

The Next Generation of Lending Technologies - Leveraging AI & ML in Lending

Moderator: Nelson Almeida. Experts: Wade Moss, Jan-Hinnerk Fahrenkamp

March 2023

Agenda

1. Set The Context
2. Discussion Forum
3. Q&A Session

Speakers



Wade Moss
Director, Senior Strategist
Moody's Analytics



Nelson Almeida
Director – Technology Specialist
Moody's Analytics



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SeniorDirector, Senior Strategist
Moody's Analytics

1 Set The Context

AI Generated Images

Artificial intelligence generated images



Sentient AI



ChatGPT as a human



Discussing AI

Discussion topics

Questions to Ponder

- Potential for Machine learning in Credit, both process and decision making, currently and in the near future?
- Regulatory and ethical challenges AI may pose for financial institutions and regulators?
- Augmented Organics or Organically Augmented Machines in Credit?
- ML /AI in Credit Early Warning - AI providing new Early Warning capabilities in credit risk?
- Machine learning limitations in Credit and Finance, What identified boundaries in the immediate and near future?

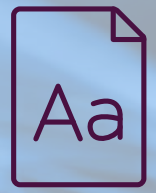
Types of Artificial Intelligence

Artificial Intelligence Outline



Robotics

Automate physical tasks



NLP

Analyse and interpret human language



Computer Vision

Analyse content of images



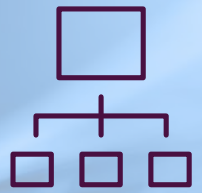
Machine learning (ML)

Analyse data, identify patterns and trends



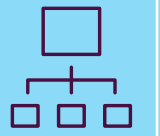
Generative AI

Generate new content,



Decision Intelligence

Identify and evaluate options; propose decisions

AI Types \ Lending Steps	Data Collection	Risk Assessment	Loan Approval	Loan Servicing & Monitoring
Robotics 	Automate data entry, Digitisation	Automate data entry and verification processes.	Automate data entry and verification processes.	Automate data entry and verification processes
NLP 	Analyse loan applications, credit reports etc. Identify potential risks & opportunities relating to client	Analyse loan applications, credit reports etc. to identify potential risks and opportunities.	Analyse loan applications, credit reports etc.to identify potential risks and opportunities.	Analyse loan applications, credit reports, and other relevant documents to identify potential risks and opportunities.
Computer Vision 	Verify ID of borrower, collateral assessment pictures	Verify the identity of borrowers and assess the condition of collateral.	Verify the identity of borrowers and assess the condition of collateral.	Assess the condition of collateral
Machine Learning 	Aggregation and analysis of large amounts of data from various sources financial statements, credit report etc. Assess creditworthiness and identify potential risks and opportunities	Predict Credit risk based on patterns and trends.	Compare to risk appetite, evaluate loan in context, include human as required	Monitor loan performance including multitude of factors in real-time and propose proactive measures to mitigate risk and prevent default
Generative AI 	Identify personalised loan products or marketing material	Automate loan approval processes by providing real-time insights into loan performance.	Develop personalized loan products or marketing materials based on data analysis and customer behaviour.	Generate personalized loan servicing strategies to improve customer satisfaction.
Decision Intelligence 	Identify most relevant data, categorise and analyse	Automate loan approval processes by providing real-time insights into loan performance.	Automate loan approval processes by providing real-time insights into loan performance.	Monitor loan performance in real-time and take proactive measures to mitigate risk and prevent default.

