



Artificial Intelligence

Zenith Special Interest Group

Executive Primer





3 Types of Artificial Intelligence:

Weak Al

- Limited by programming won't develop new skills
- Analyses preferences and improves over time

Strong Al

- Learns new skills through contextualisation
- Applies knowledge to plan ahead
- Can adapt as changes occur

Superintelligence

- Self-aware
- Surpasses human intelligence
- Only exists in science fiction

Artificial Intelligence

Artificial Intelligence is revolutionizing the financial technology (fintech) industry, offering unprecedented opportunities and challenges alike. As a rapidly advancing branch of computer science, AI enables the simulation of human thought and language through code, with recent breakthroughs in machine learning and deep learning propelling the field's growth.

For fintech companies, embracing AI presents a pathway to stay competitive amid the increasing investments in AI innovation by big tech firms. However, alongside these opportunities, several critical challenges arise, demanding careful attention.



In this executive briefing, we will explore the key challenges facing the fintech industry as it harnesses the potential of AI. Specifically, we will examine the issues of bias in AI systems, the ethical implications of AI adoption, and the importance of addressing security and maintenance concerns for AI systems.

By addressing these challenges, fintech companies can pave the way for widespread and responsible adoption of AI tools, ensuring a safe, secure, and sustainable transformation of the financial services industry.

In the following sections, we will delve deeper into each challenge, highlighting the Zenith program's opportunities to assist fintech and financial services firms in overcoming these hurdles and unlocking the full potential of AI technology. In our appendices, we will brief you on the landscape of each underlying technology.



Key Highlights

- Al algorithms can inherit biases from the data they are trained on, leading to unfair and discriminatory outcomes.
- Identifying and mitigating bias in Al systems is crucial to building trust and ensuring ethical Al adoption.
- Biases in AI can have significant consequences in sensitive domains such as finance, impacting customer satisfaction and regulatory compliance.

Biases in Al Systems

Artificial Intelligence (AI) systems are prone to inheriting biases present in the data used for their training. Technologies such as **Data Annotation** and **Data Quality & Observability** play vital roles in identifying potential biases and ensuring that training data is diverse and representative. By incorporating these technologies, fintech companies can reduce the risk of biased AI outcomes and promote fairness in their algorithms.



By adopting **Synthetic Data** generating practices, fintech companies can broaden the training data sets to include more diverse demographics in their customer data to improve the quality of the data in.

To ensure ethical AI adoption, fintech companies should also invest in technologies that relate to **Model Validation & Monitoring**. These technologies help in understanding how AI models arrive at decisions, making the decision-making process more transparent and interpretable for customers and regulators.

To tackle biases effectively, fintech firms should adopt strategies such as **diverse and representative data collection**, **regular audits**, and **fairness-aware machine learning algorithms**. Transparency in Al decision-making can also aid in identifying potential biases and gaining customer trust.



Key Highlights

- Ethical considerations in AI adoption involve privacy, transparency, fairness, and accountability.
- Fintech companies must balance Al-driven innovation with societal and ethical responsibilities.
- Responsible Al practices enhance brand reputation and foster long-term customer loyalty.

Ethical Implications of Al Adoption

As fintech companies embrace Al-driven innovation, they must navigate the ethical implications associated with its adoption. Ethical considerations involve ensuring customer privacy, maintaining transparency in Al decision-making, promoting fairness in algorithms, and being accountable for Al-driven outcomes.

To address ethical concerns related to data privacy, fintech companies should implement **Data De-Identification** techniques. These technologies protect sensitive customer information while still allowing AI models to derive valuable insights.

Transparency and explain-ability are vital to address ethical concerns in AI adoption. Consumers and regulators are increasingly demanding explanations for AI-driven decisions. To enhance transparency, fintech firms should adopt <u>Interpretable AI</u> models and establish clear communication channels to explain the logic behind AI recommendations.

Fintech companies should acknowledge their responsibility for Al-driven outcomes and establish mechanisms to rectify errors and address customer complaints. Being accountable for Al systems' behaviour fosters trust and loyalty among customers and stakeholders.

