Common Vision Blox - THE machine vision operating system for Windows

Apart from the primary function of being able to solve any machine vision task, modern image processing software needs to be flexible enough to adapt to changing conditions quickly and cost-effectively.

Because it is based on a well-structured architecture with integrated modularity and hardware independence, Common Vision Blox allows the user to change both the acquisition hardware and vision technology at anytime, simply by loading the relevant driver. In particular, the hardware abstraction layer provides an isolation of the processing algorithm from the image capture. By using Common Vision Blox, application programming can be performed using either high level programming languages, or the graphical user interface, iTution.

Because of its great flexibility, Common Vision Blox is becoming the preferred solution for machine builders, system integrators and end users when planning machine vision applications. Possible applications cover a wide variety of markets, including the chemical and pharmaceutical industries, mechanical engineering, electronics, medical and communications.

CVB Foundation Package - THE complete easy-entry vision software suite

In order to give newcomers a fast and comfortable entry into the world of industrial machine vision, CVB now includes the new Foundation Package. Based on the CVB Image Manager which has a proven track record in many thousands of industrial applications since 1997, a powerful new starter package is now available that offers control of many different types of image processing hardware as well as having an optimised image display. In addition, abstract picture access is possible using predefined tools as well as user specific algorithms. All this is complemented by an extensive set of optimised algorithms for edge detection, blob detection, statistical image analysis, image filtering plus an extensive range of arithmetic and logical functions. This comprehensive collection of tools gives the user the most important and widely used algorithms for solving a variety of machine vision tasks as part of the basic package.

In addition, the CVB Foundation Package contains core machine vision technologies such as a new algorithm for 2D spatial calibra-

tion of image data for use in the measurement or robotic applications. The Foundation Package functions also include dynamic thresholding, possibilities for use in cases of grey value alterations. In addition special functions for colour conversion and image filtering are included.
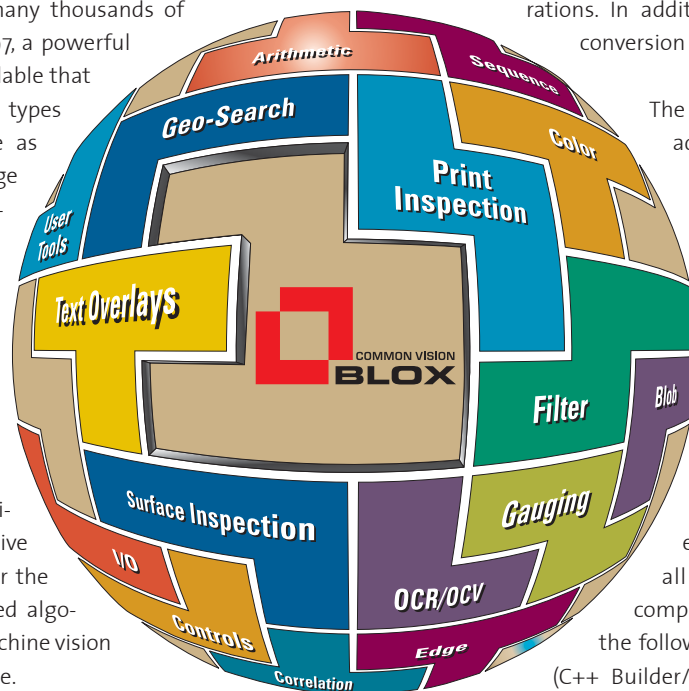
The Package is complemented by the addition of the graphical programming interface iTution, which is a fast, intuitive method for creating image processing applications using a drag & drop simplicity, thus enabling the creation of applications without the need to purchase a compiler. This graphical tool is especially useful to both newcomers, with no knowledge of compilers and also for experienced programmers. Additionally, all common high-level language compilers can be used with support for the following Windows compilers: Borland (C++ Builder/Delphi), Microsoft (Visual Basic, V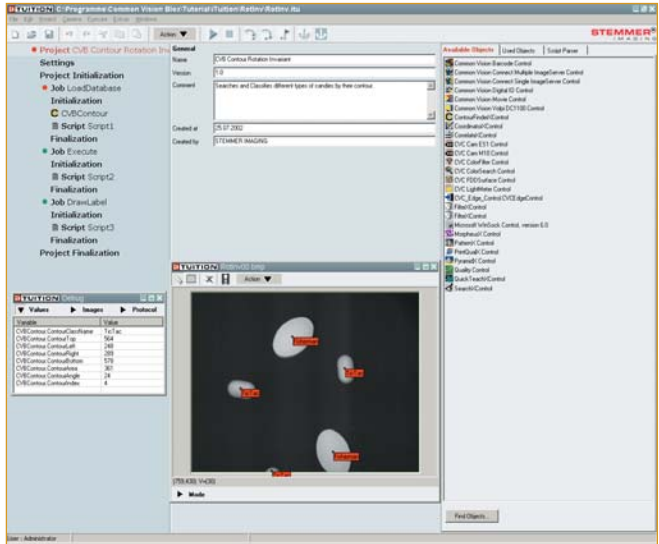isual C++, C# bis .net). Numerous sample programs are available in source code for the development environments supported.

