Fraud Detection:
Data Mining & Audit Tools

Fraud Detection:
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- "Perfect Crime / Fraud", does it exist?

  Perfect crime is a colloquial term used in law and fiction (principally crime fiction) to characterize *crimes that are undetected, unattributed to a perpetrator*, or else unsolved as a kind of technical achievement —*one which makes the crime an ostensibly inconsequential act for the perpetrator.*

  - http://en.wikipedia.org/wiki/Perfect_crime

Fraud Detection:
Data Mining and Audit Tools

- Fraud Detection
  - Fraud detection is the recognition of symptoms of fraud where no prior suspicion exists.

Fraud Detection:
Data Mining and Audit Tools

- Skill sets for a career in Fraud detection

Auditing standards & procedures

Accounting & Business reporting systems

Evidence gathering

Investigative techniques

Information Technology

Computer Science

Litigation processes & procedures

Criminology

Fraud Detection: Data Mining and Audit Tools

- What is Data mining?
  - Data mining – Two different meanings
    - Common Sense – Every method that assists in finding patterns in large data sets.

Fraud Detection: Data Mining and Audit Tools

Technical – Data mining commonly involves four classes of task:

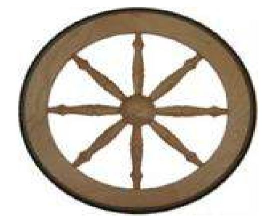
- Classification - Arranges the data into predefined groups with the help of algorithms
- Clustering - Is like classification but the groups are not predefined, so the algorithm will try to group similar items together.
- Regression - Attempts to find a function which models the data with the least error. A common method is to use Genetic Programming.
- Association rule learning - Searches for relationships between variables.

Gold is tested by fire, man by gold.

- Ancient Chinese Proverb

Fraud Detection:
Data Mining and Audit Tools

- “Man is a tool making animal” – Benjamin Franklin
- Human redefined as “Homo Faber”


- Are we alone in making tools?
- Well, we have got company…….

Fraud Detection: Data Mining and Audit Tools

The need for CAATTs

- CAATTs – Only practical means for establishing what the facts really are as they:
  - ➢Help apply intuition, knowledge and skill with far greater impact
  - ➢Identify indicators of fraud or red flags
  - ➢Document findings
- Note: results of Data Analysis may not constitute a proof for fraud.

Fraud Detection: Data Mining and Audit Tools

Types of CAAT tools

- Spreadsheet software, Database management systems, Word processors (mobile phones?)
- Generalized Audit Software (GAS):
  - ACL, IDEA, SoftCAAT
- Concurrent Audit techniques
  - Integrated Test Facility (ITF)
  - Systems Control Audit Review File (SCRAF)
  - Continuous and Intermittent Simulation (CIS)

