

# Using Generative Artificial Intelligence in Financial Services

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July 15, 2025



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# Agenda

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- What is Gen AI?
- NCCOB's Use of Generative AI
- Popular Use Cases in Financial Services
- Should You Use Gen AI?
- Mitigating Known Challenges



# Why now? Also, why me?

## How did we get here?

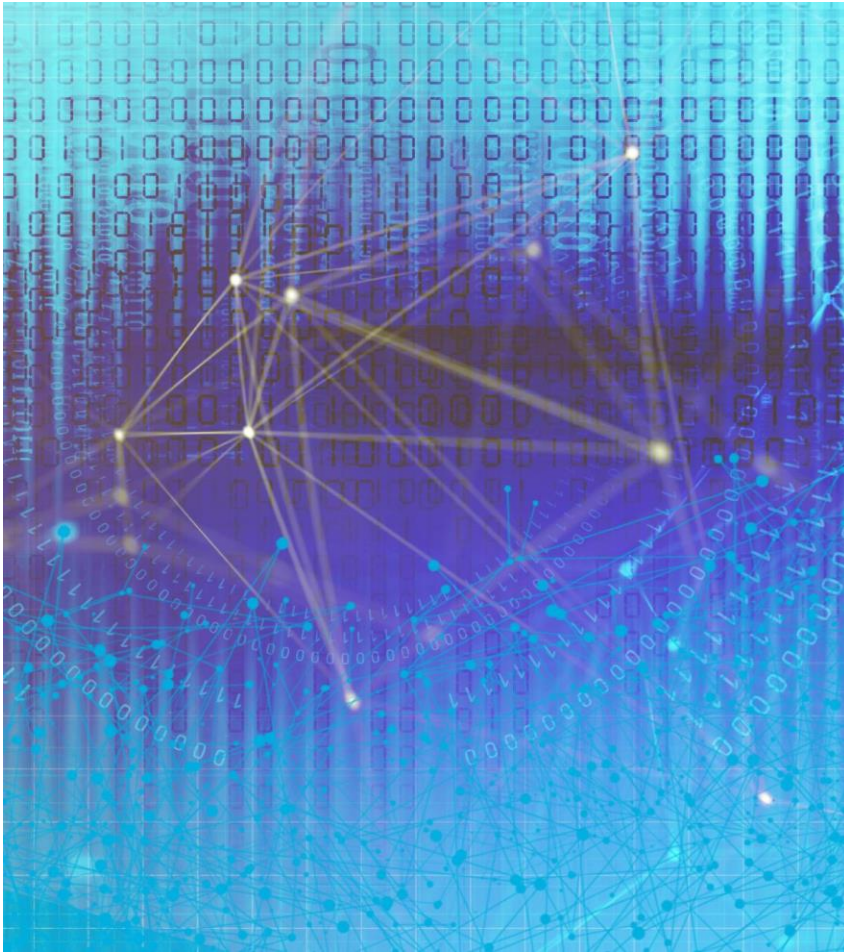
Statistics -> Machine Learning -> Neural Networks -> Deep Learning -> Generative AI -> Agentic AI

## What's different now?

Translator technology in 2017 – courtesy of a paper called “Attention is All You Need” by a multitude of computer scientists at Cornell.

- ❖ Prioritizes words in input and output (positional encoding and multi-head attention).
- ❖ Parallel processing of tokens

**Why me?** Go ask Elizabeth Hammond ☐



# Artificial Intelligence

## Generative AI vs. AGI

- AGI = Artificial general intelligence.
  - Not here yet, and possibly not ever here at all.
- Generative AI = large-language model artificial intelligence.
  - ChatGPT, Bard/Gemini, Bing
  - Improving around the same pace as Nvidia's stock price!
  - Based primarily on human-generated content.

## Regulatory Approaches

China's approach – Nothing without approval.