slido

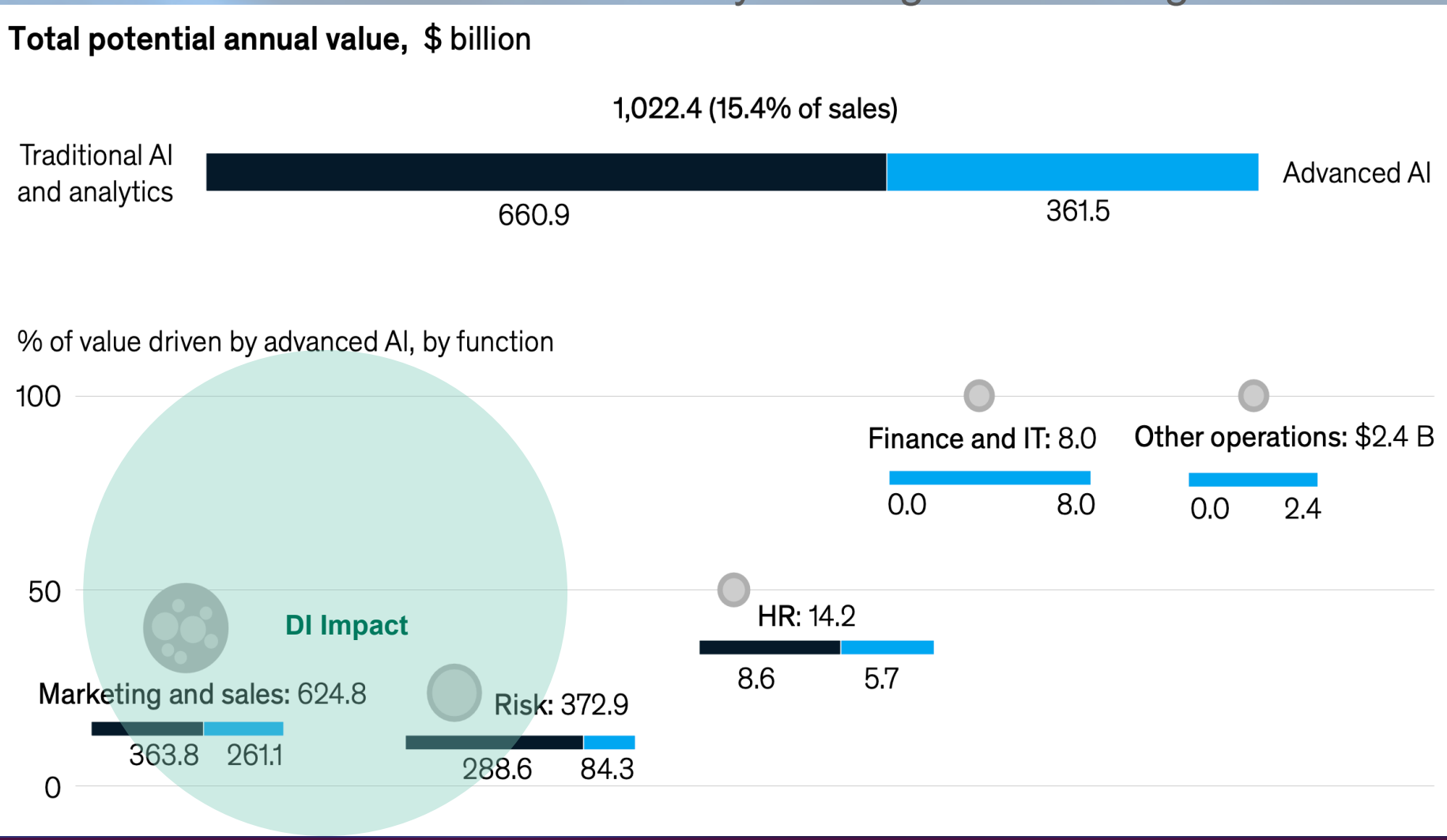


Which Technology will have the greatest impact?

ⓘ Start presenting to display the poll results on this slide.

$1T Artificial intelligence Impact in Banking

Potential annual value of AI and analytics for global banking could reach as high as $1 trillion.

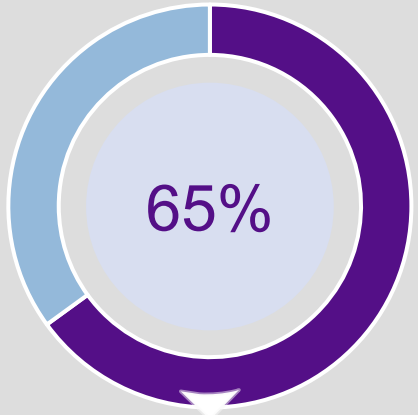


McKinsey, The executive's AI playbook

AI Value Tree: Corporate Banking

Value Tree			Expected Impact	Use Cases
Value To Business	Revenue Growth	Lead Generation	75% increase in relevant leads	Effective customer targeting
		Churn Reduction	10% increase in profit	Effective retention
		Up/Cross-sell	15% increase in revenue	Opportunity capture
		Pricing	15% increase in revenue	Dynamic pricing optimization
	Risk Control	Credit Decisioning	25% decrease in NPL	RM/PM augmented decision flows
		Early Warning	20% decrease in RWA	Early risk identification
		KYC/AML	25% increase in cost saving of total losses	Improved anomaly identification
		Fraud Detection	40% decrease in false positives	Improved fraud detection
	Efficiency	RM Productivity	20% increase in productivity	Improved productivity
		PM Productivity	20% increase in productivity	Improved productivity

Decision Complexity Is Increasing



Decision complexity is increasing

65% of decisions are more complex than two years ago.

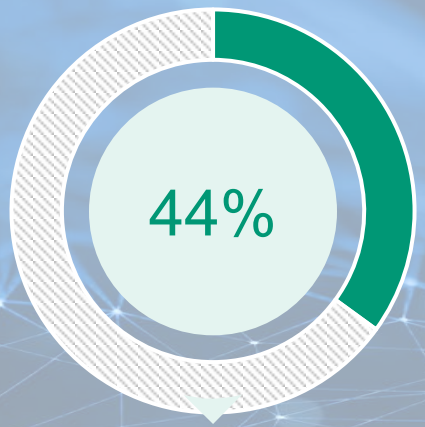
Uncertainty
Low context awareness, lack of relevant data.

