

Datacap – Advanced Topics

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- Image Enhancement

INDUSTRY SOLUTIONS
Fast Start 2012

Image Enhancement - Agenda

- Why enhancing Images ?
- Where enhancing Images ?
- How enhancing Images ?
- What are the pitfalls ?

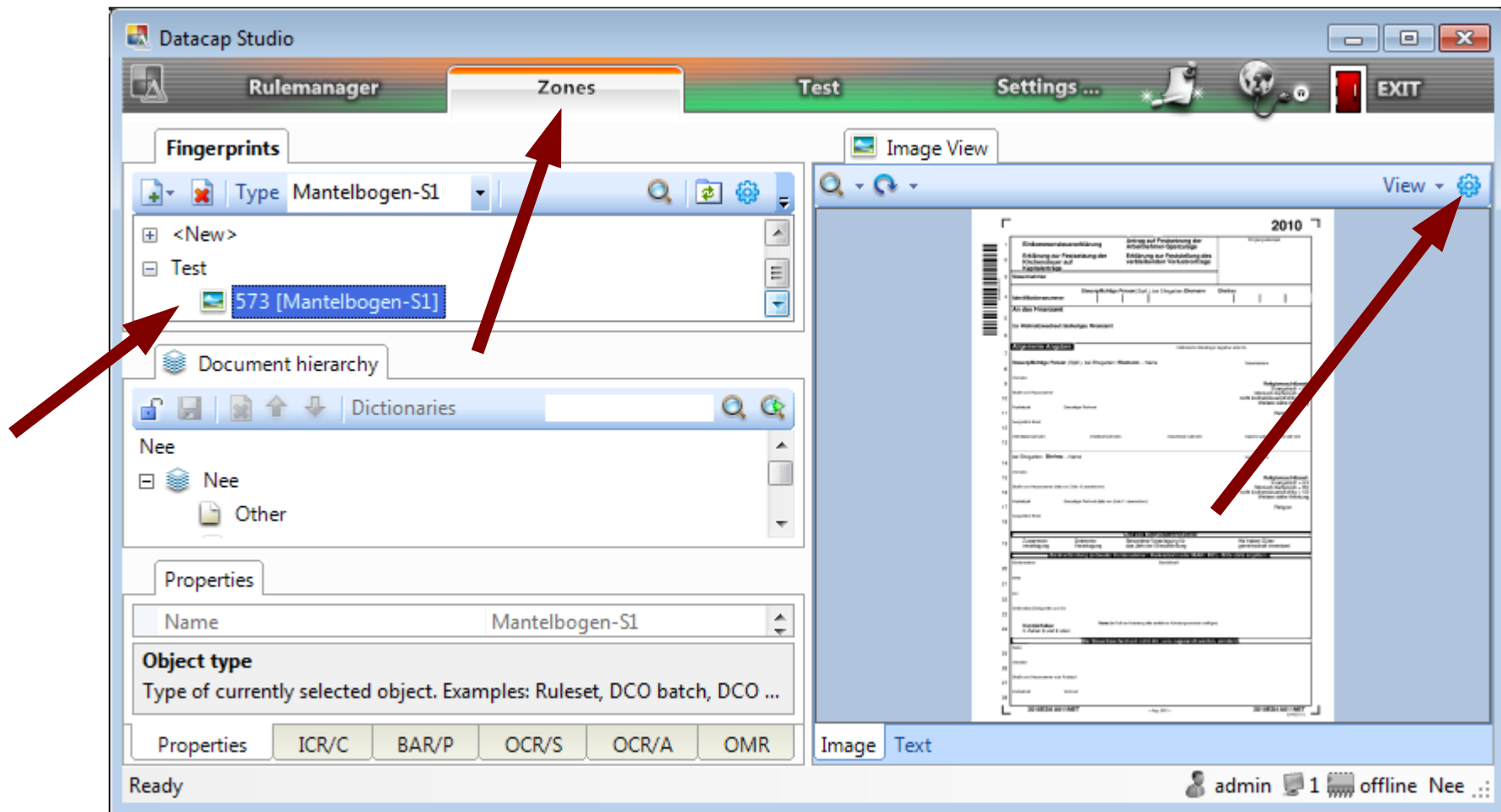
Why enhance Images ?

