

Use of Forensic Technologies for Forensic Accounting

M.A. (Criminal Law & Forensic Science):2024-2025

Jointly organised by Nalsar University of Law & Truth Labs

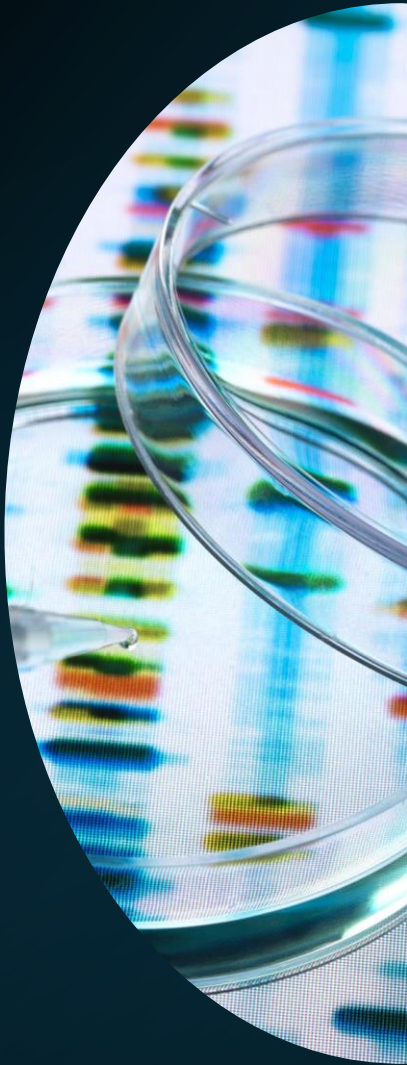
By

CA. Chandrasekhar. N ***FCA, FCPA, ACCA, CFE, CAMS, CISA***

CA & Fraud Examiner

Consultant Director, Truth Labs

ncsekhar.ca@gmail.com* *Mob: 9849130497



Use of Forensic Technologies for Forensic Accounting

Unlocking Financial Truths with Technology

Introduction to Forensic Accounting



Definition of Forensic Accounting: A branch of accounting focused on investigating financial fraud, misconduct, and other financial irregularities.

The diagram consists of two large, stylized arrows pointing towards each other. The left arrow is orange and contains the definition of forensic accounting. The right arrow is green and contains the importance of forensic accounting. The background is a light gray with a subtle geometric pattern.

Importance: Used in legal matters like litigation support, Financial fraud investigations



Role of Technology in Forensic Accounting

How Technology Transforms Forensic Accounting:

- **Efficiency:** Rapidly analyzes large volumes of data. Enhances investigative capabilities.
- **Accuracy:** Improves the accuracy of investigations, reducing the likelihood of missed fraud. Advanced tools for data analysis and evidence collection.
- **Cost-Effective:** Automates many manual tasks, saving time and resources.
- **Transparency:** Increased visibility and documentation of financial transactions.

Types of Forensic Technologies

Data Analytics
Tools

Digital Forensics

Blockchain
Analysis

Artificial
Intelligence and
Machine Learning

Geospacial
Analysis

Voice and
Speech Analysis

Image and Video
Analysis

Social Media and
Open-Source
Intelligence
(OSINT) Tools



1.Data Analytics Tools

- **Excel** (Pivot tables, Macros),
- **Tableau, Power BI** for data visualization,
- **ACL Analytics:** Used for data extraction, analysis, and reporting.
- **IDEA:** Specialized in examining transactional data and generating reports.
- **SQL Databases:** For managing and querying large datasets.
- **Python/R:** For custom data analysis, modeling, and automation.
- **Palantir:** For data integration, analysis, and uncovering complex patterns.

Application: Identifying anomalies, unusual patterns, and discrepancies within the financial data.



