FINANCIAL INTELLIGENCE

Money laundering cycle: PLACEMENT, LAYERING, INTEGRATION
ARTIFICIAL INTELLIGENCE: NETWORK ANALYSIS

- **Statistical** approaches:
  - Social Network Analysis

- **Algorithmic & machine learning** approaches:
  - Neural networks,
  - Classification and sub-tasks such as clustering,
  - Classical graph algorithms
  - Embeddings

- **Reasoning** approaches:
  - Knowledge Graphs
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STATISTICAL APPROACHES: Social Network Analysis
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* descriptive statistics
* core-periphery analysis
* exploratory analysis

* inapplicable to specific cases
* neglects analyst’s knowledge
* cannot extract evidence for judicial or law enforcement authorities from SNA
ARTIFICIAL INTELLIGENCE: NETWORK ANALYSIS

- **Statistical** approaches:
  - Social Network Analysis

- **Machine learning** approaches:
  - Graph Embeddings
  - Neural networks
  - Classification and sub-tasks such as clustering
  - Classical graph algorithms

- **Reasoning** approaches:
  - Knowledge Graphs
MACHINE LEARNING APPROACHES

* access to a large toolbox of techniques and algorithms
* support for low experience personnel

* neglects analyst’s knowledge
* mostly supervised methods
* highly unbalanced training sets
* few true positives to train models
* scarce or absent explainability
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  Classification and sub-tasks such as clustering,
  Classical graph algorithms
  Embeddings

- **Reasoning** approaches:
  Knowledge Graphs
Q: Who are the pairs of persons of the same generation?
Detecting Collusion with KG and Reasoning

If a bank owns more than 50% of another one, then the first controls the second.
Brothers are in the same family.
Two partners are in the same family.
Relations are transitive.
Two banks whose CEOs and/or major shareholders are in the same family are in a person-based link.
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Money Laundering Geometries
Finding Beneficial Owner

Diagram showing the relationship between different entities with ownership and probability values.
Money Laundering Geometries
Finding Beneficial Owner
A vision: reasoning approaches will **disrupt** the way AML is performed in the next years.

A challenge: knowledge graphs approaches entail a **holistic** approach to the contrast of financial crimes phenomena, which is almost absent now.