- Separate information from noise
- Aids to enter data in a form (like lines or boxes) disturb ICR / OCR engines
- ICR / OCR works best with black and white images
- No ICR / OCR on icons
- Increase performance of the OCR engine
- Make life easy for ICR / OCR engines to get good recognition results

Where enhancing Images ?

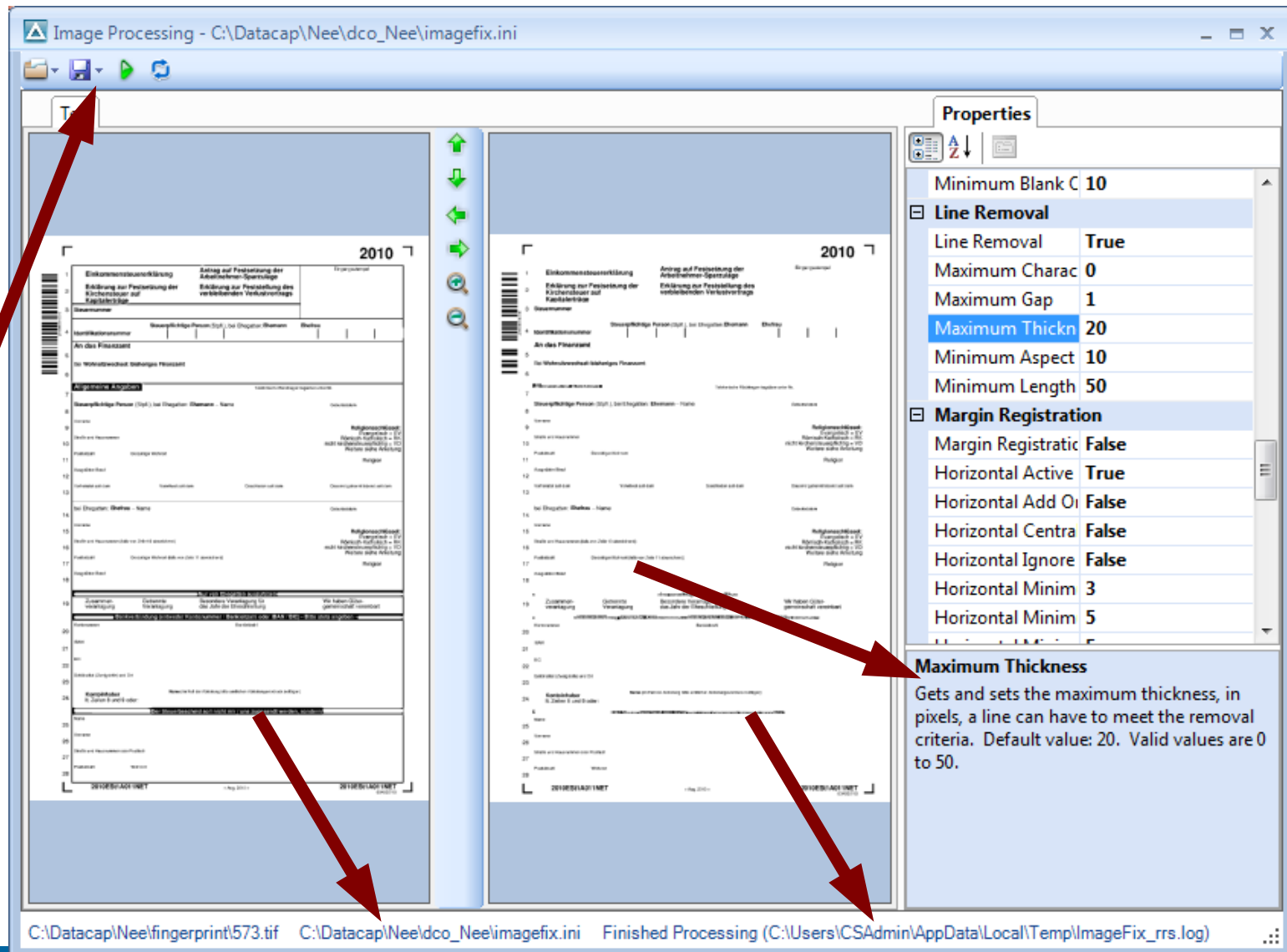
- Software : an image enhancing software can be configured and called from Datacap Taskmaster Capture
- Hardware : the scanner can enhance images

