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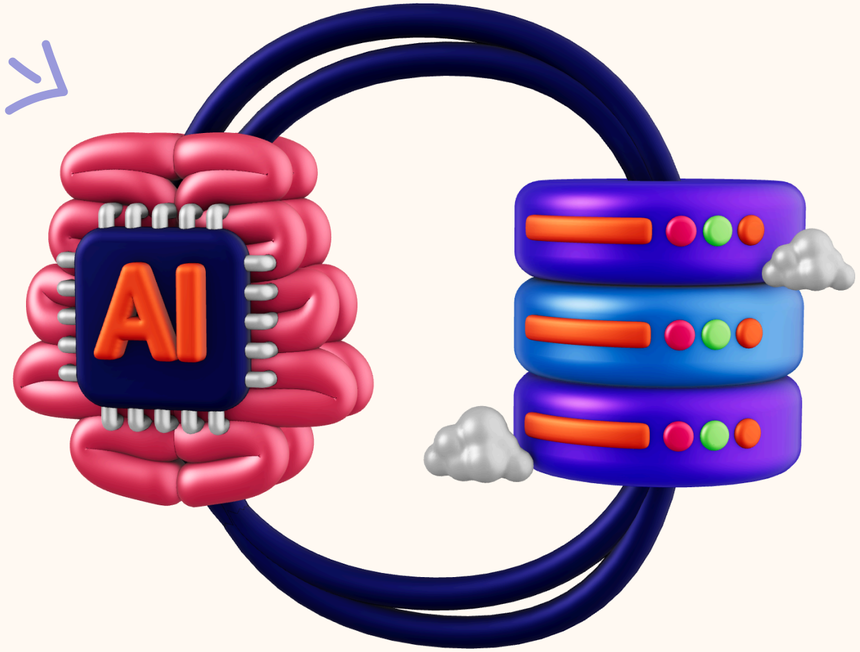
JIU

Management Information System



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7. AI in MIS for Decision Making

Learning Objectives

By the end of this session, students should be able to:

- Identify System Limits: Pinpoint where human cognitive limits and traditional MIS fail under modern data overload.
- Classify AI Tools: Distinguish between key AI technologies (ML, Expert Systems, CBR, and NLP) used in business.
- Align Decisions to Technology: Match business problem structures (structured vs. unstructured) with the correct AI solution.
- Transform Financial Workflows: Evaluate how AI shifts accounting from historical data sampling to real-time, continuous auditing.
- Govern Algorithmic Risk: Navigate critical governance risks, including algorithmic bias, data security, and the "black box" explanation problem.

Phase 1: The Problem

Why Traditional MIS is No Longer Sufficient

The Cognitive Wall: Data Deluge

Volume

Organizations are drowning in petabytes of data. Traditional reports are too long for human managers to process effectively.

Velocity

Market conditions change in milliseconds. By the time a traditional MIS report is generated, the opportunity has passed.