Irrelevant Signals
Lack of root cause analysis, driver identification.

Inability to Act
Price leakage, lost sales, biased investments, high costs, lost revenue.

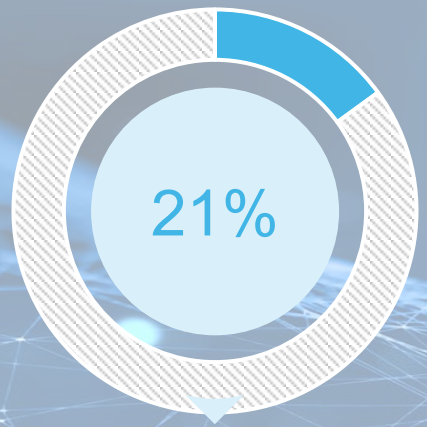
The State of Decision Making

What's the biggest block to decision making?

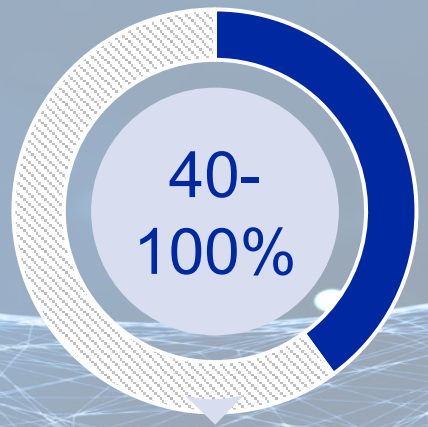


Too much data, not enough time

When asked about the biggest blockers to the decision-making process, C-suite leaders cited the vast amount of data and time



Time spent on decision making



Time consuming process

The amount of time the majority of business leaders spend on decision making.

The impact of not using Decision Intelligence

4.26T



Loss in revenue in 2020

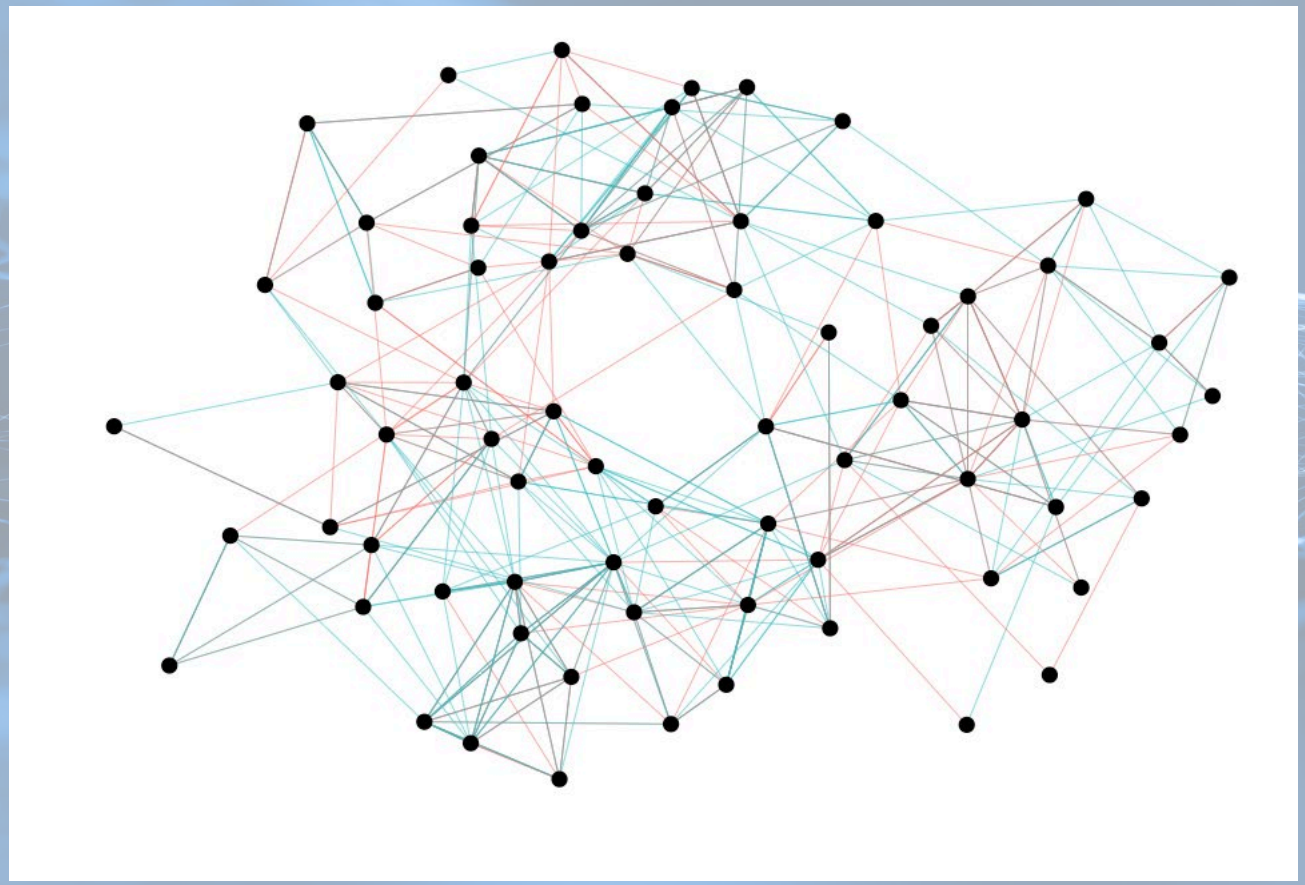
85% think they could generat upwards 20% more revenue with Decision Intelligence