### EU's Artificial Intelligence Act

- Risk Categories
  - Unacceptable risk (e.g. social scoring, subliminal manipulation, biometric identification)
  - High Risk (e.g. critical infrastructure, sensitive areas, safety components)
  - Limited Risk
  - Minimal Risk

### American approach – open-ended.

- Executive Order No. 14179 (1/23/2025): "It is the policy of the United States to sustain and enhance America's global AI dominance in order to promote human flourishing, economic competitiveness, and national security."
- State & local laws – The BBB (H.R. 1) did NOT include the moratorium on state and local enforcement of AI regulations.



# Gemini on Financial Services in 2023

The major financial issues for 2023 are:

- **Aggressive Federal Interest Rate Hikes:** The Federal Reserve implemented a series of substantial interest rate increases throughout 2022 and early 2023 to combat high inflation. This aimed to slow economic activity and curb rising prices.
- **Banking Crisis:**
  - **March 2023:** This period saw a series of bank failures, starting with the collapse of **Silicon Valley Bank (SVB)**. A bank run ensued after SVB sold off its bond portfolio at a significant loss, causing depositors to lose confidence.
  - **Subsequent Failures:** The crisis continued with the closure of **Signature Bank** two days later and **First Republic Bank** facing immense pressure.
  - **Global Impact:** The crisis impacted global markets, triggering a decline in bank stock prices and raising concerns about financial stability.
- **Government Intervention:** To prevent further contagion, the US government intervened through:
  - **Emergency Liquidity Measures:** Providing financial support to stabilize the banking system.
  - **Increased Regulatory Scrutiny:** Implementing stricter regulations to prevent similar situations in the future.

Here are some additional points to consider:

- The crisis highlighted the vulnerability of certain banking institutions to rising interest rates and potential liquidity issues.
- It emphasized the importance of **stress testing** banks to assess their ability to withstand economic shocks.
- The long-term effects of the crisis, including potential reforms and regulations, are still being evaluated.

Overall, the 2023 banking crisis served as a wake-up call for the US financial system, prompting a focus on strengthening regulations and ensuring the stability of financial institutions.





# NCCOB's M365 CoPilot Pilot



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# State DIT Principles for Responsible Use of AI



**Human-Centered**

**Transparency & Explainability**

**Security & Resiliency**

**Data Privacy & Governance**

**Diversity, Non-discrimination, & Fairness**

**Auditing & Accountability**

**Workforce Empowerment**



# The CoPilot Pilot



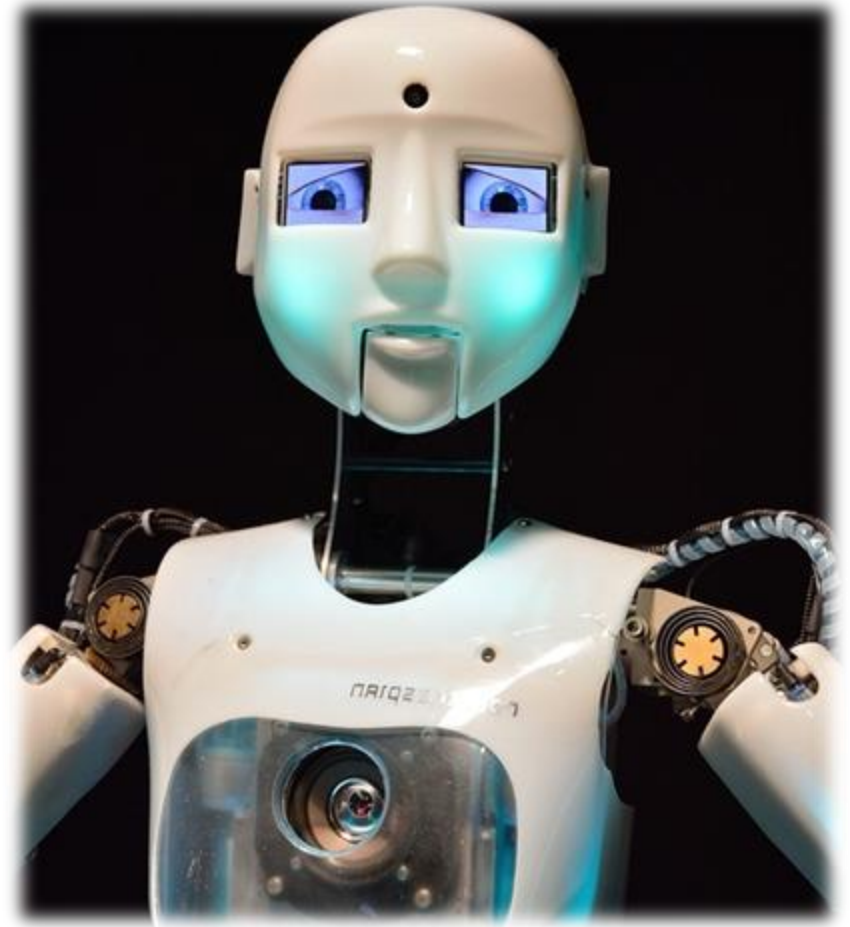
- Who: 10 users voluntold to try the tool, across the agency.
- What: 180 day test of Microsoft's genAI tool, with prompt engineering and security training.
- When: Every day!
- Why: We can't pretend genAI won't change how we work, so we can either get familiar or fail our mission.