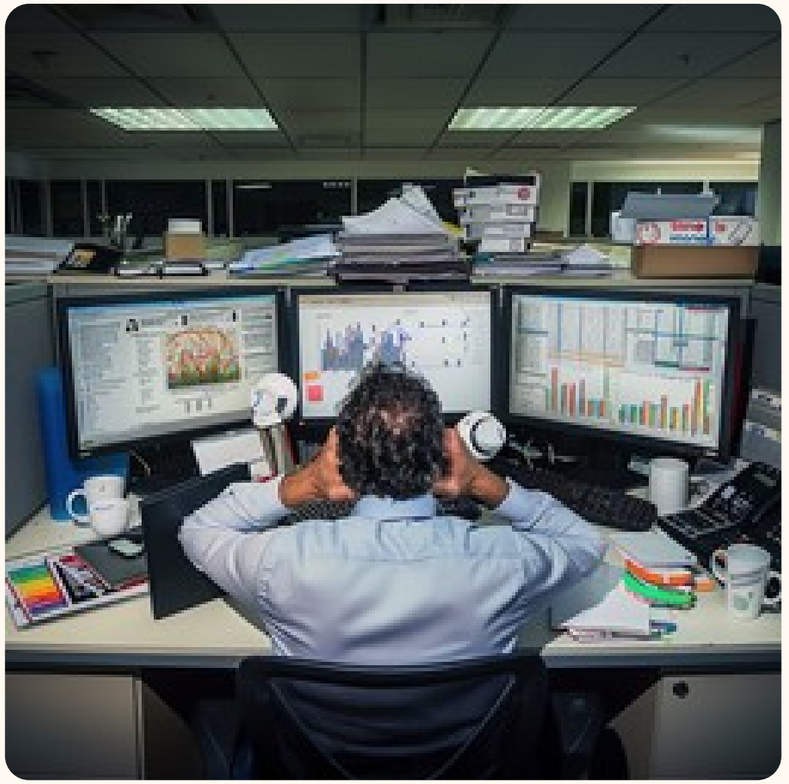
Variety

80% of business data is unstructured (emails, social media, video). Traditional databases struggle to derive meaning from it.

Human Limits In Complex Analysis

Bounded Rationality: Humans can only process a few variables at a time. In modern accounting, a single decision might involve thousands of data points across global markets.

- Subjective Biases (Optimism/Anchoring)
- Decision Fatigue (Quality drops over time)
- Inability to spot non-linear correlations



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The Massive Cost of Indecision

-$2.5M

Average Annual Revenue Loss

Per a Fortune 1000 company, due to "Decision Latency"—the gap between data availability and managerial action.

"In the digital economy, being right tomorrow is often worse than being mostly right today."

Phase 2: Why it Matters

The Value Proposition of AI Enabled Systems

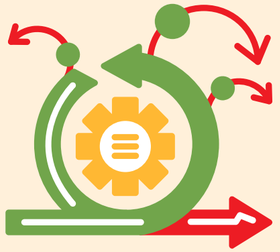
Strategic Value Of Intelligence

Operational Speed

Automating routine semi-structured decisions allows humans to focus on high-value strategy.

Precision

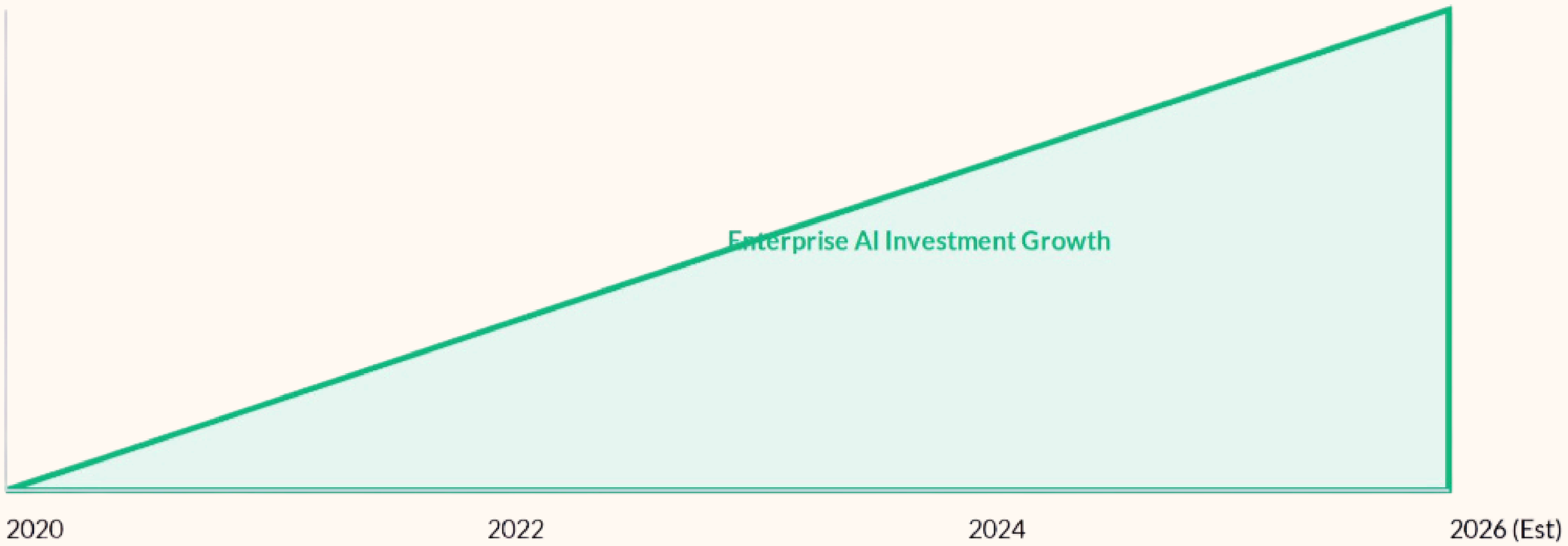
AI reduces human error in audit, tax compliance, and inventory forecasting to near zero .



