IASLab™

Image Analysis System Laboratory

Overview

IASLab™ is an advanced software product for objective, automated evaluation of image quality. IASLab™ is the software kernel bundled with QEA's image quality analysis systems such as the PIAS™-II and the Scanner IAS®. It is also available as a standalone software package.

Saved images in virtually any file format, including *.pdf, can be analyzed with IASLab™. Images may be generated by TWAIN-compliant scanners, DirectX-compliant cameras or other devices. Special IASLab™ configurations are available for portable camera-based systems such as QEA's PIAS™-II, scanner-based systems such as Scanner IAS®, PhotoQC™, ScanQC™, and JetQC™, and fully automated camera-based systems such as the IAS®-1000.

IASLab™ is an open-architecture platform designed for virtually unlimited expansion potential in image processing and image analysis. Test data can be exported to a spreadsheet or database for reporting, further analysis, or archiving. For scanner-input and automated camera-based systems, batch- and sequence-mode features are powerful boosts to productivity.

Benefits

- Performs quantitative analysis based on ISO-13660 international standards
- Handles practically all image file formats, including PDF
- Incorporates Standard Image Analysis Toolbox for analyzing dots, lines, solid areas, toner background and density
- Advanced versions include Advanced Image Analysis Toolbox for analyzing SFR on slanted edges; NPS; color registration using the slanted edge technique; and banding with VTF filtering
- Performs spatial and density calibrated measurements

- Built-in analysis sequences enable data collection immediately upon installation
- Flexible design allows users to define new test sequences
- Supports automatic document feeder (ADF)
- Transmits analysis results directly to Microsoft Access (*.mdb)
- Batch processing mode delivers maximum analysis productivity

Using IASLab™

In a typical session, the user scans a test target or opens a saved image file. For quick interactive measurements, the user specifies a region of interest (ROI) with the mouse and clicks a button on the analysis toolbar to launch the test. Graphical overlays and numerical results are displayed instantly. Input parameters for the analysis algorithms (color filtering, size filtering, threshold settings, etc.) are user-modifiable with handy dialog box controls. For optimal efficiency in testing, the user can launch one of the built-in analysis sequences to run automatically on a batch of images. The results are written to a Microsoft Access Database (*.mdb) file.

The IASLab™ graphical user interface allows users to create new test sequences and edit existing sequences. Straightforward tools help you load a template image, define the ROI for each image element to be measured and specify the measurements, input parameters, and destination database fields for each ROI in the sequence.

Special features include a batch utility for converting PDF files to compatible graphic file format; batch mode operation for operator-free testing efficiency; sample user-modifiable report and test templates for data-collection capability immediately upon installation; an OCR option; and standard and advanced image analysis toolboxes for unbeatable analysis capability.

Detailed User and Application guides are provided for reference and self-learning.

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Typical System Requirements

- High performance PC
- Minimum 1GB RAM
- Windows XP OS
- Microsoft Office including Excel and Access
- TWAIN-compliant high quality scanner, ADF optional for the scanner-based option
- DirectX-compliant digital cameras or similar input devices for the camera-based option

Software Highlights

Operating Modes:

- **Interactive** mode – interactively analyzes any ROI
- **Sequence** mode – automatically analyzes multiple ROIs using a pre-defined sequence. Sequence design is straightforward and graphical. User-defined fiducial marks correct for mispositioning of the test target.
- **Batch** mode – analyzes a batch of images in sequence mode

  Analyses can be performed on saved image files or on images captured by an input device (such as a scanner or camera) under software control. Virtually any common image file format can be analyzed, including pdf. Analysis results are displayed instantly. Data can be exported directly to Excel, Access or other applications.

Dot & Halftone Analysis Tool:

- Dot count – number of dots in ROI
- Dot size – dot area, diameter, perimeter
- Dot shape – box ratio, circularity
- Dot location – xy coordinates, bounding box
- Special tools – toner background or satellite tools
- Analysis options and tools – dot size filter, color filters, absolute or relative thresholds, dilation-erosion, boundary dot exclusion

Line and Edge Quality Analysis Tool:

- ISO-13660 based analysis methods
- Line width – e.g. bleed or inter-color bleed measurements
- Edge acuity – blurriness and raggedness
- Line darkness – density and contrast
- Line quality – fill (voids) and line breaks
- Line geometry – orientation and distance between lines (e.g. color registration measurement); slope and intercepts for line edge
- Location – xy coordinates
- Analysis options and tools – color plane, orientation & polarity (auto or user selection), threshold definition (default is ISO-13660)

Area attributes Measurement Tool:

- Average in ROI – RGB, Reflectance, Density, XYZ, and L*a*b*
- Non-uniformity (Image Noise) Measurements – graininess and mottle (ISO-13660)
- Density standards – status A, status T, DIN, DIN NB, and visual
- Color measurement parameters – illuminants including A, B, C, D50, D55, D65, D75, E, and 2° and 10° observers
- Density calibration tool

Noise Power Spectrum (NPS) Tool:

- Wiener Spectrum for image noise analysis in the spatial frequency domain (i.e. by performing a Fourier transform of the auto-correlation function of an image; it measures the noise variance at each spatial frequency)
- Displays the NPS curve
- Data can be exported to Excel, Access or other applications

Banding Analysis Tool:

- Noise power spectrum analysis using same method as the NPS tool
- Additional Human Visual Transform Function (VTF) for filtering raw spectrum to highlight frequency response most relevant to human perception
- User definable VTF

Spatial Frequency Response (SFR) Tool:

- Highly efficient method to estimate the MTF (Modulation Transfer Function) of an imaging system
- Based on the ISO-12233:2000 method of using Fourier techniques to measure the spatial frequency response (SFR) to a slanted edge
- Graphical display of SFR; interpretation and analysis same as MTF

Color Registration Tool:

- Based on the SFR slant edge analysis technique as in the SFR tool
- Relative location of the transition in each of the color planes reported

Other Productivity Tools:

- ROI (Region of Interest) definition
- Image and data copy
- Save and print (image, summary data or detailed data)
- Image zooming in or out, flip or rotate
- Display color channel selection
- Overlays (ROI, bounding box, center locations, outlines, scale)
- View profile and histogram
- Result display details selection
- Display font size selection

Colorant Coverage Tool (Option):

- Colorant coverage in % within ROI

Optical Character Recognition Tool (Option):

- Training function for any character set

Special Requirements

- If your application has special requirements, please contact QEA for more information