Image Enhancement in DatacapStudio



Start the image processing client from DStudio

Image Enhancement in DatacapStudio, cont'd



The screenshot shows the DatacapStudio Image Processing window. The title bar reads "Image Processing - C:\Datacap\Nee\dco_Nee\imagefix.ini". The interface is split into two main panes showing a document image. The left pane shows the original image, and the right pane shows the processed image. A Properties panel on the right contains the following settings:

Properties	
Minimum Blank C	10
Line Removal	
Line Removal	True
Maximum Charac	0
Maximum Gap	1
Maximum Thickn	20
Minimum Aspect	10
Minimum Length	50
Margin Registration	
Margin Registratic	False
Horizontal Active	True
Horizontal Add O	False
Horizontal Centra	False
Horizontal Ignore	False
Horizontal Minim	3
Horizontal Minim	5

Below the Properties panel, there is a section titled "Maximum Thickness" with the following text: "Gets and sets the maximum thickness, in pixels, a line can have to meet the removal criteria. Default value: 20. Valid values are 0 to 50." Red arrows point from the "Maximum Thickness" property in the Properties panel to the corresponding line in the document image on the right pane.

The status bar at the bottom shows the following paths: "C:\Datacap\Nee\fingerpint\573.tif", "C:\Datacap\Nee\dco_Nee\imagefix.ini", and "Finished Processing (C:\Users\CSAdmin\AppData\Local\Temp\ImageFix_rrs.log)".

Image Enhancement in DatacapStudio, cont'd

- Listen to the logfile
 - Samples :
 - Comb removal operation ON
 - Comb removal operation completed.
 - Search for “*Exception*”
 - Cannot process this resolution
 - *Specified argument was out of the range of valid values.*

How enhancing Images ?

- Line removal
 - If forms have lines to support writing properly on a line
- Box removal
 - If forms have boxes to support writing characters properly
- Comb removal
 - If forms have combs instead of boxes to support writing characters properly
- Dotshading vs despeckle
 - Remove noise but keep the characters like i
- Color removal
 - If forms have colours for the input aids

Line Removal

- Line removal
 - If forms have lines to support writing properly on a line

Line Removal

2010

1 Einkommensteuererklärung Antrag auf Festsetzung der Arbeitnehmer-Sparzulage Eingangsstempel

2 Erklärung zur Festsetzung der Kirchensteuer auf Kapitalerträge Erklärung zur Feststellung des verbleibenden Verlustvortrags

3 Steuernummer

4 Identifikationsnummer [LineRemoval] ON=True

5 An das Finanzamt MaximumCharacterRepairSize=0

6 Bei Wohnsitzwechsel: bisherig MaximumGap=1

7 Allgemeine Angaben MaximumThickness=20

8 Steuerpflichtige Person (Stpfl.), bei Ehegatten: Ehemann – Name MinimumAspectRatio=10

9 Vorname MinimumLength=50

10 Straße und Hausnummer

11 Postleitzahl Derzeitiger Wohnort


Religionsschlüssel:
Evangelisch = EV
Römisch-Katholisch = RK
nicht kirchensteuerpflichtig = VD
Weitere siehe Anleitung

Religion

Black and white image before line removal

Line Removal

2010

 <p>201003101201</p>	<p>1 Einkommensteuererklärung</p> <p>2 Erklärung zur Festsetzung der Kirchensteuer auf Kapitalerträge</p> <p>3 Steuernummer</p> <p>4 Identifikationsnummer</p> <p>5 An das Finanzamt</p> <p>6 Bei Wohnsitzwechsel: bisheriges Finanzamt</p> <p>7 Alternativ: Telefonat</p> <p>8 Steuerpflichtige Person (Stpfl.), bei Ehegatten: Ehemann – Name</p> <p>9 Vorname</p> <p>10 Straße und Hausnummer</p> <p>11 Postleitzahl</p>	<p>Antrag auf Festsetzung der Arbeitnehmer-Sparzulage</p> <p>Erklärung zur Feststellung des verbleibenden Verlustvortrags</p> <p>Steuerpflichtige Person (Stpfl.), bei Ehegatten: Ehemann</p> <p>Ehefrau</p> <p>Telefonische Rückfragen tagsüber unter Nr.</p> <p>Geburtsdatum</p> <p>Religionsschlüssel: Evangelisch = EV Römisch-Katholisch = RK nicht kirchensteuerpflichtig = VD Weitere siehe Anleitung</p> <p>Religion</p>	<p>Eingangsstempel</p>
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Black and white image after line removal with damaged barcode