Agility

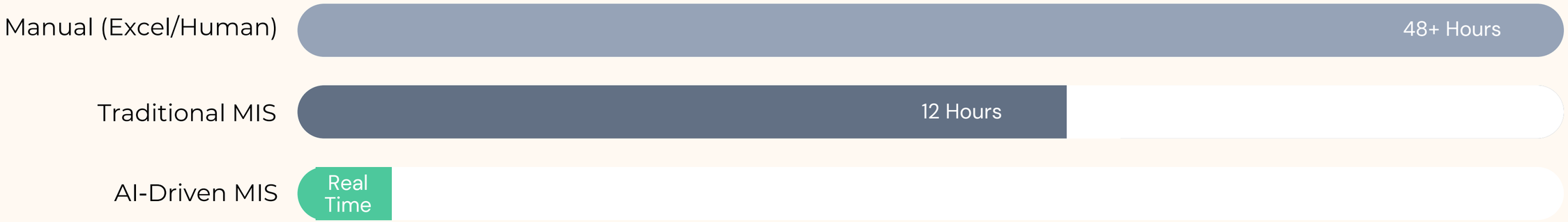
Systems that sense market shifts and recommend pivot strategies in real-time.

AI Adoption Trends in Enterprise



Source: Global MIS Industry Report 2024

Decision Latency Comparison



AI eliminates the “Human Bottleneck” in data-intensive reporting cycles.

Phase 3: Defining AI

The Core Theories and Concepts

Core Definition in MIS

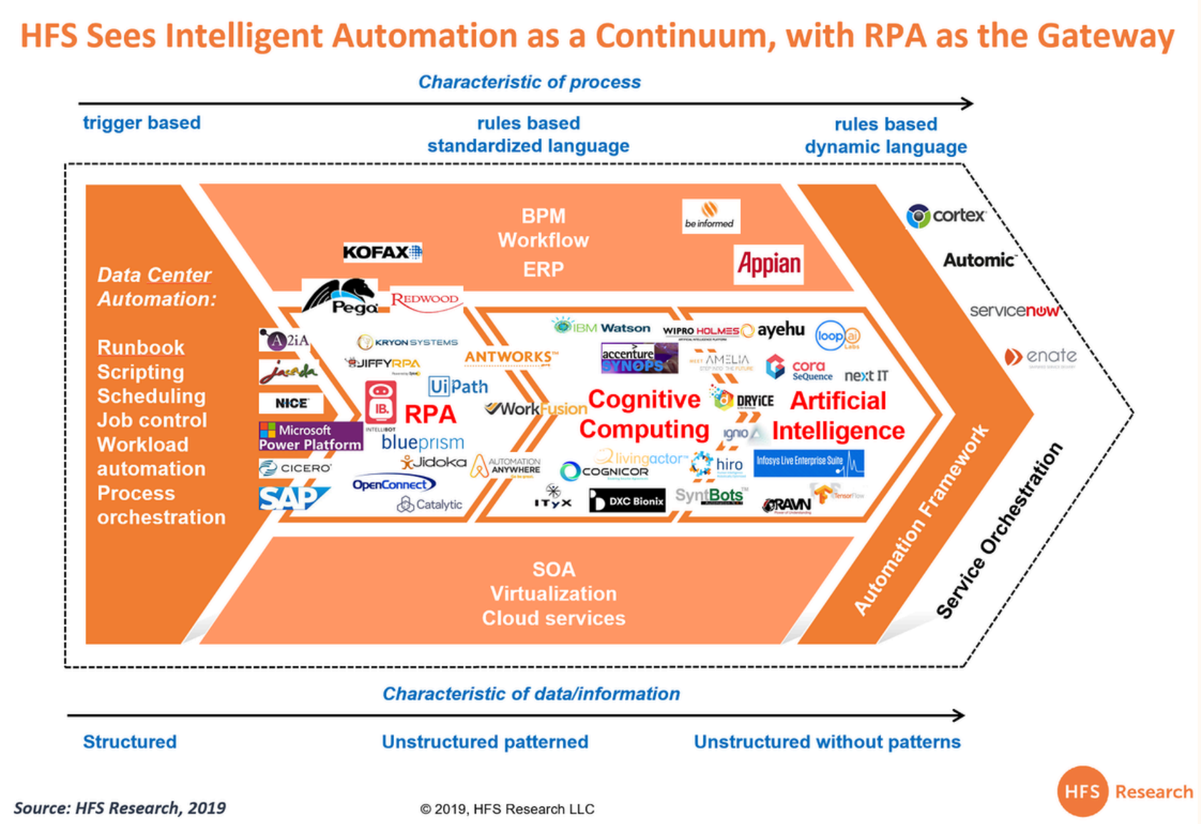
Bidgoli Perspective:
Al consists of related technologies that try to simulate human thought and behavior, including thinking, speaking, feeling, and reasoning.