1,000 C-suite leaders from companies of more than 500 employees were surveyed about decision making within their business, the biggest blockers to the decision-making process, and how technology can be applied to improve its results.

Source: Signal AI, The State of Decision Making Report 2021

The need to reengineer decisions

The evolution of the decision process reflects need to optimize for rapid scaling and fusion team support



The decisions are evolving to become more continuous, contextual and interconnected.

- **Continuous**
  No end point, evolving processes.
- **Contextual**
  Local context drives successful outcome.
- **Interconnected**
  Decision trees grow into networks.

Decision Intelligence

Decision intelligence uses ML to contextualize, rapidly model, validate and deploy continuous interconnected decisions at scale.

Contextual Decisions

DI can capture the context and identify invisible patterns and possible anomalies. that can significantly influence the outcome. It can make more precise predictions and recommend relevant options.



Multiple Problem Solving Options

Scenario editors highlight multiple outcomes of a certain recommendation when one of the parameters is changed. This feature can help the business to make the best choice from a multitude of options, taking into account their current goals and growth strategies.

Faster Decision Process

AI decision-making systems accelerate the process significantly based on their ability to process vast amounts of data at a faster rate.

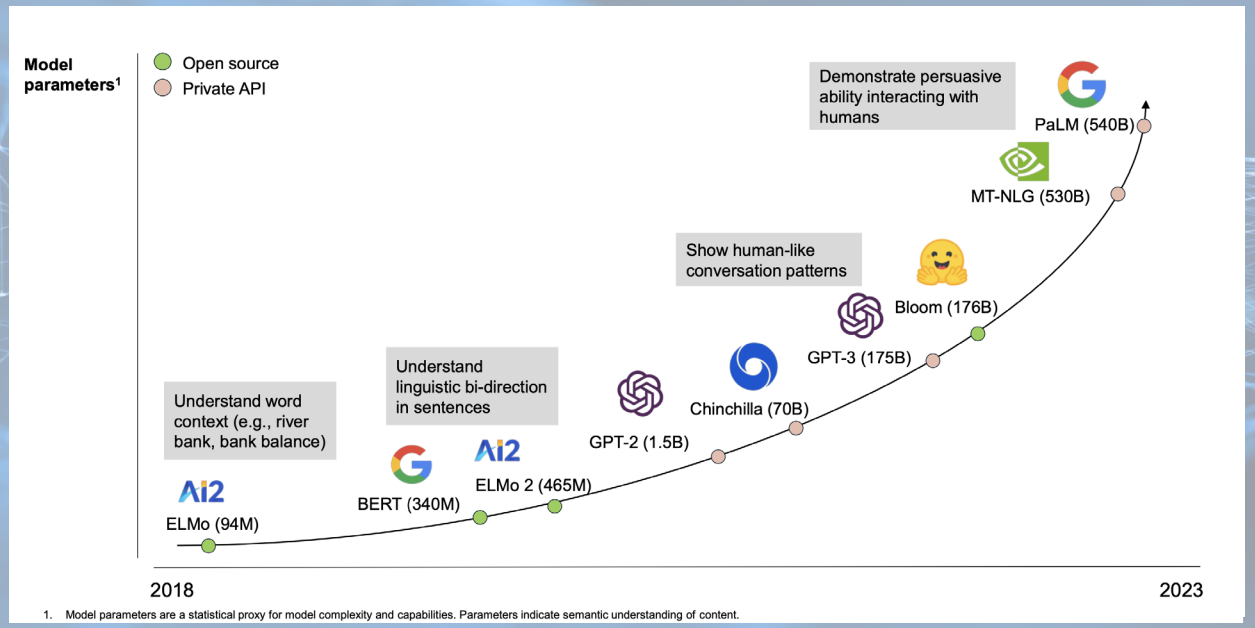
Mistake and Bias Elimination

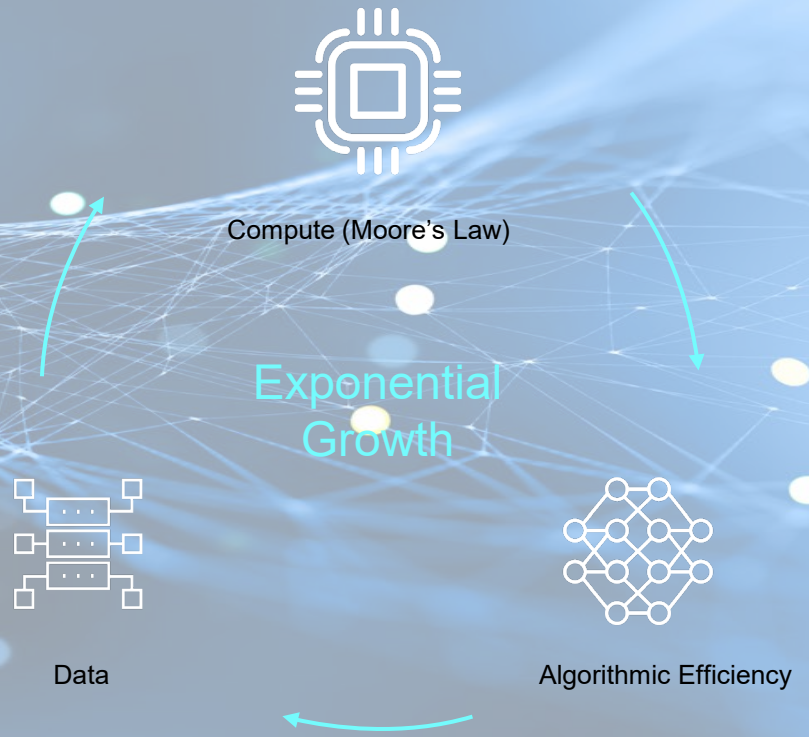
