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White Paper

Scanning the Perfect Page Every Time
Take advantage of advanced image science
using Perfect Page to optimize scanning

✔ **Perfect** Page

Document scanning is a cornerstone of digital transformation, and choosing the right technology is essential to get the right results. A scanner's image enhancement capabilities can dramatically reduce the time spent handling documents and can deliver more accurate information to automated workflows. Many companies overlook the bottlenecks that are related to image quality, but investing in the right technology upfront can reap big dividends right away.

Removing capture bottle necks

Many organizations are surprised to learn that preparing documents for digitization is more time- and cost-intensive than the actual scanning process itself. According to AIIM's Chief Analyst, Bob Larrivee, "Document preparation can be a mammoth task when you consider the volume of paper to be scanned." He continues, "Nearly a quarter of the folks I talk with say that document preparation is the biggest issue they have in managing their scanning operations, and about the same number say they struggle with bad documents and exceptions."

Businesses face increasing pressure to cut costs, improve efficiency and optimize business processes. The total cost of scanning can be reduced, along with processing times, by paying attention to the elements that seem trivial on their own, but add up to big savings when taken together.

Quality is essential when scanning documents

One common challenge is meeting stakeholders' image quality requirements during document digitization projects. Requirements can differ based on the kind of documents to be digitized; there will be varying output expectations between types like from printed forms, letters or handwritten applications with photos embedded, or graphical reports where colors and illustrations are important.

Ask the final recipient how the digitized information will be used in business workflows:

- Will documents to be scanned for archival purposes?
- What compliance or regulatory requirements must be met?
- Does the workflow involve the automatic extraction of key information to initiate a business workflow? (Invoice processing is an example)

The answers to questions like these will determine the needs for image enhancement of the final output.

Document preparation is a major bottleneck

Scanning itself is a small part of the digitization process. It's not uncommon in a scanning environment to find half (or more) of staff focusing on pre-sorting and preparing documents. Even in a scanning operation that is set-up to process the same document type, such as an invoice - challenges abound: operators are faced with a multitude of different paper types and document sizes, as well as documents which contain different colored backgrounds or a mix of landscape and portrait orientation. Often, operations have staff spend time manually sorting documents by these attributes, instead of putting technology to work for them. The right scanners can do this work automatically, saving the labor cost of extra work.

Further, there is even more manual work involved in separating out documents that are considered challenging. When a hard-to-read document is found in a job, it's scanned in a separate batch with different settings, often at a higher resolution, which results in unnecessarily large file sizes or increased background noise levels. If it's just left in the regular flow of documents without image enhancement, quality control checks tend to reject them. This results in a rescan, or the requirement to conduct manual indexing or data extraction. The typical, surprising, workaround for this problem? Scan operators use a copier to reprint the document with the contrast set to high. That's a significant manual effort that slows down operations and adds costs that could easily be avoided.

Unnecessary post scan efforts impact profitability and customer satisfaction

When using Optical Character Recognition (OCR), image quality is key - blurred, poorly scanned documents with blemishes, unclear images or lighter text, will result in poor recognition and the OCR results will suffer. Even a one percentage point lower OCR read rate can translate into significant cost associated with unnecessary exception handling.

Documents that fail the quality control check and those that are not recognized during the OCR process, require re-scans and manual entry of index fields, which costs both time and money. The level of exception processing also has an additional negative impact on business efficiency - it affects business success metrics such as claims processing times, which ultimately has a knock-on effect on customer satisfaction levels.

Reduce the time spent on document preparation

The ability to feed mixed batches, just as they arrive, without sacrificing speed and ensuring a consistent, high quality output presents a massive opportunity for organizations to improve the bottom line. It also drastically cuts wasted time spent manually pre-sorting documents.