Laudon Perspective
Intelligent techniques used to capture individual and collective knowledge and to extend their knowledge base using algorithms and heuristics.

The Autonomy Continuum

MIS systems are evolving from simple automation to full autonomy:

1. **Assisted Intelligence:** Automating repetitive tasks (e.g., RPA in invoicing).
2. **Augmented Intelligence:** Systems helping humans make better decisions (e.g., Credit Scoring).
3. **Autonomous Intelligence:** Systems making and executing decisions (e.g., High-frequency trading).



https://www.horsesforsources.com/storage/app/media/AA%20PF/Intelligent%20Automation%20Continuum%202019.png

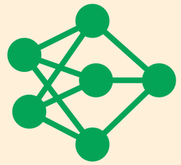
Core AI Technologies

Understanding the Tools Under The Hood

Machine & Deep Learning

Machine Learning

Algorithms that improve automatically through experience. Used for pattern recognition in financial trends.



Neural Networks

Mimicking biological neurons to find complex patterns in massive data sets where variables are highly interdependent.

Deep Learning

Multi-layered neural networks capable of learning from unlabeled data (e.g., analyzing sentiment in 10-K flings)

How AI "Thinks"

Neural networks process input data through multiple hidden layers layers of "**weights**" and "**biases.**"

By comparing its output against actual results, the system corrects its internal logic, effectively teaching itself the patterns of financial success or failure.

Source: Canva Image

EXPERT SYSTEMS (ES)

Knowledge Base

The core of the system, containing facts and "rules of thumb" (heuristics), is provided by humans experts.

Inference Engine

The "brain" that searches the knowledge base to draw conclusions and provide advice.

Explanation Facility

Crucial for audit: It explains the reasoning behind a recommendation to the manager