Responsible AI practices not only align with societal values but also enhance the reputation of fintech companies. Customers are more likely to engage with companies that demonstrate a commitment to ethical AI practices, leading to long-term customer loyalty and sustainable growth.

Interpretable AI	Explainable Al
Small models that are inherently interpretable	The process of applying a method that models the output of a more
e.g. Small decision trees or linear	complex model
models with a small number of input variables	This is performed after model training has been completed



Key Highlights

- The integration of AI in fintech increases cybersecurity risks and potential vulnerabilities.
- Continuous monitoring and updates are essential to ensure the robustness and reliability of Al systems.
- Investing in AI security and maintenance is a proactive approach to safeguarding financial data and operations.

Security & Maintenance Concerns of Artificial Intelligence

While AI offers transformative opportunities for fintech, it also introduces new cybersecurity risks and vulnerabilities. The integration of AI in financial services creates potential entry points for cyber threats, necessitating a proactive approach to security and maintenance.

Technologies like **Resource Optimisation** and **Machine Learning Deployment** are essential in enhancing Al system robustness. These technologies ensure that Al models are efficiently deployed and managed, minimizing potential vulnerabilities and optimizing real-time resource usage.

Al can also play a pivotal role in fraud prevention and risk mitigation within fintech. Implementing Al-driven Fraud Detection systems enhances the security of financial transactions and improves overall risk management.

Considering the rapid evolution of cyber threats, fintech companies must stay informed about emerging security challenges and invest in state-of-the-art Al security technologies. Collaborating with industry experts and sharing insights on security best practices can further fortify fintech systems against potential threats.





Benefits of Exploration Through Zenith

- 1. Common frameworks for adoption can be crowdsourced
- 2. Reduce internal expertise limitations through community engagement
- 3. Time-to-market of exploration in innovation labs reduced
- 4. Reserve resources for high-value development
- 5. Interoperability improves adoption across the industry
- 6. Keep in step with security, standards, and new feature development
- 7. Benefit from community contributions across key themes
- 8. Empower, retain, and attract innovators and developers

Zenith Opportunities

13
Identified Al Themes

In the Appendix, we have outlined 13 key themes that serve as innovation verticals within the Zenith program.

These themes encompass cutting-edge technologies and trends in Artificial Intelligence.

Embracing these themes will drive transformative advancements in fintech, fostering collaboration, and collective innovation within our foundation.

Our aim is to collaborate on an industry-led, financial services focused, open-source, learning language model.

Together, we can leverage the power of collective expertise to shape the future of Al-powered fintech solutions. Join us in our mission to create secure, transparent, and ethical Al applications that redefine the financial services landscape.



- Al Chipsets
- Al-Driven Fraud Detection
- Computer Vision
- Data Annotation
- Data De-Identification
- Data Quality & Observability
- Generative AI
- Machine Learning Platforms & Deployment
- Model Validation & Monitoring
- Natural Language Processing
- Resource Optimisation
- Synthetic Data
- Version Control & Experiment Tracking

Appendices

Data Sheets

This report uses Technology Readiness Levels. For more information as to this classification system, please refer to https://zenith.finos.org/docs/roadmap/TRL





Al Chipsets

Specialized processors designed to accelerate Al computations, enabling faster and more efficient Al model training and inference.

In fintech, AI chipsets drive groundbreaking advancements, powering complex algorithms for fraud detection, risk assessment, and personalized financial recommendations.

The high-performance computing capabilities of AI chipsets empower fintech companies to deliver realtime, data-intensive services, transforming the way financial institutions operate and serve their customers.

You can find out more about this subject in our Al Chipset Primer on the Zenith GitHub.