Box Removal

- Box removal
 - If forms have boxes to support writing characters properly

Box Removal

Telephone : 00491728377124

Line Removal	
Line Removal	True
Maximum Characater Repair Size	20
Maximum Gap	1
Maximum Thickness	50
Minimum Aspect Ratio	10
Minimum Length	40

Telephone : 00491728377124

Comb Removal

- Comb removal
 - If forms have combs instead of boxes to support writing characters properly
 - Applies to ICR mainly

Comb Removal

Zuchtmeister

Zuchtm

Zuchtmeister

Comb Removal	
Comb Removal	True
Comb Height	5
Comb Spacing	20
Horizontal Line Thickness	5
Minimum Comb Length	100
Minimum Confidence	50
Vertical Line Thickness	5

Smaler combs require different settings

Zuchtmeister

Zuchtmeister

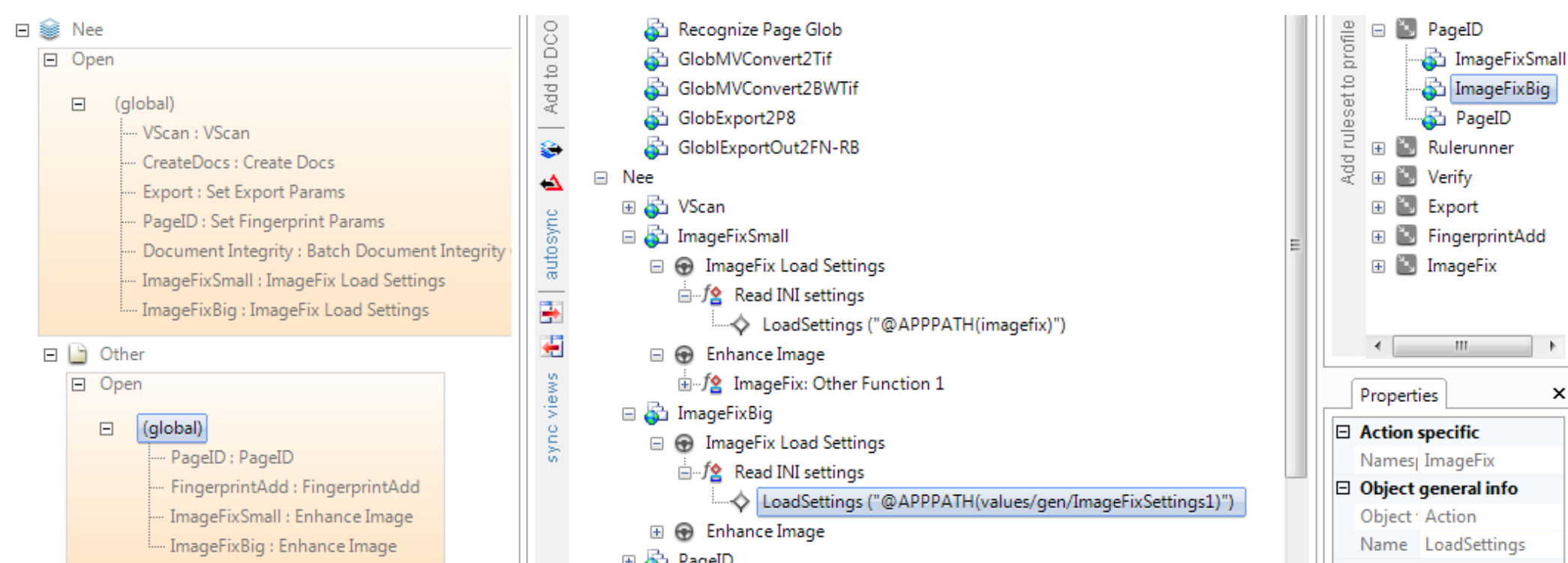
Zuchtmeister

Zuchtmeister

Zuchtmeister

Zuchtmeister

Comb Removal

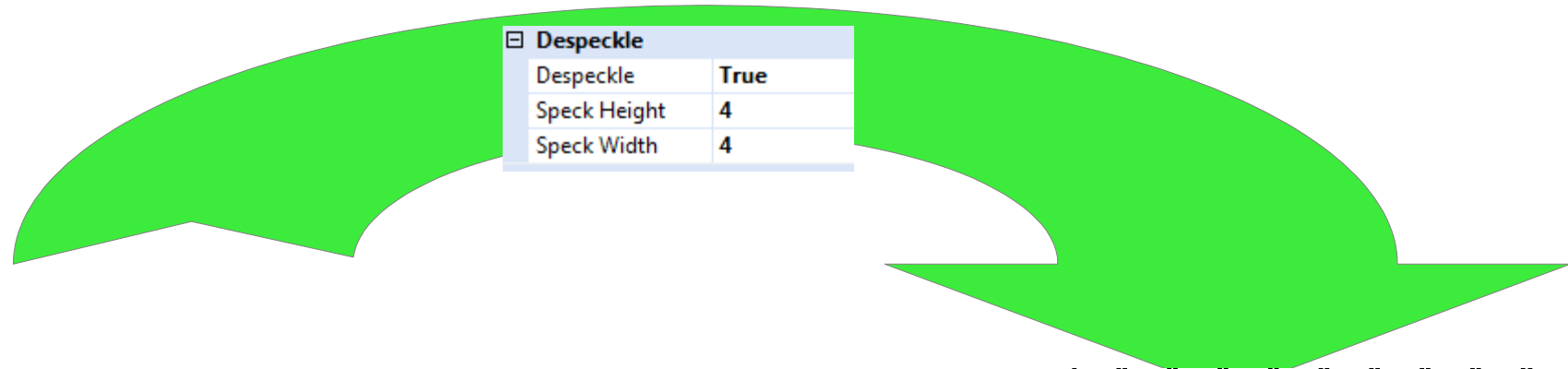


The screenshot displays the IBM Business Process Manager (BPM) console for the 'Comb Removal' process. The interface is divided into three main sections:

- Left Sidebar:** Contains two categories: 'Nee' and 'Other'. Under 'Nee', there is a 'global' folder with sub-items: 'VScan : VScan', 'CreateDocs : Create Docs', 'Export : Set Export Params', 'PageID : Set Fingerprint Params', 'Document Integrity : Batch Document Integrity', 'ImageFixSmall : ImageFix Load Settings', and 'ImageFixBig : ImageFix Load Settings'. Under 'Other', there is a 'global' folder with sub-items: 'PageID : PageID', 'FingerprintAdd : FingerprintAdd', 'ImageFixSmall : Enhance Image', and 'ImageFixBig : Enhance Image'.