# Use Cases for NCCOB

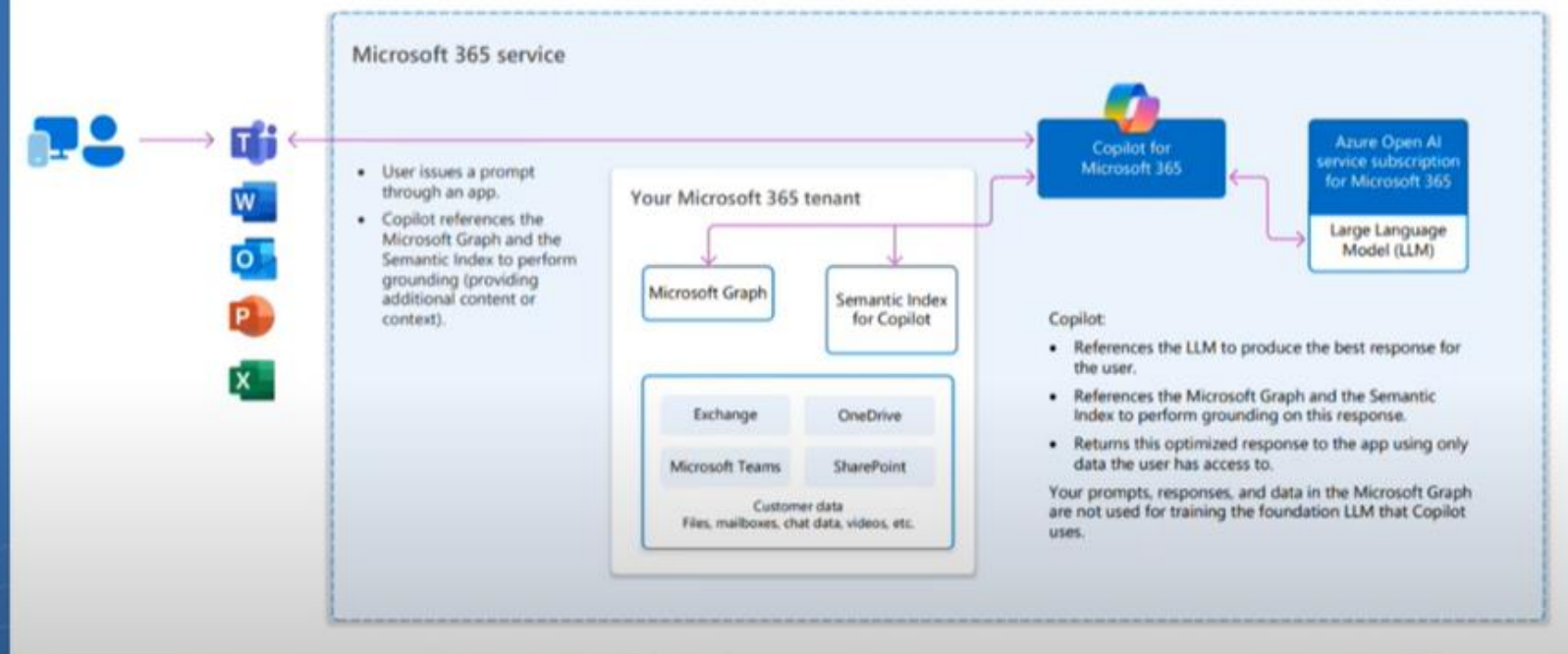
- Check for complete exam documents
- Generate annual reports
- Check outliers in data sets
- Facilitate greater exam efficiencies