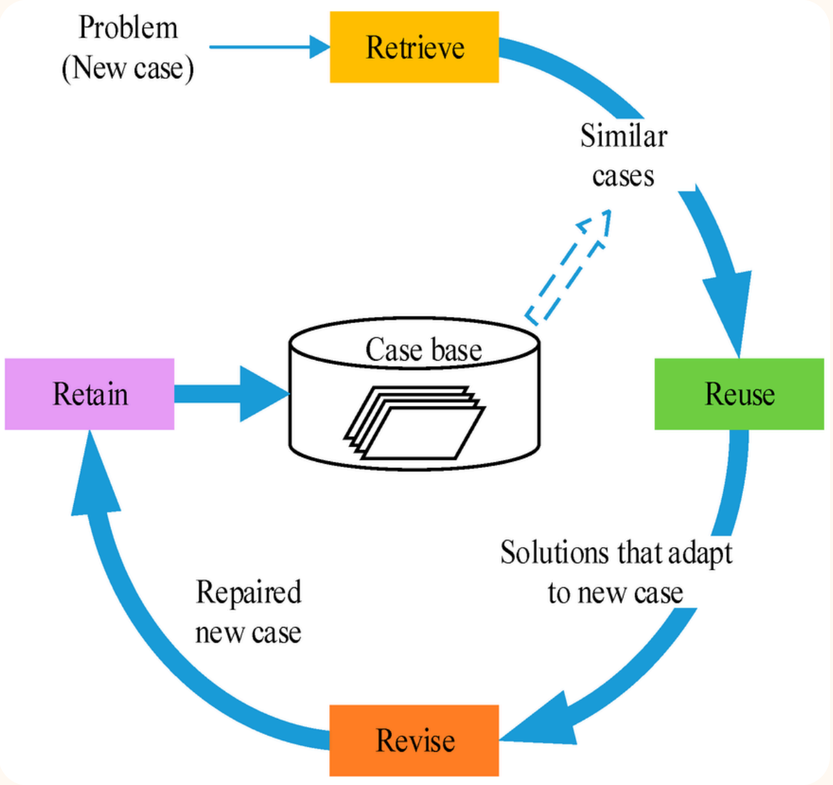
Use Case: Complex tax advice or medical diagnosis systems.

Case-Based Reasoning (CBR)

CBR mimics how human experts solve problems by remembering previous similar situations.

The CBR Cycle:

- **Retrieve:** Find a similar past case.
- **Reuse:** Map the solution to the new problem.
- **Revise:** Adapt the solution if necessary.
- **Retain:** Store the new successful case.



https://www.mdpi.com/applsci/applsci-14-07130/article_deploy/html/images/applsci-14-07130-g002.png

Logic Beyond True Or False

Fuzzy Logic

Deals with "shades of gray." In MIS, it's used when definitions are imprecise (e.g., "high credit risk" or "moderate demand"). It uses linguistic variables instead of binary ones .

Genetic Algorithms

Based on the principle of survival of the fittest. It generates thousands of potential solutions and "breeds" them to find the optimal outcome. Used for inventory and route optimization

Intelligent Agents

Shopping Bots

Search the web for the best prices and terms for procurement managers.

Data Mining Agents

Identify patterns in data and alert managers to sudden changes in sales or costs.

Monitoring Agents

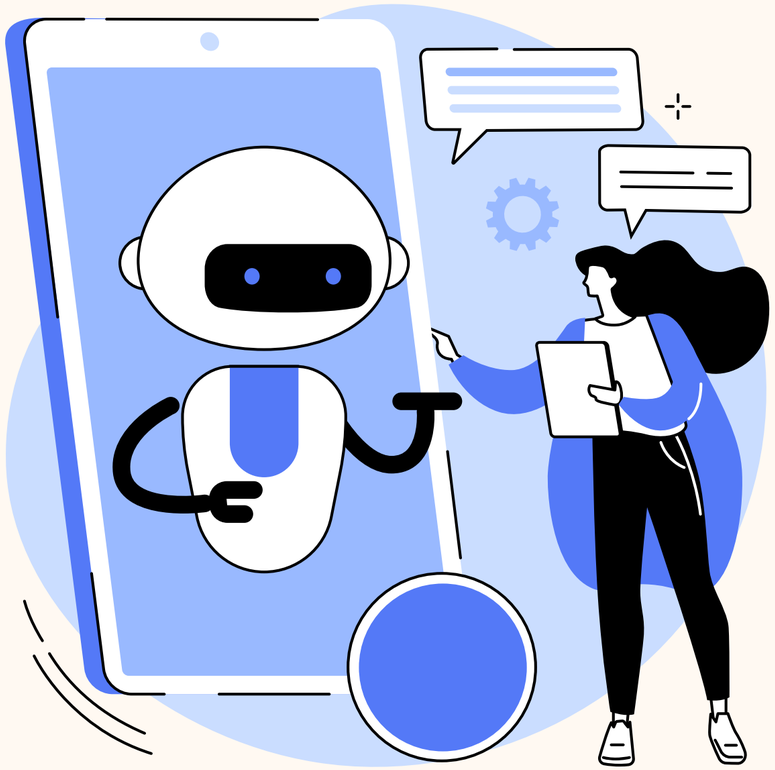
Continuously watch for network intruders or internal fraud patterns

