ATM Fraud Detection

Seminar Wissensbasierte Systeme

Prof. Dr. Hans Kleine Büning
Dr. Maik Anderka
Agenda

- An introduction into ATMs
  - Functions
  - Authentication

- ATM Fraud
  - Skimming / Identity Theft

- ATM Fraud Prevention
  - EMV Standard

- ATM Fraud Detection
  - General techniques
  - Mask detection
  - Data visualization & pattern recognition
An introduction into ATMs

- A: Screen
- B: Card Slot
- C: Button Pad
- D: Select Buttons
- E: Cash Slot
- F: Receipts Slot

[Workmobility]
An introduction into ATMs

What can we do at an ATM?

- Withdraw cash
- Transfer money
- Check balance
- Recharge cellphones
- Deposit cash
An introduction into ATMs

Authentication through Card and PIN

[about.com] [sc.com]
ATM Fraud

Skimming

[Techteachtoo.com]
ATM Fraud / ATM Fraud Prevention

Magnetic stripe card VS Smart card

[wikipedia]
ATM Fraud Prevention

Fraud Life Cycle – an arms race

- Solutions implemented to reduce fraud
- Time lag for solutions to take effect
- New solution is implemented to reduce fraud
- Familiarity with weaknesses in cards and technology increases fraud
- Fraud begins to rise as new technologies are cracked and new weaknesses are found
- Are We Here Now???

[retailDecisions]
ATM Fraud Detection

General approach

1. Raw data (e.g., transaction details)
2. Analytic approach
3. Score
ATM Fraud Detection

- Decision making is not easy

[retailDecisions]
ATM Fraud Detection - Image-based Fraud Detection

[yonsei.ac.kr]
ATM Fraud Detection - Image-based Fraud Detektion [Dong]

Input video

MOVING OBJECT DETECTION

FACE REGION DETECTION

FACIAL FEATURE EXTRACTION

DETERMINATION OF FRAUD

(a)  (b)  (c)  (d)  (e)
ATM Fraud Detection - Image-based Fraud Detection

Input video

- MOVING OBJECT DETECTION
- FACE REGION DETECTION
- FACIAL FEATURE EXTRACTION
- DETERMINATION OF FRAUD

(a) (b) (c) (d)
ATM Fraud Detection - Image-based Fraud Detection

Input video

MOVING OBJECT DETECTION

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(a)  (b)  (c)  (d)  (e)
ATM Fraud Detection - Image-based Fraud Detection

Input video

MOVING OBJECT DETECTION

FACE REGION DETECTION

FACIAL FEATURE EXTRACTION

DETERMINATION OF FRAUD
ATM Fraud Detection - Visualization of ATM Usage Patterns [Reardon]
ATM Fraud Detection - Visualization of ATM Usage Patterns

- A/C balance checks
  - Card 1, balance check then withdrawal
  - Card 2, balance check only
  - Card 3, withdrawal only

- Normal activity profile

- Withdrawals
  - Daily cash limit (e.g., $1000)

ATM Fraud Detection - Visualization of ATM Usage Patterns

Case 1
Case 2
Case 3
Case 4
Many thanks for your attention