There are at least five types of biases that can directly influence the business decision outcomes. Decision intelligence allows avoiding them all since the correctly programmed algorithm takes an ultimately objective look at the available data.

Intelligence Driven Growth

With the exponential growth potential of Generative AI, advancements in compute power, algorithms, and data quality continue to drive its capabilities, leading to increased market share for companies leveraging this technology.

We need to capture & leverage the exponential increase in GenAI capabilities to thrive in new market conditions.





Technology Trends: Web 4 & The End of Search

Big tech including companies like Google, Meta, OpenAI, Nvidia and Tencent have been working on the new way to access and process the information on the web. They are leveraging Large Language Models that may have Ts of features, run on the super-computer size GPUs and have been trained on the entire corpus of digital public data. These models are growing and improving exponentially due to compute and algorithmic efficiency curves and are rapidly evolving to become pillars of AI generated web 4.

Foundation Models

- **PALM (Google)**
  - Multi-modal training
  - Sparse Activation
  - Multiple Senses
- **Sphere (Meta)**
  - Scan
  - Validate
  - Recommend
- **GPT (OpenAI)**
  - Align
  - Transform
  - Analyze
  - Summarize
  - Translate
  - Prototype
  - Reason?

Domain-specific Models

- **Single Purpose**
  - Domain specific
  - Specialized
  - Fixed



- **Foundation Models**
  - Domain optimized
  - Generalized/Multi-Purpose
  - Adaptable