OPPORTUNITY IMPACT TECHNICAL FEASIBILITY Macro **Network Effects** Competitive Advantage **Technical Merit** Surging Demand & Interactions for applications Scalability of Al Success of Faster & more accurate decision making chipsets for high accelerated Al Integration across multiple Need for model training volume data processes Risk mgmt. & fraud detection capabilities Deep learning fast/efficient data Need for continuous upskilling to ensure advancements processing Real-time data processing for insights workforce proficiency Al-powered data analytics **Plavers DVIDIA** Tools, Ecosystem & Skills **Financial Benefits** Desire to enhance financial inclusivity & accessibility Availability of dev Optimised AI model training on chipsets **AMD** Growing ecosystem of service providers tools & frameworks Al-powers Fintech expands market reach **Distruptees** Need for continuous upskilling to ensure Google Increased investment for innovative startups chipsets are implemented correctly Legacy hardware manufacturers **Drivers** Supply Chain Friction Regulatory pressure to improve fraud detection Traditional financial services Integration Data storage and integration chipsets Data privacy requiring adaptation challenges with concerns legacy hardware Cost savings through Al-Collaboration with data/chipset manufacturers Skill shifts in job market as Al driven automation impacts workforce Regulatory compliance complexities Disruption to trad. hardware supply chains

FUTURE



Short term Initial adoption and integration of chipsets Medium term
Widespread deployment
in financial services

Long term
Evolution of chipsets for autonomous solutions

Risks

Potential delays in advancements and innovations

Market resistance and scepticism in AI-decision making

Ethical considerations surrounding responsible use

SUMMARY

Al chipsets offer a compelling opportunity for fintech, revolutionizing financial services through accelerated Al computations. Advancements in specialized hardware enable groundbreaking applications in fraud detection, risk assessment, and personalized financial recommendations. The high-performance computing capabilities of Al chipsets empower real-time, data-intensive financial services, transforming traditional banking and ushering in a new era of customer-centric financial experiences. Despite technical feasibility and potential financial benefits, challenges like data privacy, regulatory compliance, and integration frictions require careful navigation. With a promising future outlook, early adoption and collaboration between fintech players and Al chipset manufacturers will play a crucial role in shaping the trajectory of Al-driven fintech innovation.



Al-Driven Fraud Detection

This leverages advanced machine learning algorithms to detect and prevent fraudulent activities in realtime.

In fintech, this technology acts as a vigilant security layer, continuously analysing vast volumes of financial data to identify suspicious patterns and transactions.

By swiftly detecting and mitigating fraud, Al-driven systems protect financial assets, preserve customer trust, and enhance overall cybersecurity in the rapidly evolving digital financial landscape.

You can find out more about this subject in our Al Chipset Primer on the Zenith GitHub.



OPPORTUNITY IMPACT TECHNICAL FEASIBILITY

Macro

Escalating cyber

threats

Al advancements

increase accuracy

& efficiency

🥸 Ravelin

Regulatory mandates &

compliance regs.

Significant cost

saving through

loss prevention

FORTER

feedzai



Network Effects & Interactions

Widespread adoption leads to collective intelligence

Collaborative Industry-wide defence strategy

Increased trust in FS promotes further adoption



Cybercriminals facing more evolved systems

Legacy fraud detection losing competitiveness

Shift in the dynamics of financial crime investigation toward automation

Competitive Advantage

Superior fraud detection & reduced losses

Enhanced customer trust & lovalty

Real-time response capabilities to incidents

Financial Benefits

Cost savings & less post-fraud investigations

Customer retention through reputation

Investments & partnerships for potential applications following successful tests

Supply Chain

Integration of Al-driven solutions to core infra

Collaboration between Al solution providers, data aggregators & financial entities Potential changes in risk assessment and underwriting of Financial Services

Technical Merit

Demonstrable success in real world scenarios

Scalability of Al models to process vast volumes of data

Continuous improvement and refinement of ML models to adapt to evolving threat landscape



Tools, Ecosystem & Skills

Readily available dev. frameworks Growing ecosystem of talent working with AI tools

Need for continuous upskilling to keep up with emerging fraud techniques



Friction

Data privacy concerns

Over-reliance on Al models leading to blind spots

Regulatory compliance complexities in explainability of models

FUTURE

FEATURE

Growing adoption

of digital financial

services

Drivers

Brand reputation

& Consumer trust



Short term Integration efforts into security infrastructure

Medium term Industry-wide adoption & increased reliance

Long term Evolution of Al-driven responses to emerging fraud techniques

Risks

False negatives where AI fails to detect new or adaptive fraud patterns

Adversarial attacks targeting AI models to manipulate outcomes

Potential overfitting or bias in Al models affecting accuracy and/or fairness of detection