The goal of the Alaris Advanced Image Processing team is to completely eliminate document preparation over time. Alaris has a strong heritage in image science that focuses on un-paralleled image quality for all kinds of documents. Alaris Perfect Page Technology provides state-of-the-art capabilities for image enhancement, even for very challenging documents and mixed document batches. All of the features covered in the remainder of this guide are core to Perfect Page Technology. When you're considering your next scanner investment, make sure to take into account all of the ways the right technology could help your business save time, reduce costs and improve accuracy for your scanning operations. Read on for details about how Perfect Page enhances images for many of the most common, and most challenging, types of scanning applications.

Deskew and auto-cropping:

Incoming mail rarely arrives in a neatly organized stack, especially when documents are mixed in size. The images need to be straightened (or deskewed) to be used for future processes like automated recognition of text, handwriting or check marks. The image needs to be straightened so that the sides of the document are parallel to the edge of the output image. Depending on the scanning application, a black border may or may not be required. Documents with a significant black background as illustrated on the first image below, impact any further use of the image. It is therefore key to crop the image to capture the area that just represents the document.

Bad cropping can cause problems with locating data on forms. Most software still 'finds' data by using the document corners as locator points, rather than 'fiducials', which is a better option. For long documents, cropping needs to be based on a four-corner analysis rather than a two corner plus length method, this will produce superior results for pages that are not perfectly rectangular, as shown in the sample below.

Output without deskew and cropping
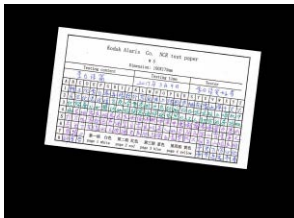
Data loss due to faulty deskew
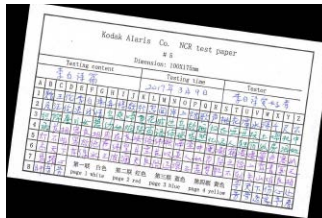
Autocrop and deskew
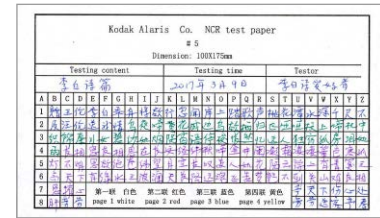
Auto-orientation:

The ability to feed batches of mixed portrait and landscape documents into the scanner and achieve a perfectly oriented series of images, is a huge efficiency gain. Businesses sometimes need to scan in landscape for faster throughput speeds or to avoid document problems that would affect feeding, like sticky edges.

A fixed 90-degree rotation of landscape documents is a good first step most of the time. For the times that documents slip during preparation, the scanner needs to be smart enough to make orientation adjustments on the fly.

Auto-orientation should be content-based, to detect and correct the orientation of documents regardless of how they are fed. For duplex scanning in landscape, a combination of default rotation and auto-orientation is advisable. And for organizations working internationally, this needs to work regardless of the language used.

Input
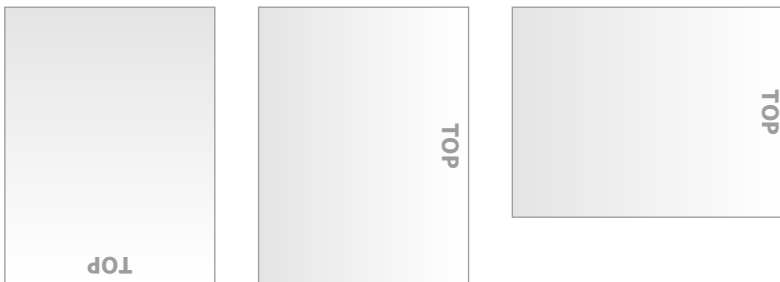
Output

Auto brightness:

There is no need to use a copier to change the brightness of a low contrast document. Scanning technology automatically adjusts image brightness optimization, which works with no loss of speed or throughput on color and grayscale documents. By making the brightest colors in each image as bright as possible, and the darkest colors as dark as possible, both the image quality perception and the human readability of documents are significantly improved. This feature is beneficial for the archival of documents.