- Central Workspace:** Displays the process flow diagram. The flow starts with 'Recognize Page Glob', followed by 'GlobMVConvert2Tif', 'GlobMVConvert2BWTif', 'GlobExport2P8', and 'GlobExportOut2FN-RB'. The main flow is under the 'Nee' category, which includes 'VScan', 'ImageFixSmall', and 'ImageFixBig'. The 'ImageFixSmall' task has a sub-task 'ImageFix Load Settings' which calls 'Read INI settings' and then 'LoadSettings ("@APPPATH(imagefix)")'. The 'ImageFixBig' task has a sub-task 'ImageFix Load Settings' which calls 'Read INI settings' and then 'LoadSettings ("@APPPATH(values/gen/ImageFixSettings1)")'. The flow ends with 'PageID'.
- Right Sidebar:** Contains a 'Properties' panel. The 'Action specific' section shows 'Names: ImageFix'. The 'Object general info' section shows 'Object: Action' and 'Name: LoadSettings'.

Call image enhancement twice with different settings

Remove gray Background – Option 1



<input checked="" type="checkbox"/> Despeckle	
Despeckle	True
Speck Height	4
Speck Width	4

Telephone :

Company Name :

Address :

Zip :

City :

Street :

Registration form (please fill in your personal/company information)

Telephone :

Company Name :

Address :

Zip :