Natural Language Processing (NLP)

NLP bridges the gap between human language and computer data. In modern accounting, it allows managers to query the system naturally:

> *"What was our net margin in Q3 compared to the industry average?"*

- Sentiment Analysis (Predicting stock moves)
- Automated Report Generation
- Voice-driven Executive Dashboard



AI and Decision Systems

Integrating Intelligence Into Management Tools

Evolution Of Decision Support

1970s

MIS

Structured, routine, periodic reports.

1990s

DSS

Interactive, what-if analysis for managers.

2010s

Large data mining and visualization.

2024+

IDSS

Proactive, AI-driven, predictive systems.

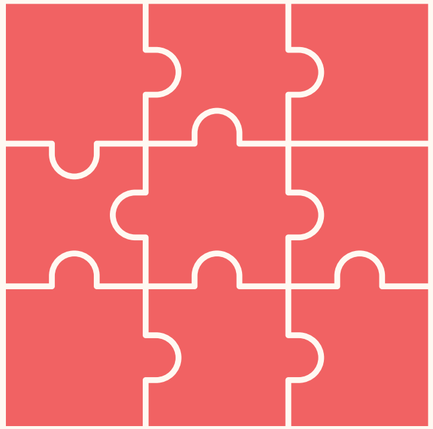
Structured VS Unstructured

Structured Decisions

Repetitive and routine. Well-defined procedure.
Al Role: Full Automation (RPA).

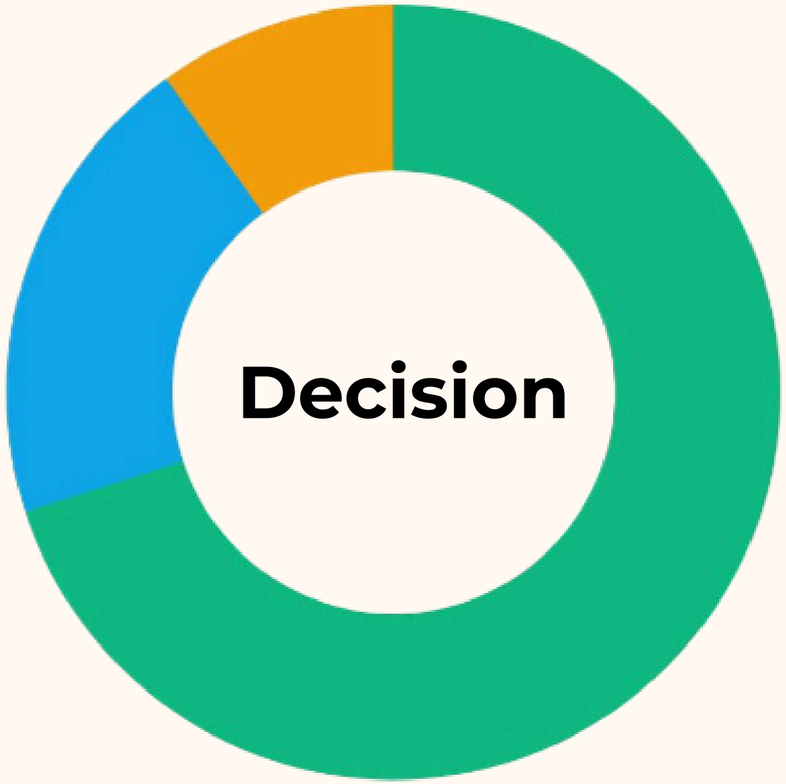
Unstructured Decisions

Novel, non-routine, and important. No agreed-upon procedure.
Al Role: Intelligence Augmentation (IA).



