access is automatically provided. An SDK example that shows this integration and lists the available parameters will be automatically generated when the hardware applet is synthesized.

The porting of designs on other frame grabber is easy to realize by an integrated conversion function. This allows a rapid prototyping on a high-performance frame grabber at the start and a conversion after completion of the design on the most economical platform.
VisualApplets runs under Windows, but supports the runtime environment for a variety of operating systems on 32bit and 64bit.

Overview of operators and libraries in VisualApplets

With the leap to version 2.0, Silicon Software continues the development of the graphical programming tool for FPGA hardware. GUI and handling of the software were revised and are even more intuitive. In addition to support of new frame grabber models, the existing image processing libraries have been enhanced and optimized.
Users of VisualApplets will find an extended range of application designs as examples that allow a rapid and successful entry into applied hardware programming.
Through workshops, which are hosted at Silicon Software and now also at Stemmer Imaging, essential technical and application-related issues are explained.

VisualApplets is that integrated development environment for real-time applications on FPGA hardware in Machine Vision. It owns unique tools for automatic error indication and correction, and a sopisticated high-level simulation.

In 2006 VisualApplets was awarded with the International Vision Award.

Available or planned VisualApplets products:

Standard / Product	Description
VisualApplets	VisualApplets certified
VisualApplets 2.0	graphical programming environment
VisualApplets	Blob library line scan camera/area scan camera applications
VisualApplets	compression library for the JPEG format

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