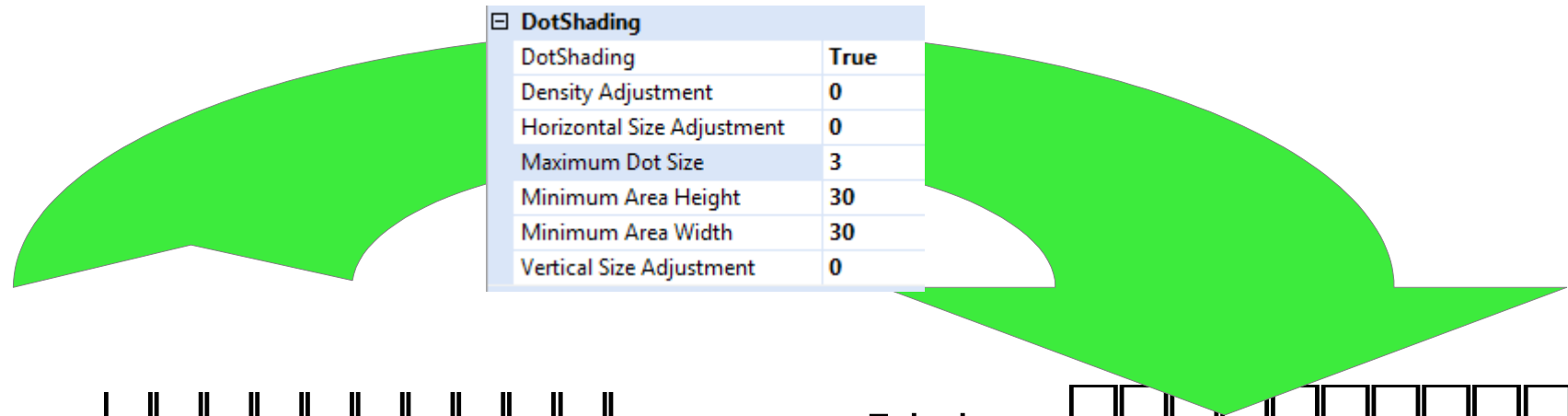
City :

Street :

Registration form (please fill in your personal/company information)

Remove gray background

Remove gray background – Option 2



Telephone :

Company Name :

Address :

Zip :

City :

Street :

Registration form (please fill in your personal/company information)

Telephone :

Company Name :

Address :

Zip :

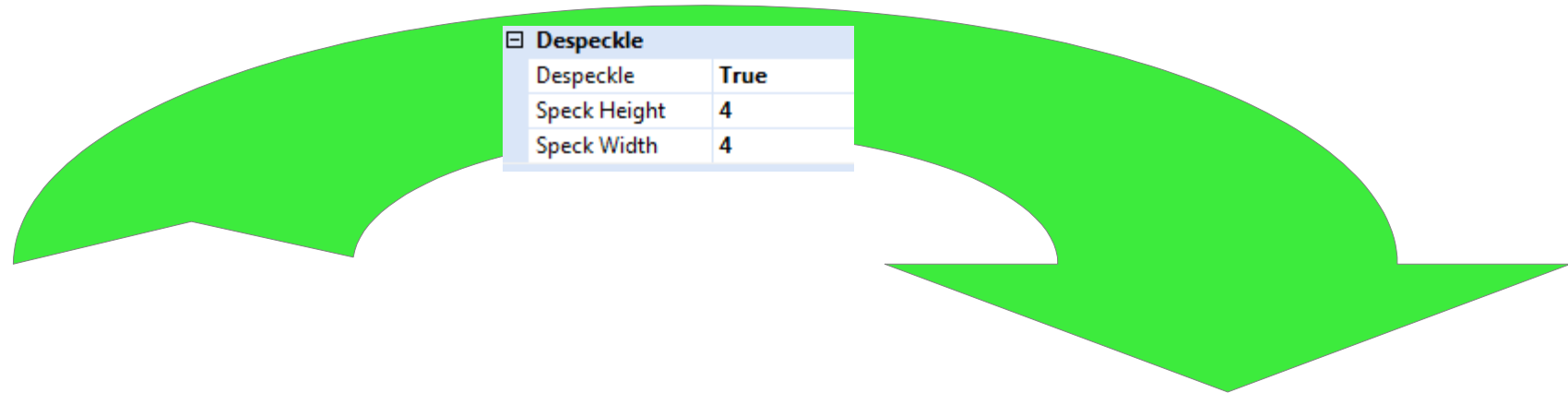
City :

Street

Registration form (please fill in your personal/company information)