Digital Evidence

- **Digital devices**
 - Mobiles
 - Computer/laptop hard disk
 - Other storage devices including cloud
- **Types of digital evidence:**
 - Emails
 - Financial Transactions in the database of Accounting Software
 - Transaction logs

Digital Forensics Tools: Tools to examine electronic evidence

Digital Forensics Tools: Tools to examine electronic evidence

- **EnCase:** Widely used in forensic investigations to recover and analyze digital data.
- **FTK (Forensic Tool Kit):** A complete toolkit for investigating and examining digital evidence.
- **Autopsy** (An open-source tool),
- Magnet AXIOM,
- Cellebrite,
- Samuri RECON ITR

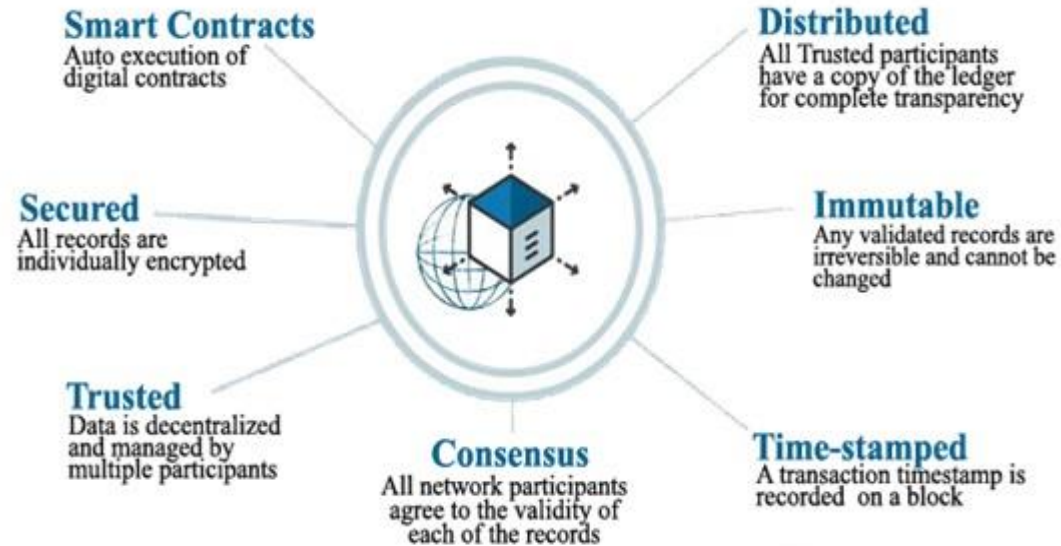
Application: Recovering deleted files, email analysis, and tracing fraudulent activities.



Blockchain is a decentralized digital database/ledger that securely stores records across a network of computers in a way that is transparent, immutable, and resistant to tampering. Each "block" contains data, and blocks are linked in a chronological "chain."

- Used for Tracking/ tracing transactions, wallet identification, visualization, compliance monitoring, risk scoring, real time alerts and
- **Preventing** fraud through decentralized immutable ledger system that ensures data integrity.

Properties of Block Chain



3. Blockchain Analytics

• **Chainalysis** - used by governments, financial institutions, and crypto businesses to investigate and monitor blockchain transactions.

- Investigating cryptocurrency fraud and money laundering.
- Compliance monitoring for crypto exchanges.
- Tracing stolen funds in hacks or scams.

• **Elliptic** - helps organizations to detect and prevent financial crime in cryptocurrency transactions

• **Application in Forensic Accounting:**

- Fraud prevention through transaction transparency and traceability in financial transactions.
- Auditing financial records to verify their



4.AI/ML

- **Are Employed for**
 - **Anomaly Detection:** Identifying unusual patterns or outliers in financial data.
 - **Pattern Recognition:** Detecting recurring patterns of fraudulent activities.
 - **Real-Time Monitoring:** Providing real-time alerts for suspicious transactions.
 - **Predictive Analytics:** Using historical data to predict future fraud risks.
 - **Automation:** Automating the process of fraud detection and investigation.
 - **Visualization:** Creating visual representations of fraud patterns and trends.
- **Examples:**
 - **Splunk** - AI and machine learning to monitor and analyze large datasets for fraud detection
 - **H2O.ai** , **KNIME** - are open-source machine learning platform that provides tools for building and deploying AI models for fraud detection
 - Microsoft Azure and Google Cloud also provide tools for building and deployment