Input
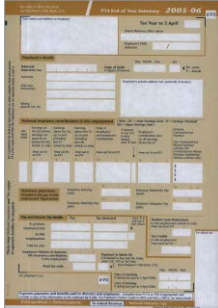
Default
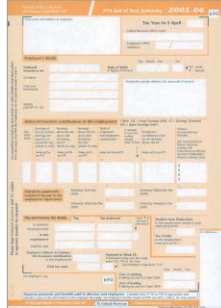
Autobright
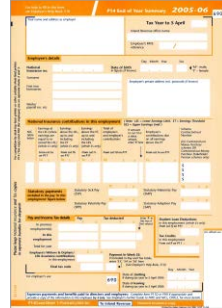
Sharpening:

By increasing the contrast of edges within an image, automated sharpening makes objects in the image appear 'crisper'. This improves the appearance of the document for better OCR read rates.

Sharpening sample

None

Normal

High

Intelligent background color smoothing:

Background colors in a color or grayscale image can be uneven. Image smoothing minimizes color variation, providing a 'cleaner' image that looks more like a digitally born document. It also typically reduces the size of compressed images. Documents or forms where the foreground (e.g. text, lines, etc.) needs to be more prominent can be enhanced through intelligent foreground boldness.

No color smoothing
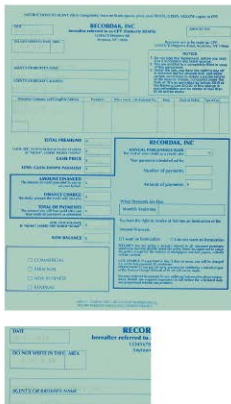
Color smoothing
but foreground hard to see
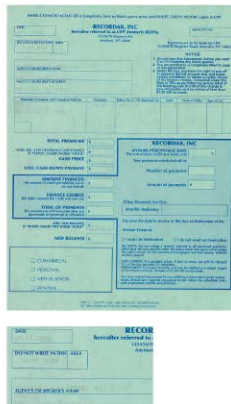
Color smoothing and
foreground boldness added
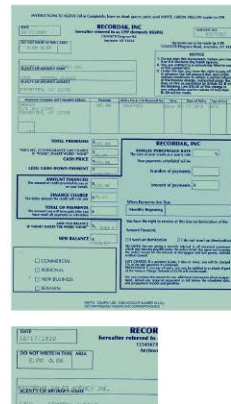
Streak removal:

Streak filtering technology addresses one of the most common image quality issues - dealing with vertical black lines on an original, non-deskewed image. These are frequently caused by dust that gets under the scanner housing over time. Regular cleaning is needed to avoid this, but image enhancement technology can remove or reduce it when it occurs.
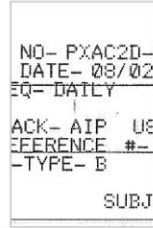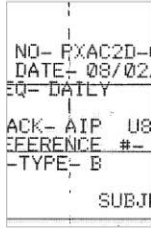
Before (streak filtering off)
Color

Black and white
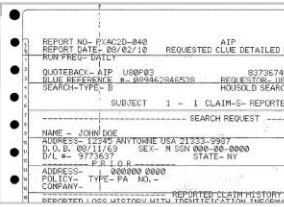
After (streak filtering on)
Black and white

Noise reduction:

Another common challenge when converting color documents to black and white images is the appearance of small (or larger) dots commonly referred to as 'noise' caused by dust or lower paper quality like recycled paper. Noise removal algorithms remove single dots (lone pixels), groups of pixels (majority rule) or even bigger groups of pixels (background noise removal) to improve the appearance of a document.