# Getting Comfortable with M365 CoPilot

## Microsoft 365 Copilot

### Microsoft Copilot for Microsoft 365 query flow



# Popular Use Cases In Financial Services



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# Fraud Detection and Prevention

## Proactive Detection & Remediation

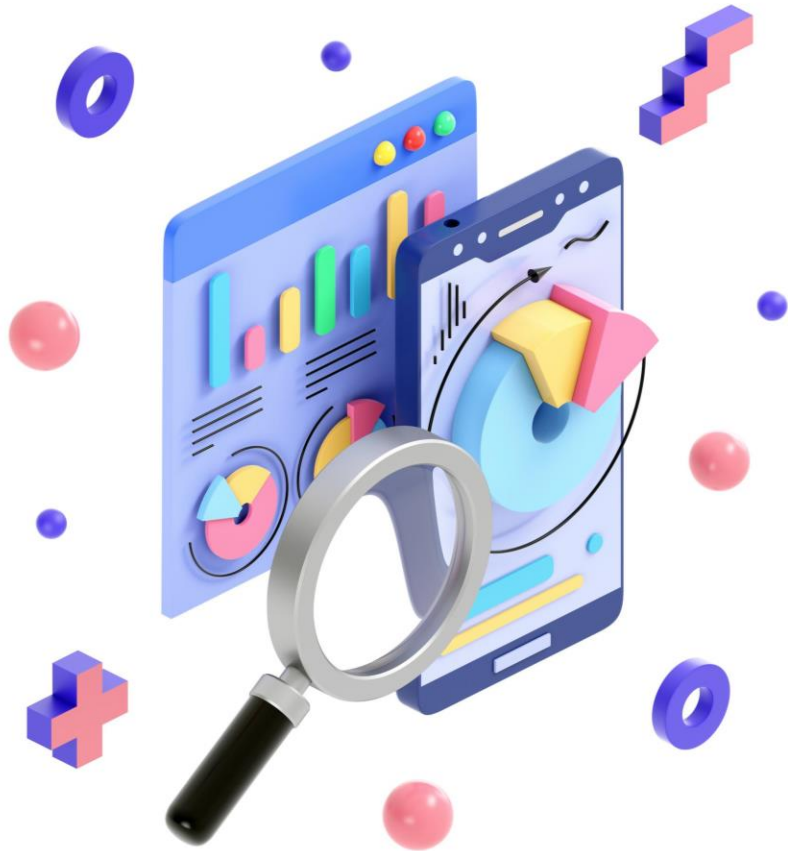
Financial institutions are subject to an intense amount of fraud, costing billions for them and their customers. Using genAI tools to proactively detect, stop, and respond to suspicious activities prevents further escalation, facilitates compliance with BSA/AML rules, and saves customers money.

- ❖ Growing sophistication of digital fraud
- ❖ Synthetic identity theft & deepfakes
- ❖ GenAI modeling
- ❖ Elder abuse





# Risk Assessment and Management



## Data Analysis for Risks

Generative AI analyzes large datasets, enabling the identification of potential risks and emerging trends effectively.

- ❖ Insurance underwriting
- ❖ Financial stress and credit card utilization
- ❖ EarnUp's AI Advisor – currently run by a credit union, not publicly available yet.
  - ❖ Helps identify when people are going to struggle paying their bills, and offers the customer suggestions.