SUMMARY

Al-driven fraud detection represents a significant opportunity in fintech, providing real-time protection against sophisticated cyber threats. Advanced machine learning algorithms analyse vast financial data to swiftly identify and prevent fraudulent activities, safeguarding financial assets and customer trust. Collaboration between fintech companies, financial institutions, and cybersecurity experts is driving the development and adoption of robust fraud prevention solutions. The technology's impact is far-reaching, with macro network effects and improved cybersecurity across the digital financial landscape. While the potential for financial benefits and competitive advantages is substantial, the implementation of Al-driven fraud detection requires careful consideration of technical feasibility, frictions, and risks. By striking the right balance between innovation and responsible use, Al-driven fraud detection will continue to transform the way financial entities combat financial crime, contributing to a more secure and trusted financial ecosystem.



Computer Vision

An AI technology that enables machines to interpret and understand visual information.

In fintech, computer vision revolutionizes various processes, from automating document verification and identity recognition to analysing financial charts and visualizing data patterns.

By harnessing the power of computer vision, fintech companies streamline operations, enhance user experiences, and unlock valuable insights from visual data, driving efficiency and innovation.

You can find out more about this subject in our AI Chipset Primer on the Zenith GitHub.



OPPORTUNITY

IMPACT

TECHNICAL FEASIBILITY

Macro

Competitive Advantage

Quick & seamless document processing

Enhanced security through adv. verification

Data-driven decision making for strategy

Financial Benefits

Automation of labour intensive doc verification.

Higher customer engagement & satisfaction

Demonstration of technological leadership & innovation of products with customer focus

Supply Chain

Integration of end-to-end operations

Collaboration required to meet specific industry needs

Streamlining of data collection & analysis

Technical Merit

Real-world demos of visual data interpretation

Scalability to handle large-scale real-time

Continuous improvement and refinement required to improve accuracy & efficiency

Tools, Ecosystem & Skills

Readily available libraries, APIs and tools

Growing ecosystem of collaborating entities

Need for continuous upskilling to keep up with new data use cases

Friction

Data privacy concerns over processing

Ethical considerations when decision making

Potential biases affecting financial data analysis & decision outcomes

Rising interest in

data-driven FS

decision making

Increasing availability of HQ visual data

Growing demand for automation & efficiency















Competitive advantage through visualising complex data

Need for fast & accurate ID & docs verification

Potential improvements to fraud detection

Conventional data analysis methods challenged

Obsolescence creates need

to adapt to automation

Network Effects

More focus on visual

interaction with data

Combination of computer

vision with other AI tech

Improved accessibility &

inclusivity via automation

Distruptees

& Interactions

Shift in the skill set required within FS Operational tasks

FUTURE



Timeline

Short term Document verification and basic data analysis

Medium term Widespread POCs for other FS operations

Long term Augmented Reality based financial interactions



Technical challenges affecting decision making

Regulatory compliance in ID verification & customer data processing

Market resistance to automated interpretation of visual data

SUMMARY

Computer vision technology holds immense potential in transforming fintech processes, enabling machines to interpret and understand visual information. Fintech companies are leveraging computer vision to automate document verification, enhance fraud detection, and gain valuable insights from complex financial data. The technology's impact extends to improved user experiences, data-driven decision-making, and increased efficiency in financial operations. While the opportunity is significant, challenges related to technical feasibility, ethical considerations, and regulatory compliance must be addressed. The future outlook for computer vision in fintech is promising, with a gradual timeline for adoption and a need for careful risk management and responsible implementation. By capitalizing on the benefits and addressing frictions, computer vision will play a pivotal role in driving innovation and efficiency in the evolving landscape of fintech services.



Data Annotation

This involves labelling and tagging data to train AI models, providing the foundation for robust and accurate machine learning applications in fintech.

High-quality annotated data ensures the development of Al models that accurately recognize patterns, make precise predictions, and drive data-driven decision-making.

In fintech, data annotation underpins critical processes such as credit risk assessment, fraud detection, and personalized financial recommendations.