Improved performance, reduced development costs

2 Discussion Forum

Discussion topics

Questions to Ponder

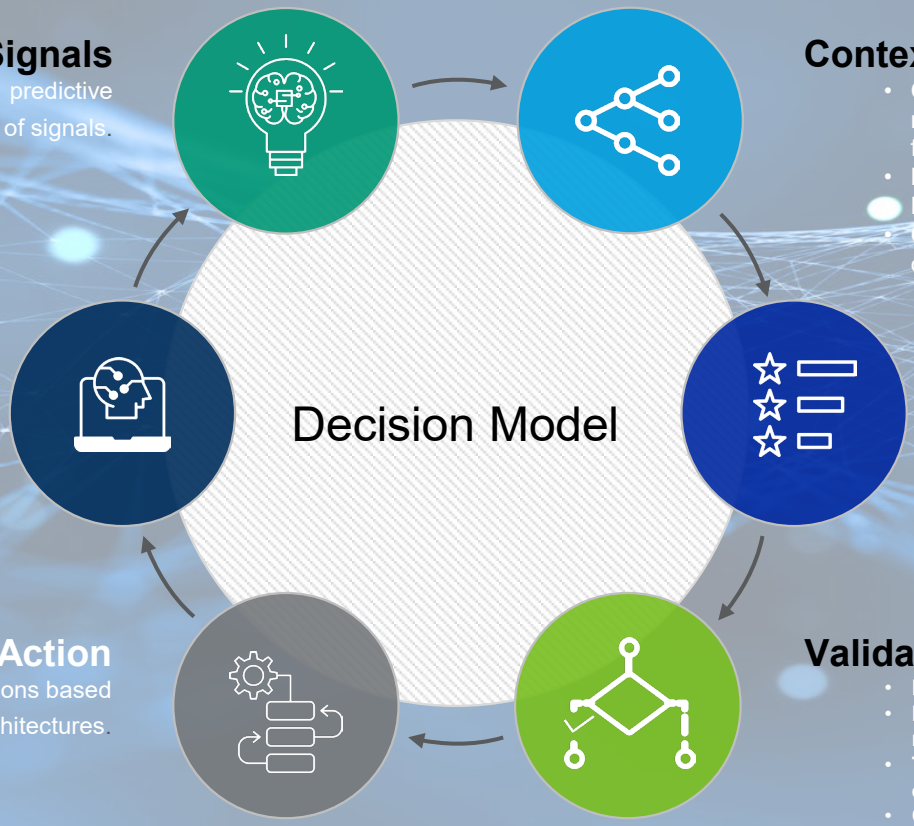
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Decision Intelligence Framework

Industry and asset class agnostic framework that enables composable decision flows.



Smart Signals

- Smart early warning modules enable predictive identification and prioritization of signals.

Contextualization and Filtering

- **Clustering/network generation:** automatically finds sets of resolved entities and links that are relevant to a given decision, filtering out low value ones and expanding others.
- **Driver identification:** highlight key influencers.
- **Benchmarks:** using benchmarks to establish peer relevance.
- **Out of control variables:** removing variables that can't be controlled.

Accessibility and Feedback

- The combination of intelligent assistants and ML loops improves access to content and system performance over time.

Recommendation

- **Prediction:** used as a base line.
- **Target rate change editor:** aligns system with organization's objectives.
- **Contextual recommendations:** subsets of driver values that lead to a desired outcome supported by a data-driven story.

Action

- Integrated workflow tools translate validated decisions into actions based on predefined target architectures.

Validation

- **Decomposition**: explains how and why of the case.
- **Explainability:** Every part of the process is transparent and available for review supported by relationship graphs and model graphs.
- **Target rate change for scenarios:** Aligns with the organizations objectives.
- **Confidence score:** promotes trust in generated decisions.
- **Scenario Editor:** uses recommendation as a base and provides further customization options.



» Regulatory and ethical challenges AI may pose for financial institutions and regulators?

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Artificial intelligence generated images



Sentient AI



ChatGPT as a human



Discussing AI

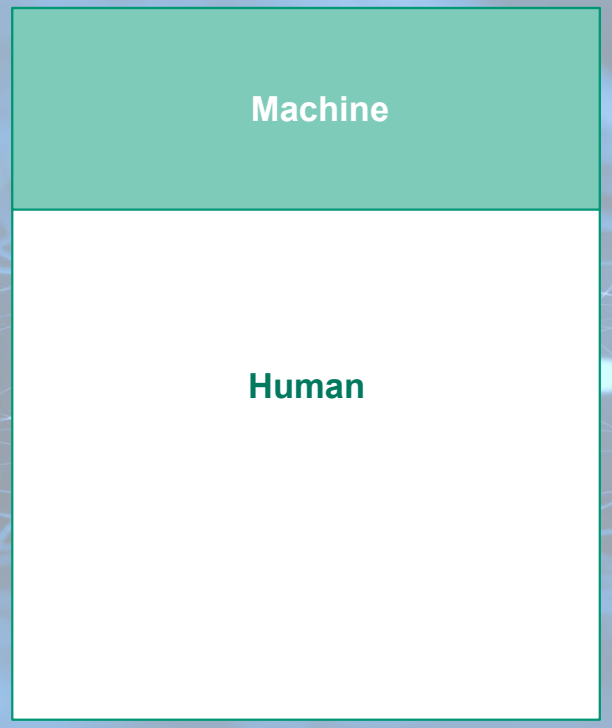
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» Augmented Organics or Organically Augmented Machines in Credit?