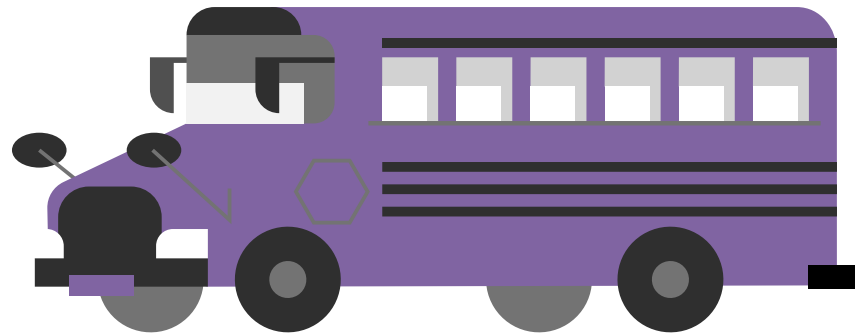
# Training and Teaching

Personalized Learning  
Experiences

Immersive Simulation

Self-testing

Reduced Content Creation  
Times



# Lending & Operational Processes

## Credit Scoring

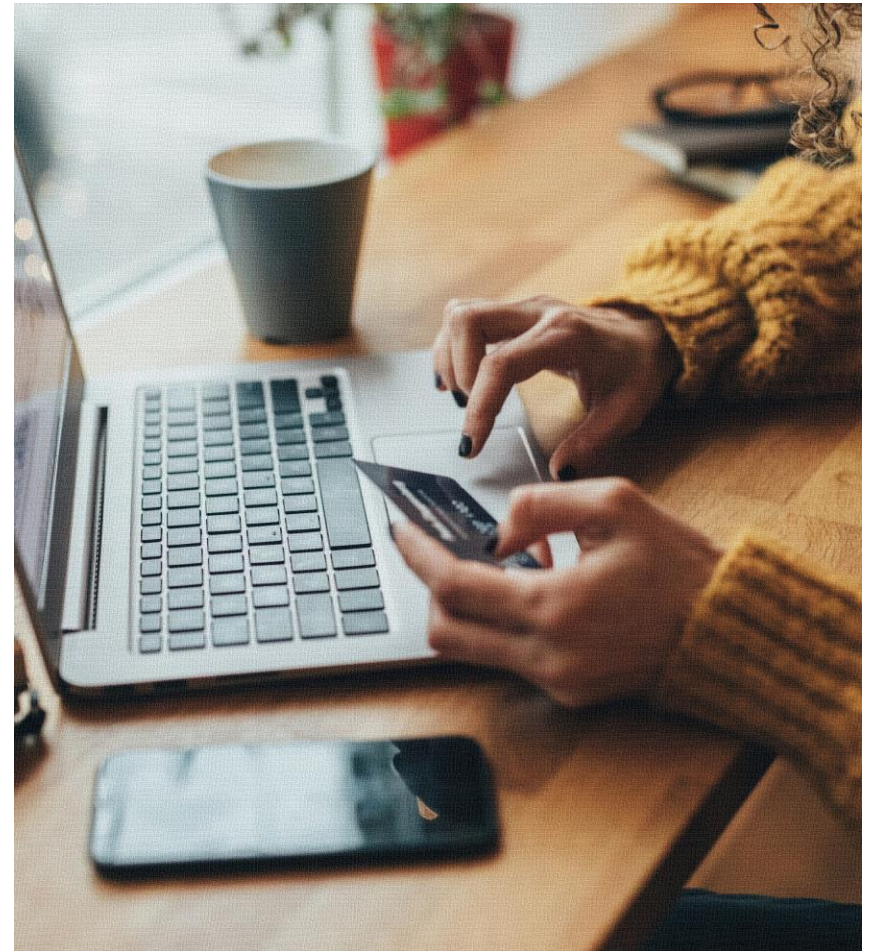
AI enhances credit scoring by analyzing vast amounts of data, leading to a potentially better assessment of borrower risk. (But only with good data & good training.)

## Loan Underwriting

AI is being used in loan underwriting by automating document reviews, checking for application completeness, and looking for loan anomalies.

## Marketing

Gen AI can generate content faster, can reach new audiences, and can be used for trend analysis.



# Customer Service & Chatbots



## AI-Powered Chatbots

Several financial institutions are already using chatbots to handle routine interactions – this is kind of the telephone IVR thing with a bit more power under the hood.