Remove gray background

Remove doted Boxes



LOAN TRANSMITTAL HEADER

LOAN NUMBER:	1 1 1 1 1 2 2 2 2 2
BORROWER LAST NAME:	S M I T H
TRANSMITTAL DATE:	0 1 - 1 6 - 2 0 1 2 MM-DD-YYYY



LOAN TRANSMITTAL HEADER

LOAN NUMBER	1 1 1 1 1 2 2 2 2 2
BORROWER LAST NAME	S M I T H
TRANSMITTAL DATE	0 1 . 1 6 . 2 0 1 2 MM-DD-YYYY

Remove gray background

Recognition Sequence

- OCR reads from top left. If a word is higher than its left neighbour, it will be read first

Colour Removal

- Most scan devices offer the color removal feature. It should be used there. Datacap Taskmaster Capture does not support colour removal
- Used if forms have coloured input aids

Colour Removal

Überweisung 290 200 00

N
BANKHAUS NEELMEYER

Zahlungsempfänger: Name, Vorname/Firma
H. Zuchtmeister

Konto-Nr. des Zahlungsempfängers
123456789

Kreditinstitut/Zahlungsdienstleister des Zah
bank

Bankleitzahl
290 200 00

Kunden-Referenznummer - Verwendungszweck, ggf. Name und Anschrift des Zahlers - (nur für Zahlungsempfänger)
Für besondere öffentliche Verdienste

noch Verwendungszweck (insgesamt max. 2 Zeilen à 27 Stellen)

Kontoinhaber: Name, Vorname/Firma, Ort (max. 27 Stellen, keine Straßen- oder Postfachangaben)
Zufriedener Kunde

Konto-Nr. des Kontoinhabers
987654

U 30/01.02

20

0660506

Datum, Unterschrift(en)

Bitte NICHT VERGESSEN Datum, Unterschrift

Betrag: Bei HAND-Bil auch das Komma in ein

Die Durchschrift ist für Ihre Unterlagen bestimmt!

scanned as jpg

Colour Removal

Überweisung 290 200 00

N
BANKHAUS NEELMEYER

Zahlungsempfänger: Name, Vorname/Firma
H. Zuchunolster

Konto-Nr. des Zahlungsempfängers
123456789

Kreditinstitut/Zahlungsdienstleister des Zah
bank

Bankleitzahl
290 200 00

Kunden-Referenznummer - Verwendungszweck, ggf. Name und Anschrift des Zahlers - (nur für Zahlungsempfänger)
Für besondere öffentliche Verdienste

Kontoinhaber: Name, Vorname/Firma, Ort (max. 27 Stellen, keine Straßen- oder Postfachangaben)
Zufriedener Kunde

Konto-Nr. des Kontoinhabers
337051

U 30/01.02

Betrag: Bei HAND-E auch das Komma in e

Bitte NICHT VERGESSEN Datum, Unterschrift

0660506

Datum, Unterschrift(en)

Die Durchschrift ist für Ihre Unterlagen bestimmt!

Color removed from jpg with action C2BW_Convert

Colour Removal

Überweisung 290 200 00

N

BANKHAUS NEELME

H Zuchtmeis

123456789

bank

290 200 00

Für besonder

Zufriedener Kunde

987654


0660506

20

Bitte
NICHT
VER-
GESSEN
Datum,
Unter-
schrift

Die Durchschrift ist für Ihre
Unterlagen bestimmt!

Schreibmaschine: normale Schreibweise!
Handschrift: Blockschrift in GROSSBUCHSTABEN, Kästchen beachten!



scanned as tiff

Considerations

- Consider performance when defining the taskprofile (gray boxes / shading)
- Consider required sequence of image enhancement actions. Use multiple calls with different parameters (imagefix.ini's) if required
- Line removal most likely destroys barcodes
- Comb removal should run before line removal
- OCR reads from top left. If a word is (slightly) higher than its left neighbour, it will be read first
- Run image enhancement before fingerprint

Pitfalls

- Don't try to improvise with images. - Insist upon getting proper demo documents from the customer. It can be a huge waste of time !!
- Physical scanner can bring different results than virtual scanning. Slight rotation can make a huge difference

More Information

Datacap Document Capture Community (IBM internal)

- <http://w3.ibm.com/connections/communities/service/html/communityview?communityUuid=45274911-4b22-4b67-80a0->
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