OPPORTUNITY

Exponential

growth of data &

labelling

Advanced machine

learning relying on

HQ annotations

Fintech investment into

data annotation services

and tools

Collaboration

required to create

HO labelled data

IMPACT

Macro

Network Effects & Interactions

Already widespread adoption in FinTech sector

Pre-existing labelled dataset sharing in FinTech

Models gaining accuracy, accessibility & inclusivity

Distruptees

Manual data labelling processes facing obsolescence

Traditional methods of risk and fraud analysis being challenged

Shifting job roles within fintech with demand for data professionals/experts

Competitive Advantage

Precise recommendations giving competitive edge for financial transactions Enhanced customer trust & loyalty from higher accuracy and relevant predictions

Cost savings through data annotation automation & streamlining model development

Financial Benefits

Increased revenue through tailored services

Investments & partnerships from mutual stakeholders impressed by HQ data Reduction of financial losses from better risk & fraud prevention

Supply Chain

Integration to core infrastructure of platforms & models Industrial collaboration with annotation service providers to ensure high quality datasets Streamlining of data collection & AI model creation through efficient data enrichment

Technical Merit

TECHNICAL FEASIBILITY

Pre-existing success of data annotation for machine learning

Scalability of data annotation to handle larger volumes

Ongoing advancements needed in annotation techniques to address evolving needs



Tools, Ecosystem & Skills

High availability of Fintech specific tools & platforms

Growing ecosystem of collaborating experts

Need for upskilling of proficient data annotators in FinTech-specific requirements



Friction

Privacy & security when annotating sensitive data

Regulatory complexities in use for risk assessment

Ethical considerations of using annotated data for Decision Making

FUTURE



Timeline

Increased demand

for personalised

financial services

Players

Drivers

Numerous

startups and

service providers

Short term Identification of specific use-cases for adoption

Medium term

Projections for widespread integration of high quality data in operations

Long term Create evolution strategy for data annotation

Risks

Risk of flawed annotations impacting machine learning models Explanation of annotation methods & responsible use to regulators

Market resistance (ethical) to automated data annotation

SUMMARY

Data annotation is a fundamental technology in fintech, providing the foundation for robust and accurate Al-driven financial services. Fintech companies leverage data annotation to improve credit risk assessment, fraud detection, and personalized financial recommendations. The technology's impact extends to enhanced customer trust, competitive advantages, and cost savings. While the opportunity is substantial, challenges related to technical feasibility, data privacy, and regulatory compliance must be addressed. The future outlook for data annotation in fintech is promising, with a gradual timeline for adoption and a need for careful risk management and responsible implementation. By capitalizing on the benefits and addressing frictions, data annotation will continue to play a pivotal role in driving innovation and efficiency in the evolving landscape of fintech services.





Data De-Identification

A privacy-enhancing technique that removes or obscures personally identifiable information from data sets.

In fintech, where data security and privacy are paramount, data deidentification enables the safe and compliant use of sensitive financial information for AI research and analysis.

By protecting customer identities while allowing for data-driven insights, fintech companies can responsibly leverage AI technology to innovate and improve financial services.



OPPORTUNITY

Increasing

regulation on data

privacy & PII

Advances enable

safe use of

sensitive data

Necessary to balance

innovation & privacy

Demonstrating

commitments to

data privacy

IMPACT

TECHNICAL FEASIBILITY

Macro



Network Effects & Interactions

Data de-identification practices becoming more common in industry

Ongoing collaboration to share techniques

Higher interest in sharing & responsible data use



Distruptees

Outdated practices falling behind regulation

Legacy methods challenged by privacy-aware clients

Evolving job market in fintech being driven by demand

Competitive Advantage

Competitive edge through data responsibility

Customer trust focused on reputation

Compliance adherence reducing legal exposure



Financial Benefits

Reduced impact of data breaches

Leveraging de-identified data for Al research & analytics in applications Attraction of investors impressed by

responsible Al use



Supply Chain

Integration to core infrastructure of platforms & models Partnership models to maintain transparency & consistency