- ❖ Personalized financial advice
- ❖ Targeted marketing
- ❖ Enhanced human production behind the CSR
- ❖ Sentiment analysis (how does the customer feel)

## Agentic Chatbots

These bots can actually make decisions, and are higher risk.





# Should You Use Gen AI?

(Hint: It's Up to You!)



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# Algorithmic Bias



## Algorithmic Bias Defined

Algorithmic bias refers to the tendency of AI systems to perpetuate existing biases in its training data.

## Algorithmic Drift

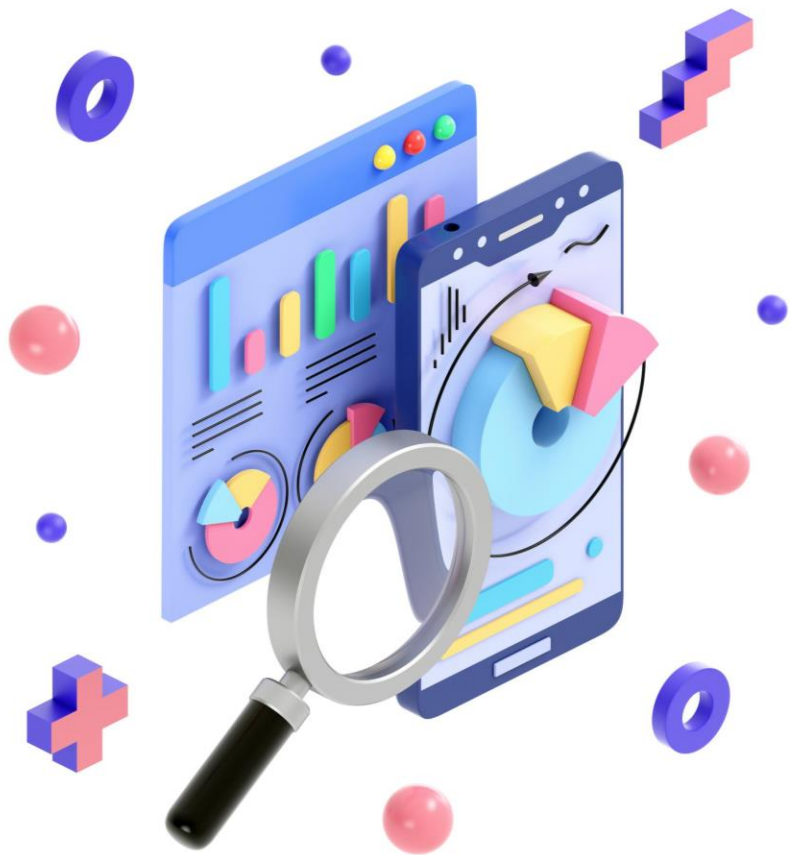
Algorithmic drift is the degradation of a machine learning model over time due to changes in the underlying data patterns or real world encounters.

## Model Mechanics

That's not a real term yet – but this generally describes a professional who maintains, repairs, and troubleshoots various types of machines – in this case, the genAI model.



# Importance of Data Quality in AI Models



## **Essential for Accuracy**

High-quality data is fundamental for training AI models to ensure their accuracy and reliability in predictions.

## **Data Completeness**

Data must be complete to avoid gaps that could lead to misleading outcomes in AI decision-making processes.

## **Representation Matters**

Ensuring data is representative helps prevent biased outcomes that can negatively affect lending decisions.



# Data Breaches and Security

## Impact on Consumer Information

Data breaches compromise sensitive consumer information, resulting in significant financial loss and erosion of trust.

## Reputational Damage

Organizations suffering from data breaches face reputational damage that can have long-lasting effects on customer relationships.

## Importance of Security Measures

Financial institutions must prioritize robust security measures to safeguard customer data and prevent breaches.





# Challenges in Regulatory Compliance



## **Evolving Regulations**

The federal regulatory framework changes constantly, creating challenges for institutions to stay up-to-date and compliant.

## **Diverse Jurisdictions**

Compliance requirements vary substantially across jurisdictions, complicating adherence to regulations for institutions.