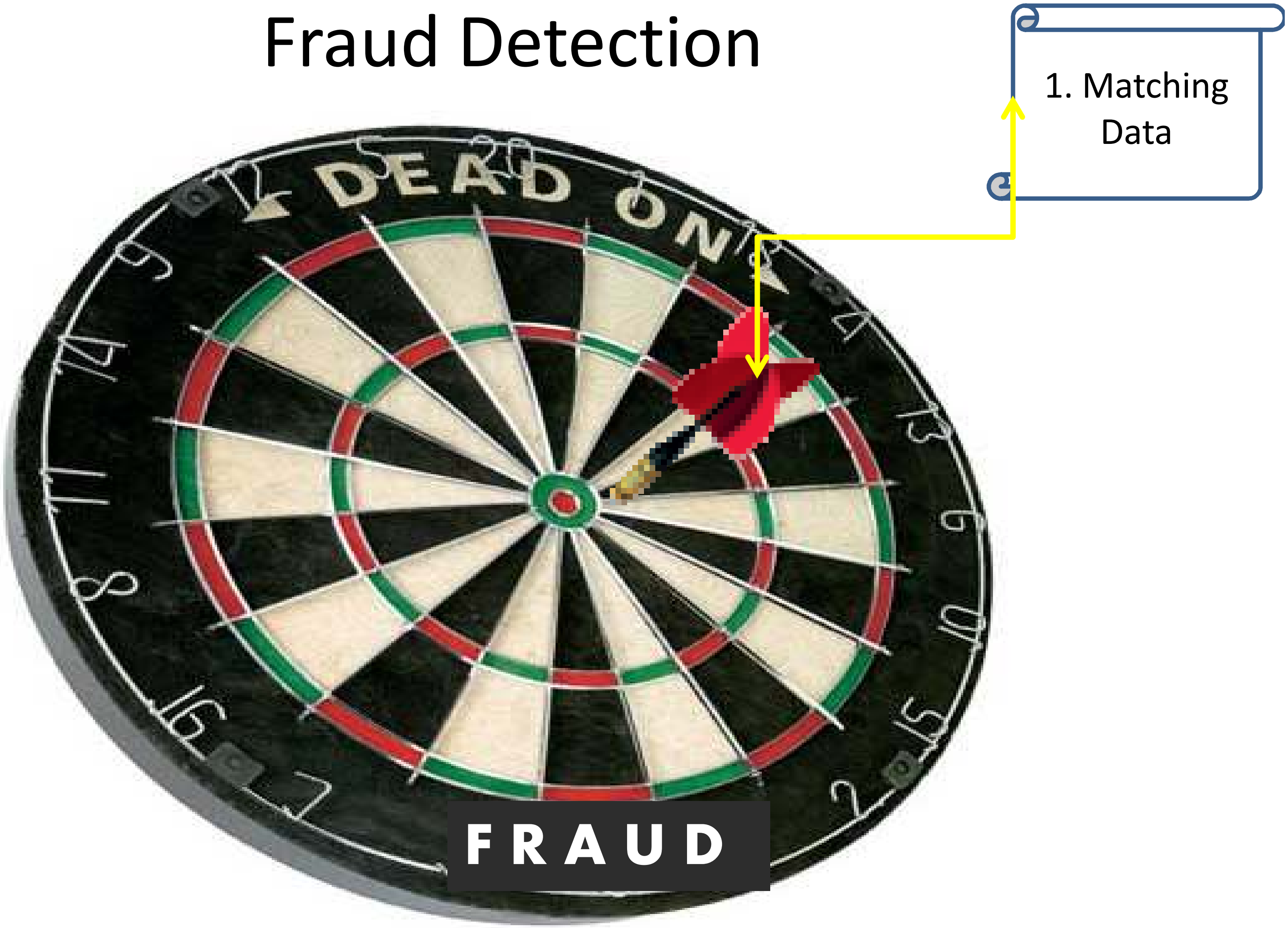
There are seldom small frauds; merely large ones given insufficient time to grow.

- Michael J. Comer, Corporate Fraud, p. 18

Fraud Detection: Data Mining and Audit Tools

- Data mining process with CAATTs has two steps
  - Defining patterns manually and recording it in the tool.
  - Testing patterns' presence in the database automatically.

Data Mining and Analytic Techniques for Fraud Detection



Data Mining and Analytic Techniques for Fraud Detection

Matching Data:

How do I do it?

- Use the VLOOKUP() function in Excel or Join Databases feature in IDEA to match data from different sources
- Such data must have a common field, usually called as ‘Key field’ on which the data is joined.

Case studies:

- Match the payroll data with the card swipe data / server log on data on the employee ID to detect ghost employees
- Match the transaction file received from the stock exchange with the transaction data from the broker’s application on client ID to detect possible money laundering

Data Mining and Analytic Techniques for Fraud Detection

1. Matching Data

2. "Same Same Same" & "Same Same Different" test

Data Mining and Analytic Techniques for Fraud Detection

"Same Same Same" & "Same Same Different" test:

How do I do it?

- Use the Sort, IF() & AND() functions in Excel or Duplicates / Duplicates exclusion feature in IDEA to do these tests

Case studies:

- Use these tests to detect customers having same email address, Pin Code but different Names
- Use these tests to detect customers having same address, Pin Code but different FD Nos
- Use these tests to detect double payments i.e. payment made to the same vendor against the same invoice no. and same date

“There are three things in the world that deserve no mercy, hypocrisy, fraud, and tyranny.”

- Frederick W. Robertson

Data Mining and Analytic Techniques for Fraud Detection

1. Matching Data

2. "Same Same Same" & "Same Same Different" test

3. Benford's Law

Data Mining and Analytic Techniques for Fraud Detection

Benford's Law:

How do I do it?