Secure collaboration strengthening data privacy standards in the chain



Technical Merit

Demonstrated success of deidentification

Scalability of data annotation to handle larger volumes

Ongoing advancements needed in deidentification to address evolving requirements



Tools, Ecosystem & Skills

Privacy regulators engage on tools & services

Growing ecosystem of privacy experts

Need for upskilling of proficiency in data privacy needs and specialisms



Friction

Compliance vs utility of data for research

Ethical considerations

Ongoing regulatory complexities and changes in data protection laws

FUTURE



Timeline

Need to leverage

Al while working

to strict rules

Plavers

Drivers

GDPR & CCPA

regulations

Short term Improve data privacy & compliance requirements

Medium term Develop initial data deidentification automation

Long term Collaborate on advanced data privacy techniques



Unintended data deidentification techniques causing privacy breaches

Evolving data privacy regulations affecting deidentification processes

Scepticism of strength of de-identification practices from Customers

SUMMARY

Data de-identification is a pivotal technology in fintech, ensuring the responsible use of sensitive financial data for AI research and analysis. By protecting customer identities while facilitating data-driven insights, fintech companies can innovate and improve financial services while adhering to strict data privacy regulations. Data de-identification brings opportunities for competitive advantages, cost savings, and enhanced customer trust. While the potential benefits are significant, challenges related to technical feasibility, regulatory compliance, and market acceptance must be addressed. The future outlook for data de-identification in fintech is promising, with a gradual timeline for adoption and a need for careful risk management and responsible implementation. By capitalizing on the benefits and addressing frictions, data de-identification will continue to play a crucial role in shaping the future of privacy-aware fintech services.



Data Quality & Observability

This practice ensures that data used in Al models is accurate, complete, and reliable.

In fintech, where data drives critical decision-making, these technologies play a fundamental role in maintaining trustworthy Aldriven predictions and outcomes.

By enhancing data observability, fintech companies gain valuable insights into data pipelines, ensuring transparency, and reducing risks associated with inaccurate or biased data.



OPPORTUNITY IMPACT TECHNICAL FEASIBILITY Macro **Network Effects**

Higher demand for data-driven insights

Players

Drivers

Regulatory

mandates on

transparency

Increasing reliance on Al-driven decision making

Advances in data pipeline transparency

Demand for accurate

and reliable data across

the industry

Customer trust

driven by accurate

predictions

Simultaneous adoption of data transparency processes

Distruptees

& Interactions

Established industry best practices & data standards

Obsolescence penalised in

the marketplace

Legacy methods challenged

by evolving standards

More data literate & aware

talent in the workforce

Financial Benefits

Reduced impact of data inaccuracies

Quantifiable trust & accuracy in predictions

Increased revenue through data-driven insights

Reduced potential for legal & reputational

damage caused by poor data quality

Competitive Advantage

Increased revenue from higher model accuracy

Attraction of investors impressed by commitment to data quality

Supply Chain

> Integration or defined practices to core platforms & business areas Observability helping with overall strategic planning of business

> Interoperability strengthening data quality standards through increased transparency

Technical Merit

Demonstrations of improvements to accuracy

Already scalable to large data volumes

Backdating of work to historic data sources required for proper meshing



Tools, Ecosystem & Skills

Commonplace tools available for Business Intelligence

Data Quality & **Observability Talent** is commonplace

Data Science requirements for strategic planning & legacy solutions harder to source



Friction

Compliance priority over quality-of-life hygiene

Data quality impacting decision making to users

Observability may cause painful indicators to be published until data quality is solved

FUTURE



Timeline

Short term Identify data repositories and quality issues

Medium term Publish & implement data quality standards

Long term Automate observation and handle legacy data Risks

Overly complex data quality processes creating inefficiencies

Stringent data quality standards affecting operational practices

Prioritisation slowing down legacy data clean-

SUMMARY

Data quality and observability are fundamental practices in fintech, ensuring the accuracy, completeness, and reliability of data used in Al models. By enhancing data observability, fintech companies gain valuable insights into data pipelines, ensuring transparency, and reducing risks associated with inaccurate or biased data. Data quality and observability offer opportunities for competitive advantages, cost savings, and enhanced customer trust. While the potential benefits are significant, challenges related to technical feasibility, data privacy, and regulatory compliance must be addressed. The future outlook for data quality and observability in fintech is promising, with a gradual timeline for adoption and a need for careful risk management and responsible implementation. By capitalizing on the benefits and addressing frictions, data quality and observability will continue to play a crucial role in shaping the future of trustworthy and data-driven fintech services.