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IIIIIIII iTuition - THE fast and intuitive route to your image processing application

- ► **Intuitive visual programming**
- ► **Ergonomically designed graphical user interface**
- ► **Drag&Drop followed by customisation**
- ► **Powerful script language**

Projects developed using iTuition cover all aspects of a complete application, encompassing all the necessary functions from capturing images and image display to evaluation and decision-making, right through to the output of the results. The division of the project into individual tasks enables the creation of complex loops and case control. Because iTuition internally compiles the user's application, there are no compromises with regard to speed, which means it compares very favorably to other compilers. ITuition's powerful development environment also offers a series of useful tools for troubleshooting such as step-by-step program execution, addition and removal of breakpoints, execution up to the next breakpoint, and the output of current variable values or writing of log files.

Password-protected user levels enable access to be restricted therby ensuring secure use in an industrial situation. The language of all menu items and texts in iTuition can also be altered, customised


Example application: Object detection

or even swapped during runtime. The frame grabber I/O connections can be used for communications, such as COM-Port, network, PLC, etc.
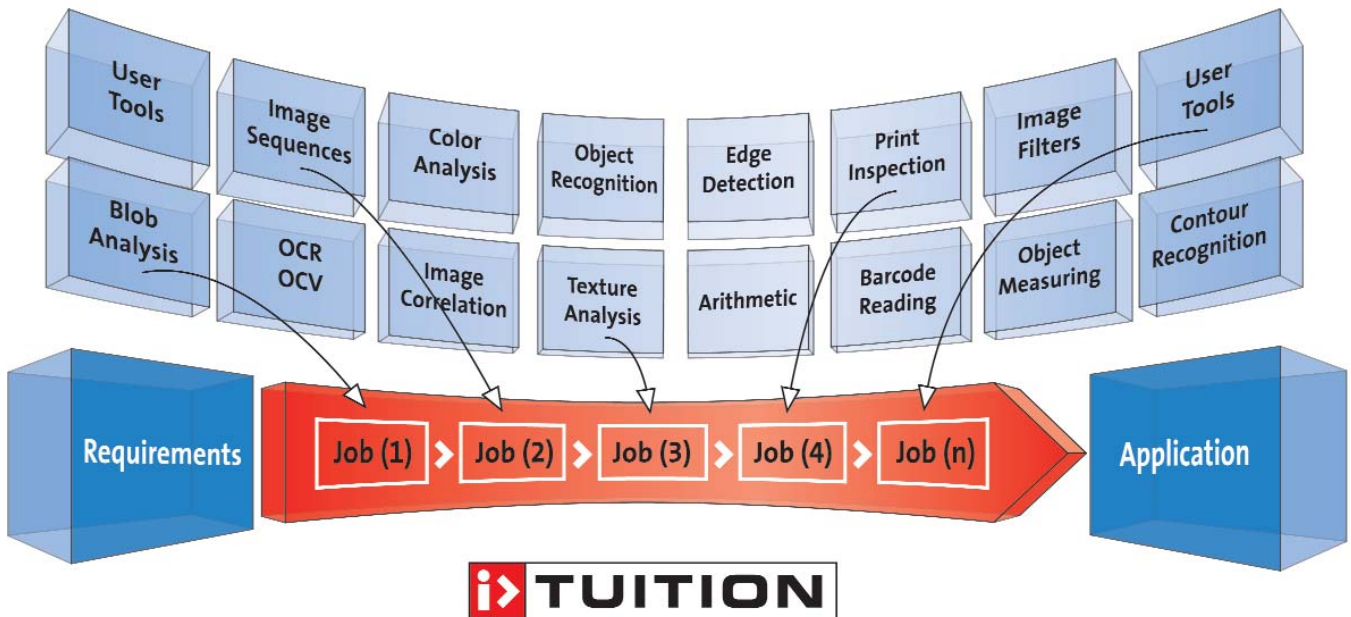
Functions for the statistical evaluation of images

Quick and easy analysis of an image using statistical calculations such as mean value, standard deviation, etc. Ideally suited for control of object completeness and presence checks, surface inspection (homogeneity, scratches, print, etc.) or the supervision of a camera image in regard to integration time, illumination, etc.
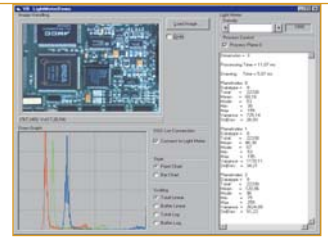

Functions for blob analysis and segmentation of objects

Measurement of geometric dimensions of objects with coherent pixel areas (blobs). The surface area, diameter or position of any object can be determined using this algorithm. Especially useful for verification of shape completeness (i.e. drilling, junking).
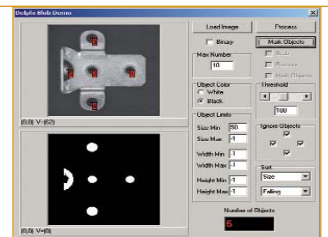
Functions for edge detection