## **Investing in Compliance**

Compliance programs that are focused on AI are expensive, potentially ineffective, and challenging to understand.

## **Remember the Election Cycle**

The Chopra CFPB did not provide a lot of guidance on implementation of AI, and the Voight CFPB has repealed so many rules our heads are still spinning. Just remember that this pendulum can swing the other direction.



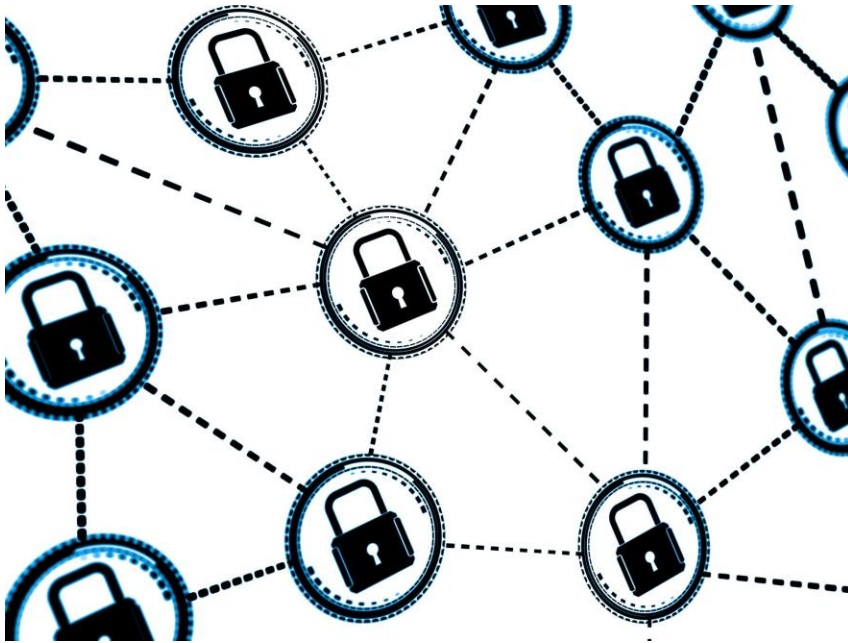
# Mitigation Strategies



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# Ensure Data Integrity and Protection



## **Data Governance & Encryption**

Implement a data governance framework & encrypt your data.

## **Regular Security Assessments**

Conducting regular self assessments to identify vulnerabilities and evaluate the effectiveness of data protection measures.

## **Train Models on Different Datasets**

Using diverse datasets can reduce algorithmic bias to prevent discriminatory lending practices. This is vital if you use a homegrown model.

## **Conduct AI Audits**

Conducting regular audits of the algorithms to spot bias, drift, or error in decision-making.





# Transparency and Accountability



## Building Trust

Transparency with these tools is essential for fostering trust among consumers and regulators.

## Establish Accountability Metrics

What are you going to do if the model runs amok?

Who is responsible for that?