moodysanalytics.com

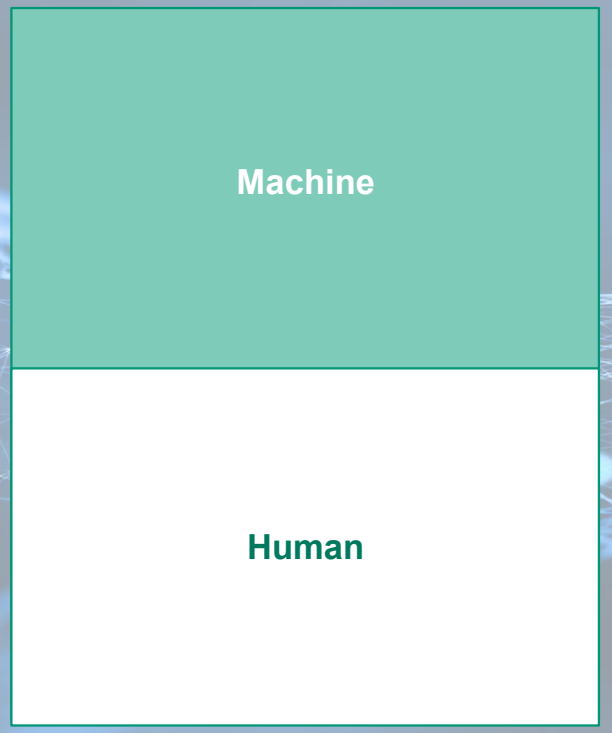
Target Architectures

Decision Support



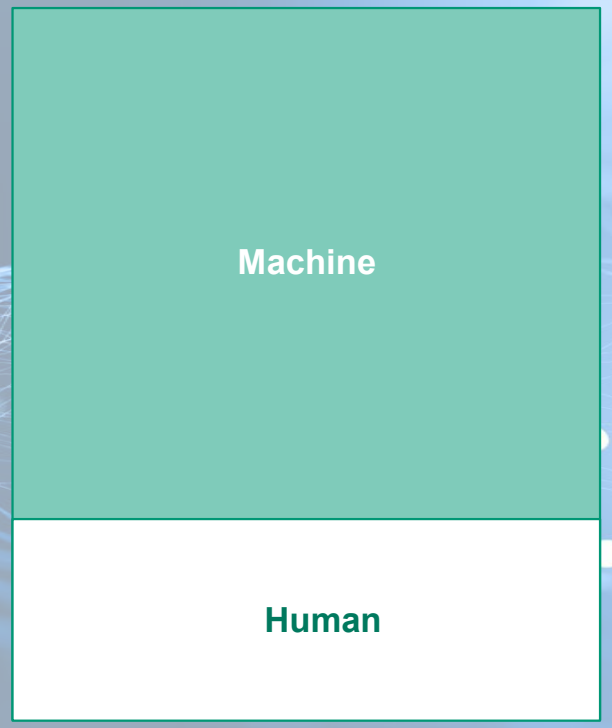
Recommending and improving rule based signals

Decision Augmentation



Recommendations with scenario editing

Decision Automation



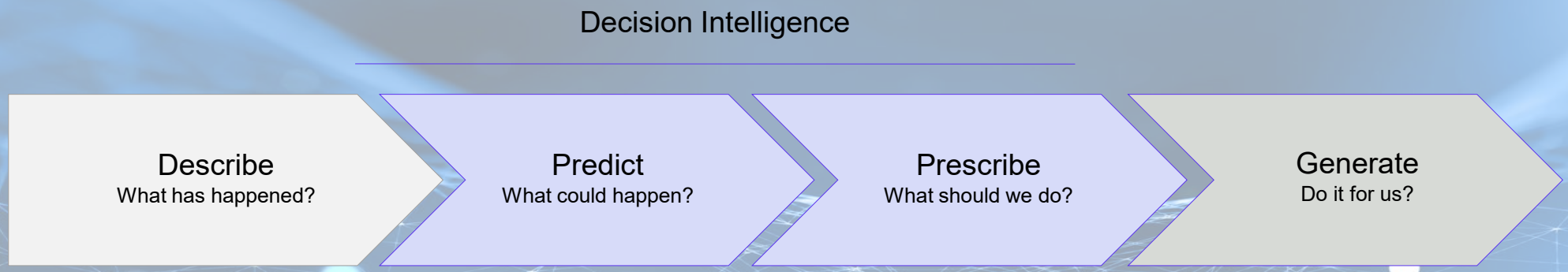
Fraud, Cross-sell, pricing, SME credit decisioning

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ML /AI in Credit Early Warning - AI providing new Early Warning capabilities in credit risk?

Prescriptive Solutions

Implementing a **Decision Intelligence Framework** allows for the transition from a platform that is "descriptive" to one that is "prescriptive".



- Raw data (inputs)
- Data visualization
- Past and present data

- Future state
- Ratings
- Early warnings (signals)

- Contextualization
- Filtering
- Decision Modeling (Recommendation)
- Validation
- NLQ (Natural Language Query)
- NLG (Natural Language Generation)
- Actionability

- Interpreting
- Reporting
- Credit memo generation
- Data reports
- Analytical insights



Machine learning limitations in Credit and Finance, What identified boundaries in the immediate and near future?

