Automatic Check Processing & Advanced Content Recognition

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Changing Technology

“Any sufficiently advanced technology is indistinguishable from magic.”

Arthur C. Clarke
British Science Fiction Author

“We’re changing the world with technology.”

Bill Gates

"MickeyMinniePlutoHueyLouieDeweyDonaldGoofyLansing"
Background on Content Recognition

• It all started with “Gismo” in 1951. Followed by Intelligent Machines Research Corporation (IMR)
  – Used image analysis, rather than character matching.
• First commercial installation installed at Readers Digest in 1955.
• Second installation at Standard Oil Company for reading Credit Card imprints for billing.
• US Postal Service has been using OCR machines for sorting mail since 1965.
• In 1974 Raymond Kurzweil developed the first omni-font OCR system and built a reading machine for the blind.
  – Stevie Wonder bought the first production system in 1976 after hearing a demonstration on the “Today Show”.

“We’ve come a long way, baby”
Elements of Content Recognition

- **Optical Character Recognition (OCR)**
  - The process of translating scanned images of typewritten text into machine-editable/usable information.

- **Intelligent Character Recognition (ICR)**
  - The process of translating scanned images of hand-printed characters (not cursive) and convert them into machine-readable characters.

- **Optical Mark Recognition (OMR)**
  - The process of detecting the existence of a mark, not its shape, on a scanned image.

- **Magnetic Ink Character Recognition (MICR)**
  - Specialized character recognition technology to facilitate check processing. Since background designs can interfere with optical recognition, the banks use magnetic ink on checks to ensure accuracy.

- **Barcode Recognition**
  - Machine-readable representation of information.

- **Intelligent Writing Recognition (IWR)**
  - Obtaining cursive information
1D barcode
Universal Product Code (UPC)

2D barcode
The Gettysburg Address
Government Challenges

- Reduced Staff
- Reduced Funding
- Still flooded with documents everyday
- Maintain constituent service levels
- Meet public document disclosure regulations
- Get documents into electronic systems quickly
  - Easy to retrieve
  - Meet compliance regulations
A World Leader: Intelligent Word Recognition

23 Country Versions
+ 6 Languages
+ Arabic in Development
recognizing the world’s handwriting
Extract All Possible Information from Paper

Machine Print

Combs

Check box

Signature detection

Cursive or freestyle handwriting

Pre-box

Capital

Unconstrained Handprint
Remittance:
Automated Check Processing

Check 21
Remote Deposit Capture
Accounts Receivable
Automated Check Processing

• Many government documents include accompanying payments;
  – Parking Tickets
  – Licenses
  – Tax payments
  – Court Fines
  – Utility bills
  – Registrations
  – Applications

“What if you never had to go to the bank again, and received your funds quicker.”
Electronic Financial Transactions

• **Check 21**
  – The “Check Clearing for the 21\textsuperscript{st} Century ACT”
  – This law allows the recipient of the original paper check (you), to create a digital version of the original check (called the “substitute check”), thereby eliminating the need for further handling of the physical check.

• **Cash Application Letter (X9-100.197)**
  – Common file format of information extracted from the scanned paper check for direct electronic deposit to the bank.
ImageSoft “Check2Bank” Services

- ImageSoft’s Check2Bank provides electronic check processing and bank deposits.
  - Utilizing A2iA CheckReader technology
  - Kofax or OnBase Scanning
  - ImageSoft Cash Letter Generator
  - ImageSoft Cash Letter Sender
  - AR Output File
  - OnBase WF
• Reduces “Days Sales Outstanding” (DSO)
  – Get your funds faster
  – Faster notification of NSFs
• Capture payments at remote locations
• Eliminate time and potential errors of posting to ERP system
• No proprietary hardware requirements – use the scanners you have today.
• No need to make bank runs for deposits
  – Faster
  – Safer
  – Less Expensive
• Potential lower bank deposit fees
A2iA CheckReader Quick Facts

• 17 Years of check-processing experience.
• Ability to read every field on a check or related payment document.
• Locates, cleans, de-slants and segments writing into words, numerals and characters.
• Only check-processing engine to detect mismatched CAR/LAR amounts in real-time.
• Contains no third-party technology.
• Proprietary recognition engines: OCR, OMR, ICR and IWR.
• Proprietary, advanced neural network and artificial intelligence.
• Check image quality (IQA), usability (IUA) and negotiability provided in one simple call.
• Efficient use of computer resources, allows for other applications and operations to function simultaneously.
Counterfeit Check & Fraud Detection at the Merchant or Point of Care

**Name and Address Block** Location and Encrypted Values

**Characteristics of Handwriting Style** on Legal Amount Line

**Font style and size of the letter “D” in the word ‘Date’**

**Check Number Fields Mismatch Detection**

**“To the Order Of” - Wording and Location**

**Location of Lines Relative to Each Other**

**Date Field Location**

**Courtesy Amount Field Location**

**Location, Size and Style of Currency Sign**
Advanced Document Classification
The Next Frontier
A class can be multiple pages of the same document...

...Different pages that relate to one another based on their topic / subject matter

- OR -

Application forms

Application form, supporting letter of reference, and a check to process the application.
Layout Clues for Classification

- **Titles, Subtitles**
- **Logos**
- **Lines and Frames**
- **Machine-Printed Text Detection**
- **Handwritten Text Detection**
- **Keywords**
- **Size of the Documents**
“Intelligent Word Recognition (IWR) technology lies at the heart of A2iA. IWR is optimized for data...on real-world documents that contain mostly free-form, hard-to-recognize handwriting that is inherently unsuitable for ICR.

The best use of IWR is to eliminate a high percentage of the manual entry of handwritten data and run-on hand print fields on documents that otherwise could be keyed only by humans.”

Arthur Gringade, ICP
Partner, Imerge Consulting
“Using IWR to Cut Labor Costs Without Outsourcing”
Forms & Handwritten Document Processing
Advanced Content Recognition

• Eliminate the manual keying of government documents and automating workflow for a more seamless, budget friendly document process.

• Incorporate handwriting into your workflow by extracting machine print through to complex, cursive handwriting from structured and unstructured documents on all types of forms, documents and archives.

• Properly route information to the appropriate departments or workflow; index documents by layout and content with A2iA’s holistic methodology.
Alpha or Numeric Content?

Recognition in Context, Using Field Configuration

"BO" or number "130"?

Alpha or Numeric Content?
Reading of **fields automatically identified** near a pre-defined sign (currency sign or a pre-printed keyword).
Automated Forms Processing

Reduce Keying
Ensure Confidentiality
Consistent Data Accuracy

Handwritten Fields
  • Names, Addresses, DOB, Codes

Machine Printed Data
Check Boxes
Dates
Dollar Amounts
SSN
Billing Codes
ID Numbers
How is Handwritten Data Processed?

Classification of Handwritten Documents
• Geometric & Content Analysis
• Interfaced with country dictionary & user-defined databases

Extraction of Handwritten Data
• All types of information: alpha, numeric, alpha numeric.
Through a **user-defined or trade dictionary**, A2iA achieves higher accuracy even on the most complex cursive handwritten documents.
**Keyword Spotting**

*A2iA DocumentReader* automatically extracts and recognizes user-defined keywords and key expressions in a cursive paragraph.

**Potential Uses:**
- Redaction
- Compliance
- E-Discovery
- De-Classification
ImageSoft Check2Bank Solution

• Components
  – A2iA CheckReader
  – Kofax or OnBase scanning
  – ImageSoft Cash Letter Generator
  – ImageSoft Cash Letter Sender
  – AR Output File
  – OnBase Workflow