- Use the LEFT() and COUNTIF() functions along with other mathematical functions in Excel or Digital Analysis feature in IDEA to do these tests

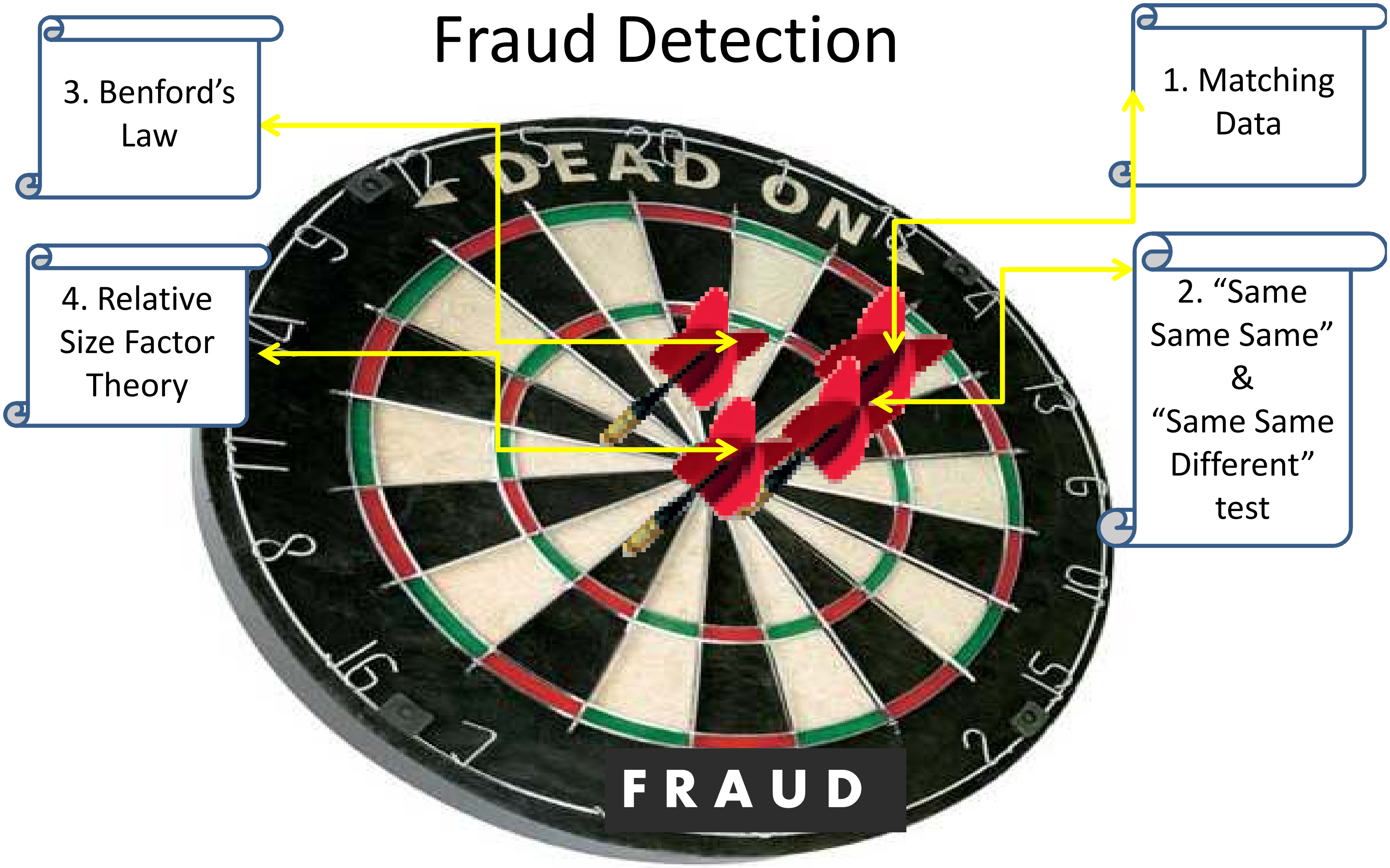
Case studies:

- Use these tests to detect unusual duplications of digits; think hard to find the reasons thereof

"The important thing is not to stop questioning……
Never lose a holy curiosity."