Data Pipeline Integration

Access to a real-time data pipeline is the largest constraint for the capabilities of the foundation models (FMs). The current global technology landscape dynamic indicates that Google on one hand and Microsoft and OpenAI on the other will compete on real-time data pipeline integration and automation that leverages FM's ability to stack the tasks.

FM + Historic Data

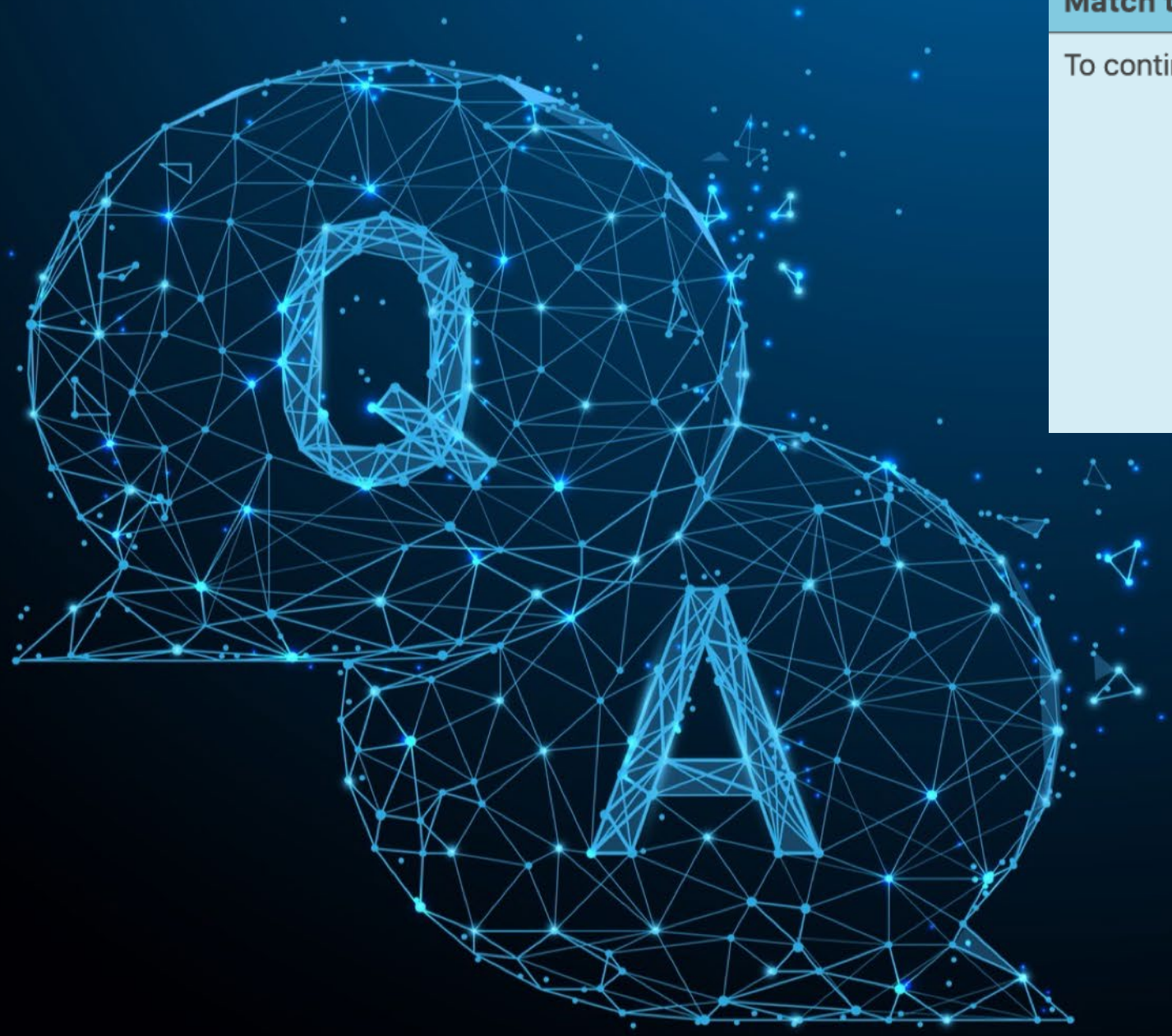
- **Assisted Productivity**
  - Assisted Writing
  - Action Transformers
  - Workflow Assistants

FM + Real-time Data

- **Assisted Data Gathering**
  - Assisted Search
  - Automated Actions
  - Inteligent Assistants

FM + Real-time Data Pipeline

- **Assisted Analytics**
  - Assisted DI
  - Automated Strategies
  - Adaptive Intelligence



Match the characters in the picture Help

To continue, type the characters you see in the picture. Why?



The picture contains 8 characters.

Characters:

Continue



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Please return to plenary for closing keynote


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