## Retain Human Judgment!!





# Continual Monitoring and Improvement

## Importance of Monitoring

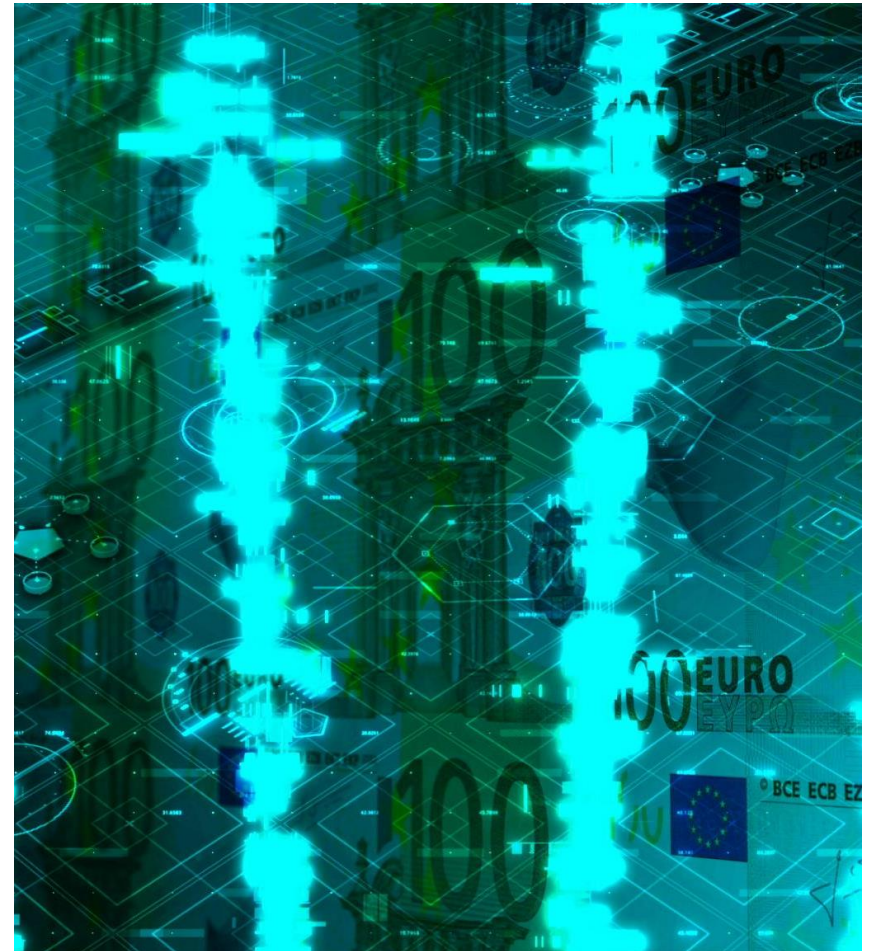
Ongoing monitoring of AI systems is critical to ensure their effectiveness and compliance with regulations.

## Regular Audits

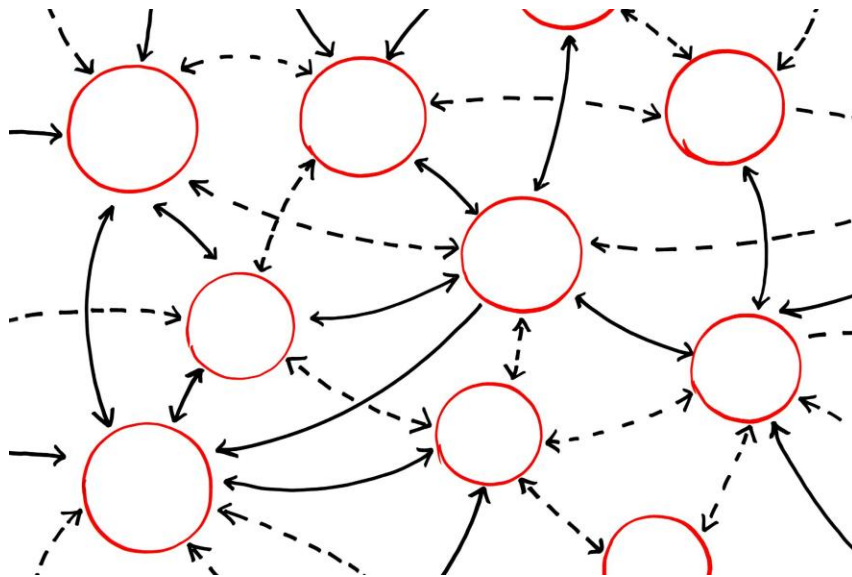
Conducting regular audits helps identify areas for improvement and ensures adherence to regulatory standards.

## Adapting to Challenges

Updates and improvements allow institutions to adapt AI systems to new challenges and evolving regulations.



# Some Terms to Know



## **Adverse Impact Ratio (AIR) Analysis**

Proactive approach to spot disparate impact before someone else points it out.

## **Thresholds for Internal Analysis**

At what level should you examine your model more intensely for signs of bias or drift? What loss rates would you accept? Make these choices before you deploy the model.

## **Adversarial Debiasing**

Training both a predictor and a discriminator to isolate the target variable.



# Questions

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