- Albert Einstein

Data Mining and Analytic Techniques for Fraud Detection



Data Mining and Analytic Techniques for Fraud Detection

Relative Size Factor Theory

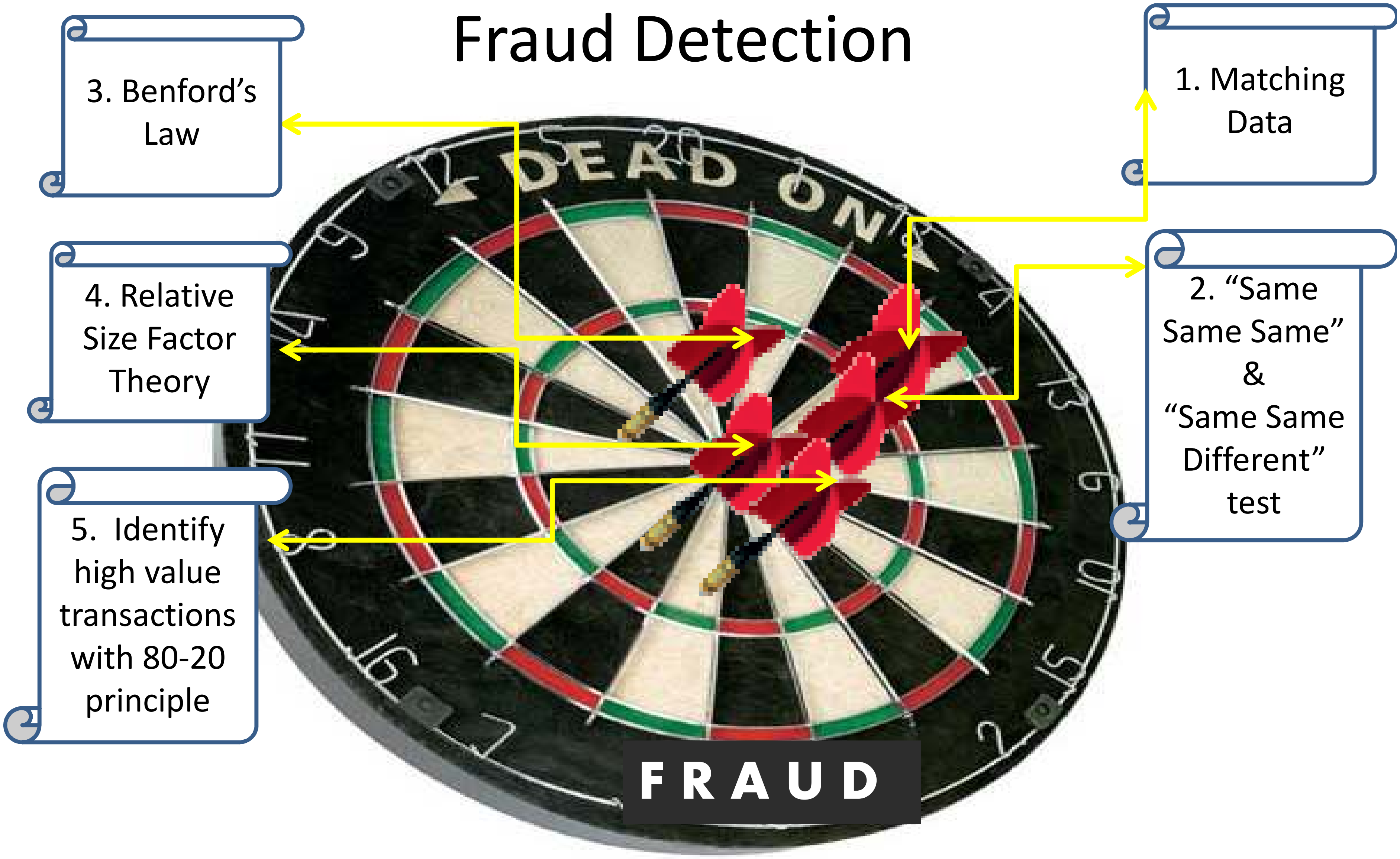
How do I do it?

- Use the Sort, IF() & other mathematical functions in Excel to do these tests

Case studies:

- Use these tests to detect "Out of Place" transactions in PO to vendors, vendor payments, credits in vendor accounts, etc.

Data Mining and Analytic Techniques for Fraud Detection



Data Mining and Analytic Techniques for Fraud Detection

Implement 80-20 principle to identify high value transactions

How do I do it?

- Use the Pivot table feature in Excel, drop the amount field in the row and in the data area and group the amount in the row fields into appropriate strata.

Case studies:

- Use this test to identify high value (and may be high risk) transactions in purchases, sales, vendor payments etc.

"If you are out to describe the truth, leave elegance to the tailor."

- Albert Einstein

Fraud Detection: Data Mining and Audit Tools

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Ideas??

Queries??

Suggestions??

Thank You

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