Noise reduction
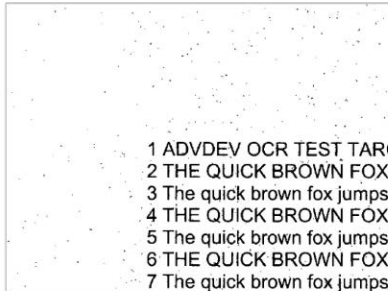
Background noise removal
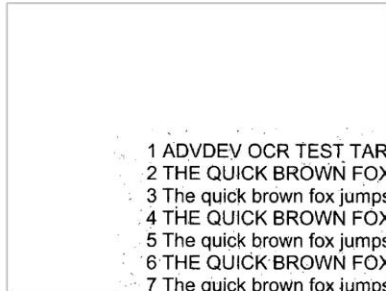
All-color drop-out:

The use of color dropout is a standard practice during automated forms processing, where an optimized bi-tonal image is required for enhancing OCR read rates. Businesses often use forms with different dropout colors mixed together. Intelligent technology can intelligently identify and electronically remove multiple dominant or pre-defined colors to reduce manual intervention and ensure optimum read rates.

Color image
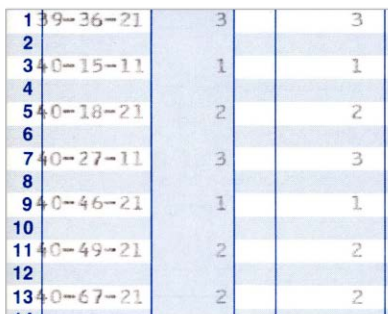
All-color drop-out
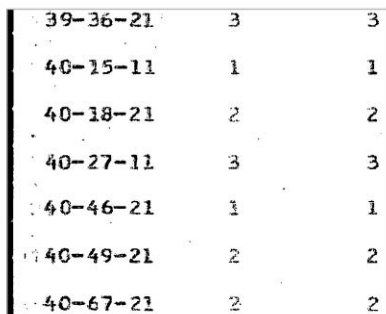
Dual stream:

It's important to generate a color scan at the same time as a black and white one. A color image is usually the preferred choice for archival purposes and for any human interaction during processing. For automated processing for indexing or extraction of data, an optimized bi-tonal (black and white) image is required. Dual Stream capability creates both kinds of files during the scanning process.

Photo segmentation:

Documents containing both text and pictures, such as passport applications or insurance claims, need to be treated differently. By distinguishing photos from text areas, technology can apply different processing techniques to each area, and apply photo cropping to color images. If a bi-tonal image is required, auto-dithering technology can be used that makes the photo look almost like a greyscale image, while other elements like barcodes will not be dithered to ensure recognition.

Input   Binarized   Segmentation Applied

Improved OCR read rates and binarization "iThreshholding":

Binarization, i.e. the conversion of color images to black & white images, is core to all data extraction features and therefore the foundation for any image processing. In a batch of mixed quality documents, requirements for this binarization and enhancement differ from one document to the other. Intelligent technology analyzes the foreground and background of document images, assessing brightness and contrast, then dynamically sets the optimal threshold values. This optimizes the overall image quality and file size, especially for shaded/halftone documents that cause issues with character recognition.

Original form   Output binarized   Output optimized

Conclusion

Advanced image processing can streamline how documents are accurately digitized and delivered to business systems. Perfect Page Technology offers several techniques to improve image quality, without the need for multiple, cumbersome manual efforts during document preparation or further down the scanning process. The capabilities illustrated in this article are just a small fraction of the Perfect Page features available in our award-winning range of document scanners and scanning software. Partners and customers accredit Perfect Page as one of the key advantages of scanners and software that are part of the Alaris IN2 Ecosystem. When evaluating a new document capture solution, make sure to give these aspects the importance they deserve regarding the impact on your total cost of ownership. Ask the vendors you are evaluating to demo their image quality and assess the impact on your document preparation and post scan process and associated cost.

Perfect Page Technology allows you to:

- Reduce document preparation to simple tasks like removing staples, with absolutely no pre-sorting required.

- Process mixed batches of documents without sorting for orientation, size, type or shape.

- Increase OCR/ICR results significantly as well as cut exception handling to a fraction.

Perfect Page Technology is an integral part of the Alaris IN2 Ecosystem and underpins the exceptional image quality associated with Alaris. The Alaris IN2 Ecosystem is a powerful combination of best-in-class scanners, software, services and partnerships, designed to take complexity out of information capture and enable customers to transform data chaos into critical information that drives efficiency.

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