Optimised functions for exact edge detection and subsequent measurement of positions in an image. Regardless of whether single edges, edge pairs or multiple edges, the geometrical dimension of any objects can easily be determined.
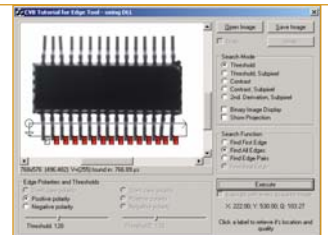
Functions for the correlation of images

Extensive set of functions for pixel-wise, arithmetic and logical combination of images captured. Allows easy image calibration, image averaging or image masking. Specific areas of an image can thus be hidden and systematical interferences can be removed.


Functions for superimposing destructive text overlays

Enables insertion of user definable texts and numbers into any position within a captured image. Thanks to the permanent alteration of the image data after adding the text, this function is especially useful for archiving and documentation purposes. Type styles can be selected from a range of available fonts and generated in different sizes and notations.

Functions for filtering of images

Comprehensive collection of highly optimised filter algorithms for fast image pre-processing. The use of these filters makes it possible to intensify or attenuate certain image details in order to simplify or accelerate the subsequent analysis.


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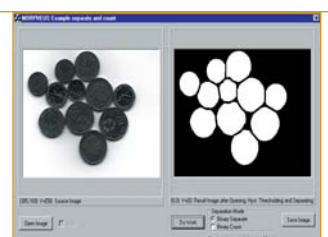
Functions for binarization using dynamic thresholding

The use of dynamic thresholding simplifies the processing of image data in situations where there are illumination variations. Using binarization, grey value images are translated into pure black & white images and the dynamic thresholding uses local thresholds that are automatically updated in case of local changes in illumination.
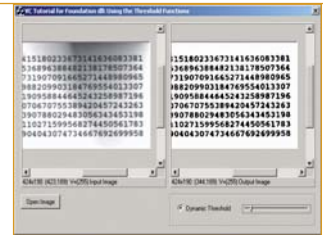
Functions for 2D-calibration of image data

Correction of distortions and optical aberrations arising from lens distortions or non-perpendicular viewing angles. After the calibration is trained, the algorithm produces corrected image data for further processing. This is an easy way to transform images on cylindrical surfaces for example.
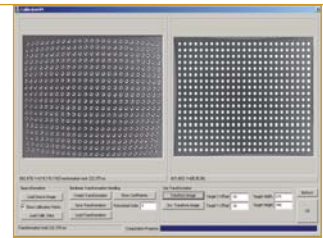
Functions for colour space conversion

Depending on the image content and evaluation task, the conversion of the original image into another colour space may facilitate the subsequent processing. Different highly optimised algorithms are used to segment the captured image in regard to brightness, colour and saturation.
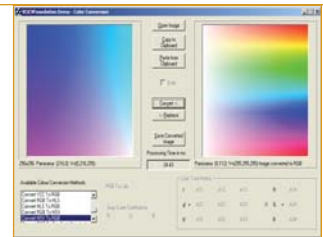
Additional tools available include:

The CVB Foundation Package offers the user an easy to use, comprehensive collection of optimised image processing functions, allowing the development of a vast range of machine vision applications without the need for further investment.

In addition, the CVB Foundation Package can be extended with optional, specialised CVB-Tools, enabling the user to solve even the most demanding machine vision applications rapidly. Of special interest are the tools for object recognition and for reading and inspecting scripts. For some years now, CVB Minos, CVB Manto and CVB ShapeFinder have been the leading software tools due to their recognition speed and reading reliability. Indeed, CVB Manto allows applications to be solved for which no industry-suitable solution existed previously, i.e. reading of hand written scripts, recognition of numbers punched onto coated surfaces and even the classification of different types of foodstuffs.

To read and verify 1D and 2D-barcodes, CVB Barcode is the tool of choice. It includes support for the location of codes in captured images as well as being able to handle most of the popular barcode symbology up to and including modern data matrix codes. Special emphasis was given to fast and reliable code reading in realistic, industrial environments, even when poor quality codes are encountered.

Using the recording tools CVB Movie and CVB Sequence, complete sequence recording systems can be created. Based on CVB's hardware support and modular concept, the user can create flexible, customer-specific recording solutions that easily outclass competing systems as far as their suitability for daily use is concerned.
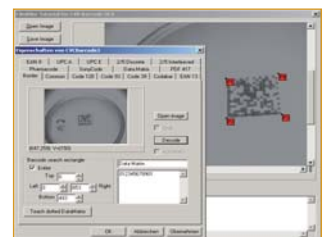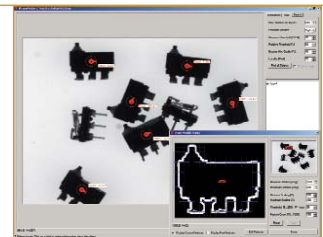
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