AI is moving into the semi-structured middle ground where humans and machines collaborate.

AI Application By Decision Level



- Operational (70%) - Highly Automated
- Tactical (20%) - Predictive Support
- Strategic (10%) - Scenario Modeling

Division Of Decision Labor

Capability	Human Manager	AI System
Processing Speed	Slow (Seconds/minutes)	Fast (nanoseconds)
Consistency	Variable (Fatigue/Stress)	Absolute (Persistent)
Context/Common Sense	Excellent	Limited
Ethics and Judgement	Primary/Owner	Incapable

AI in Accounting

The Transformation of the Modern Controller

Intelligent Fraud Detection

Anomaly Detection

AI flags expenses or wire transfers that deviate from the employee's or firm's historical patterns.

Network Analysis

Spotting complex "round-robin" payment schemes across thousands of shell companies.

Real-time Alerting

Instead of discovering fraud during a year-end audit, the system stops the transaction in milliseconds

The Future Of Continuous Audit

Traditional auditing relies on "sampling" (testing 5-10% of transactions). Al enables **100% Audit Coverage.**

- Automated Reconciliation.
- Continuous Compliance Monitoring.
- Predictive Risk Assessment (Assessing which accounts are likely to have errors).

Source: https://www.magnific.com/premium-ai-image/file-icon_224892497.htm

Enhanced Credit Risk Management

28%

Improvement in Prediction

Using AI for credit scoring vs. traditional FICO/Statistical methods. AI looks at "Alternative Data" (payment history, social footprint) to determine creditworthiness

Phase 4: Ethics & Challenges

The Responsibility of The Intelligent Firm

THE "BLACK BOX" PROBLEM

The Challenge

Deep learning models can be accurate but impossible t o explain. "Why was this loan denied?"

Explainable Al (XAI)

New tools that map the "importance" of different variables in a n Al's decision process.

Transparency

Managers must be able to defend decisions t o regulators and stakeholders.

A Professional Responsibility

"Algorithms should not be the final judge. The accountant remains the ultimate guardian of truth and integrity."

— Principles of Intelligent Accounting

The Danger Of Algorithmic Bias

Historical Bias

If past loan decisions were biased against a demographic, the AI will learn and amplify that bias.

Data Quality

"Garbage In, Garbage Out." Inaccurate accounting data leads to flawed strategic recommendations.

Solution: Regular "Algorithm Audits" to ensure fairness and accuracy

The Human-In-The-Loop Model

The most successful companies use AI as a Co-pilot, not a replacement.

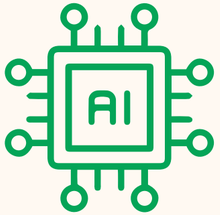
- AI handles the data-heavy lifting
- Human provides t h e Strategic Intuition
- Shared Accountability for outcomes

Sources: https://imgcdn.stablediffusionweb.com/2024/12/9/df01941c-5085-41d7-b27f-abded89ffed3.jpg

The Manager Of Tomorrow

AI Literate

Able to evaluate and oversee intelligent systems.

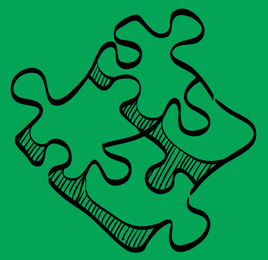


Value Focused

Shifting from "Data entry" to "Insight creation."

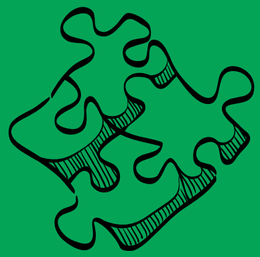
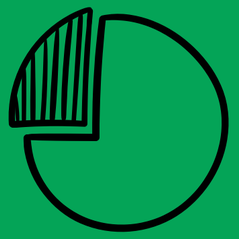
Ethically Minded

Guiding the responsible use of powerful tech.





Thankyou!

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