Image Technologies to Detect Fraud

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Topics

- Fraud Trends
- Image Implications for Fraud Detection
- Image-based Fraud Detection Technologies
  - Automated Signature Verification
  - Comprehensive Image Analysis
- Relationship to Other Initiatives
Fraud Trends

• **ABA Deposit Account Fraud Study 2002**
  – Fraud attempts doubled in 2001 to $4 billion
  – Check Fraud is still growing (+3%); downward trend (-20%) for large institutions but upward more quickly for smaller institutions (+200%)
  – More institutions are reporting fraud losses
  – More loss cases (+35%), but at a lower average dollar loss per case (-23%)

• **Identity theft rising**
  – Multiple sources report that identity theft is one of the fastest growing crimes

• **Increasing fraud perpetrator sophistication**
  – Organized crime involvement
  – Multi-channel attacks on consumer accounts (check, debit card, ACH, ATM, pre-authorized drafts, etc.)
  – Exploiting knowledge of bank detection methods including more small dollar attempts
• Check 21 legislation expected to be signed soon
  – Joint Conference Committee compromise bill (H.R. 1474) passed by the House on October 8, 2003
  – Act takes effect 12 months from date of enactment

• Benefits likely to drive rapid adoption
  – Annual industry benefit estimated to be in $1B - $2B range
  – Most banks already have image technology installed

• Work on standards and infrastructure is proceeding quickly
  – Image exchange standards and formats
    ➢ Higher resolution images are best for automated image analysis
  – Quality issues and responsibilities
  – Alternative image exchange networks
Impact of Image on Fraud Detection

• The Bad News
  – Current paper-based methods of fraud detection must be replaced
  – Clues from paper such as feel, color and smell will be lost

• The Good News
  – As digital artifacts, check images enable new methods of fraud detection
  – Automated image-based detection methods
    ➢ Remove the limit on the volume of checks that can be analyzed
    ➢ Provide the foundation for integrated fraud detection operations
  – Image-based fraud detection operations open up new opportunities
    ➢ Industry-wide loss reduction methods
    ➢ More productive integration with other bank operations
Fraud Loss Category Impact

Image-based Fraud Detection Impact

~ 55% of Losses

Based on Losses
Based on Cases
Automated Signature Verification
Signature Analysis

SignPlus Product Suite

- **Enterprise-Wide Reference Signature Database**
  - Optional ability to store imaged signature cards, documents, photos, etc. for Patriot Act Compliance

- **Automatic Signature Verification**
  - Artificial Intelligence Utilizing Neural Network Technology
  - Unlimited Scalability

- **Automatic Signer Rule Verification**

- **Integrated Dynamic (Biometric) Verification**

- **Integrated Electronic Document with Static and Dynamic Signature Capture**

- **Automated Account Opening Process – Electronic Capture of Signatures in Branches**
A neural network decides - similar to the human brain - as it was trained in separate training processes with tens of thousands of signatures.

Thanks to Fuzzy Logic it also reflects the variability of the various signature characteristics.
Signature Analysis

Verification Engines - Profile

**for static attributes**

- **SIVAL**
- Neural network verifying up to 50 primary and 600 secondary parameters

**for dynamic attributes**

- **ADSV**
- Dynamic programming algorithm optimized for on-line signatures
Signature Analysis

Signature Characteristics (Examples)

- upstrokes, crossings etc.
- line vectors
- compactness vectors
- lower enclosed area
- upper enclosed area
Comprehensive Check Image Analysis
A check writer profile including the characteristics for each of those fields can be used to validate each new check:

- Stock Validation
- Global Properties
- Payee Recognition
Automated Check Stock Mask Creation
Personal Check Example

Normal check for account

Fraudulent check

Stock Validation score = 0

Only thing that matches is the account number
Normal check for account

Fraudulent check

Stock Validation score = 0

Perpetrator focus on signature forgery
Global Properties = Mathematical representation of writing

Global Properties – Personal Check Example

Global Properties Score = 0

Fraud !!!

Global Properties Score = 0
Global Properties – Business Check Example

- For a business check, Global Properties includes the fonts and formats used in the variable data fields
• Recurring payees represent ~80% of all payees for personal accounts

• Recognizing the payee establishes prior relation with account
  – Very low likelihood of fraud

Banks / Loans
Credit Cards
Phone Companies
Merchants
Payee Recognition – Business Accounts

Use check number and amount to correlate with payee in issue file
Verify that payee on check exactly matches payee in issue file
Normal check for account

Pre-authorized draft

Stock Validation score = 0

Suspect payee!
Relationship to Other Initiatives

- Image and Data Analysis Integration
- Image Survivable Security Features
- Account Information Sharing
- Technology Alliances
Image and Data Analysis Integration

Potential to lower data analysis amount thresholds and use image analysis results to eliminate most false positives
• FSTC project underway to evaluate current and proposed check security features in an image environment
  – The ability to detect whether a check is genuine and unaltered from an image would have obvious benefits for fraud detection

• Issues to be addressed include:
  – Will they survive image capture?
  – Can they be verified by the bank of first deposit in a fully automated environment?
  – Do the features survive equally well in both black and white and gray scale image environments at various resolutions and across multiple generations?

• Intent of the study is to address utility, cost and risk issues
Account Information Sharing

• National Fraud Data Bases
  – New accounts
  – Hot files
  – Consolidation of cases across geography/financial institutions for better prosecution
Technology Alliances

- Changes in the payments system demand a holistic fraud prevention tool that looks at all transactions regardless of payments channel
- New technologies and the need to integrate them across multiple tools and processes require a greater use of alliances to provide comprehensive and cost effective solutions
Questions?

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