5. Geospacial Tools

- **Employed for**
 - **Mapping:** Visualizing geographic data to identify patterns and trends.
 - **Spatial Analysis:** Analyzing spatial relationships and proximity between entities.
 - **Heatmaps:** Identifying hotspots of fraudulent activities.
 - **Proximity Analysis:** Detecting relationships between locations and transactions.
 - **Integration with Financial Data:** Combining geospatial data with financial records for fraud detection.
 - **Real-Time Monitoring:** Providing real-time alerts for suspicious geographic activities.
- **Examples:**
 - **GRASS GIS** is an open-source geospatial analysis tool that provides advanced spatial analysis capabilities.
 - **Google Earth Pro** is a geospatial tool that provides high-resolution satellite imagery and mapping capabilities.
 - **QGIS** is an open-source geospatial analysis tool





6.Voice and Speech Analysis Tools

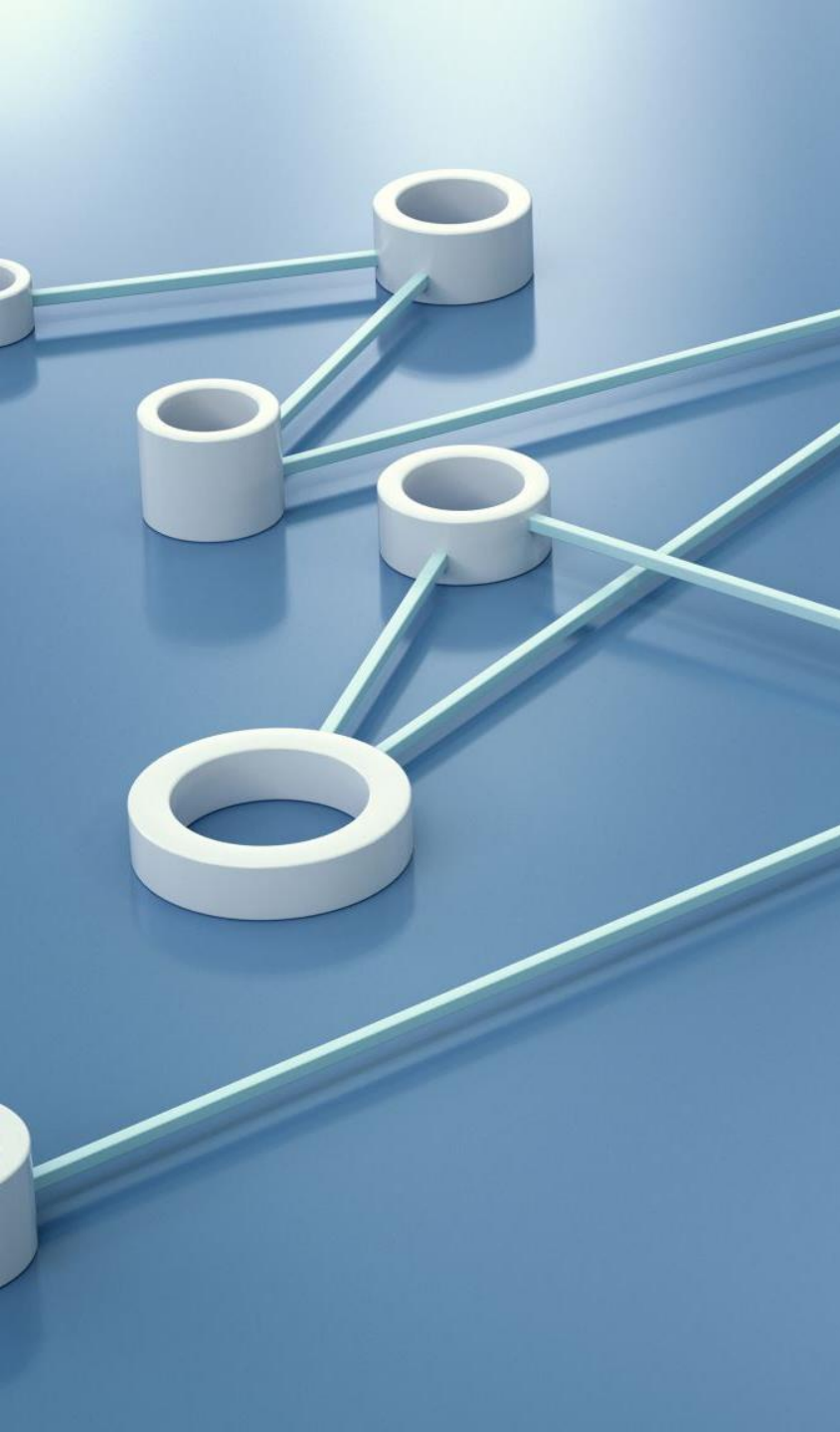
Enable uncovering of evidence of fraud in recorded conversations, analyze customer interactions for signs of deception, and enhance investigations with voice data insights, by performing:

- **Speech-to-Text** **Transcription:** Converting voice recordings into text for analysis.
- **Keyword and Phrase Detection:** Identifying specific words or phrases associated with fraud.
- **Emotional and Stress Analysis:** Detecting emotional cues and stress levels in speech.
- **Pattern Recognition:** Identifying recurring speech patterns that may indicate fraud.
- Some Examples:
 - **IBM Watson Speech to Text**
 - **Google Cloud Speech-to-Text**

7. Image and Video Analysis Tools

- Employed for
 - **Real-Time Monitoring:** Providing real-time analysis and alerts for suspicious activities.
 - **Object and Text Recognition:** Detecting objects, text, and faces in visual data.
- Examples:
 - **Adobe Photoshop** is a powerful image editing and analysis tool that can be used to detect alterations or manipulations in financial documents.
 - **Amazon Rekognition** is a cloud-based tool for analyzing images and videos using machine learning.
 - **Microsoft Azure Computer Vision** is a cloud-based tool for analyzing images and videos using machine learning.
 - **IBM Watson Visual Recognition** is a cloud-based tool for analyzing images and videos using machine learning.





8. Social Media and Open-Source Intelligence (OSINT) Tools

- Can help proactive detection, analysis using OSINT tools by
 - **Verification of Identities and Claims**
 - **Detection of Fake Profiles and Networks**
 - **Monitoring for Brand Impersonation**
 - **Geolocation and Activity Tracking**
 - **Investigating Connections and Networks**
 - **Sentiment and Trend Analysis**
- **Example tools**
 - **Social Links** aggregates data from social media, dark web, and other sources
 - **CrowdTangle** - A social media monitoring tool owned by Meta (Facebook)
 - Many open source tools that can employed are **theHarvester**, **Metagoofil** etc.

Challenges in Implementing Forensic Technologies



Technical Skills:

Need skilled forensic accountants proficient in using these tools.



Data Privacy Concerns: Ethical and legal issues around accessing and analyzing sensitive financial data.



Cost of Tools:

High cost of advanced forensic technology tools may be a barrier for smaller firms.

Conclusion

- **Summary:** Forensic technologies, such as data analytics, digital forensics, AI/ML, and blockchain, are significantly improving the field of forensic accounting.
- **Future of Forensic Accounting:** As technology continues to evolve, the **integration** of advanced tools will enhance financial fraud detection and make forensic accounting more proactive.
- **Emerging technologies:**
 1. Cybersecurity measures for Cybercrimes
 2. Continuous Monitoring Systems

Any Questions / Clarifications?

Thank You

CA. Chandrasekhar. N *FCA, FCPA, ACCA, CFE, CAMS, CISA*

CA & Fraud Examiner

Consultant Director, Truth Labs

ncsekhar.ca@gmail.com Mob: 9849130497 *18*