



Privacy-Aware AI: Advancing Predictive Analytics in Financial Services

Raghavender Reddy Puchhakayala

Senior IEEE Member

Smarter Models. Safer Data. Real Financial Impact.



AI/ML Redefines Analytics

AI/ML is redefining predictive analytics in finance



Privacy & Compliance

Data privacy and compliance are critical enablers



Roadmap for Responsible AI

A roadmap for deploying responsible AI in finance



Improved Business Value

Improved accuracy, trust, and governance



A person is seen from the side, sitting at a desk and working on a computer. The computer monitor displays a dashboard titled 'Predictive Analytics Models' with various charts and graphs. In the background, a whiteboard is visible with the title 'Privacy Regulations' and a flowchart diagram. The scene is set in a modern office environment with a blue wall and some potted plants on the desk.

From Reporting to Responsible Intelligence

1

Static Reports

Basic historical data offering limited insights into past performance.

2

Predictive Models

Leverage forward-looking analytics, but require extensive datasets raising privacy concerns.

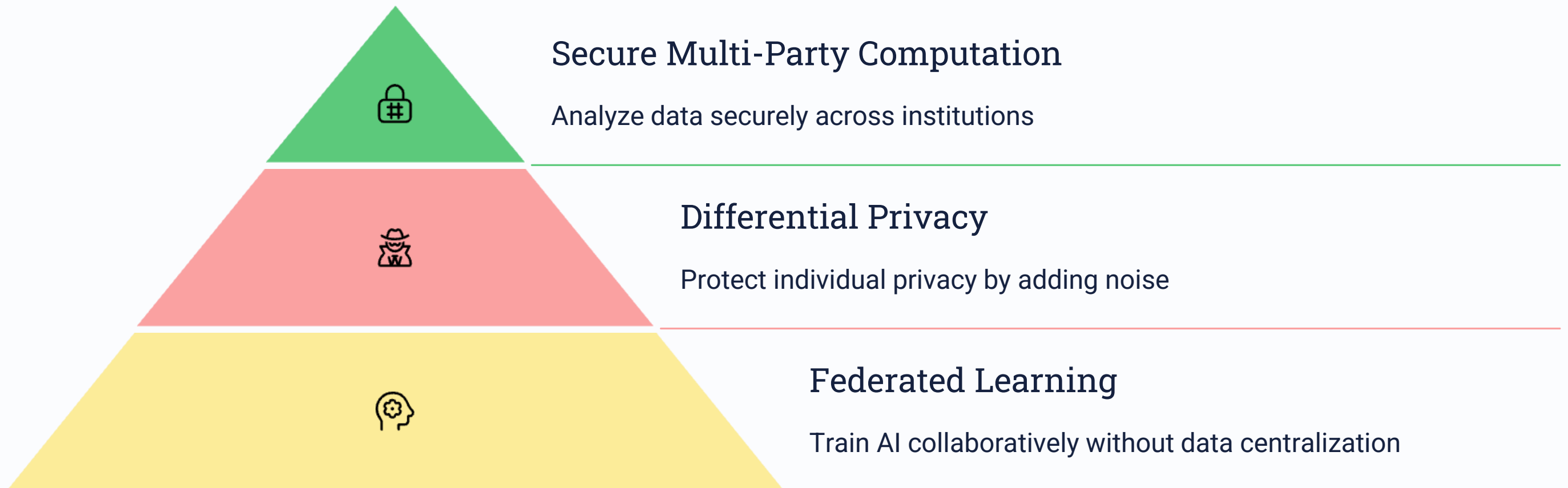
3

Privacy-Aware AI

Achieves compliant intelligence, adhering to regulations like Basel III and GDPR, ensuring data privacy.

Architecting Trust with Federated and Secure AI

Key privacy-enhancing techniques for a trustworthy AI foundation:



Incorporate compliance into AI development from the outset.

AI-Driven Risk, Without Risking Data

Global Credit Risk Modeling

Minimize defaults using data while adhering to privacy regulations.

Privacy-Preserving Fraud Detection

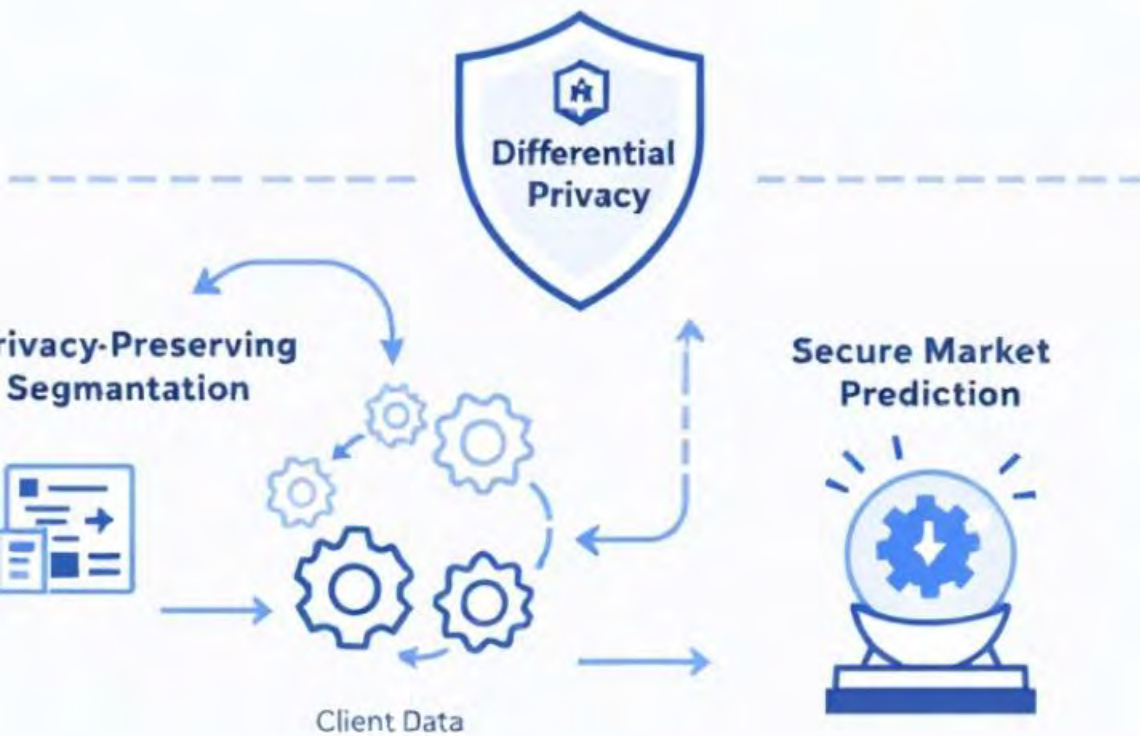
Accelerate fraud detection without exposing Personally Identifiable Information (PII).

Compliant Algorithmic Trading

Build confidence with regulators through transparent, compliant AI.



AI for Investment Decisions That Respect Client Privacy



Global Advisory

Enable global advisory services while keeping client data localized and secure.



Private Segmentation

Offer personalized experiences through privacy-preserving client segmentation.



Secure Predictions

Generate reliable market predictions using datasets protected with differential privacy.

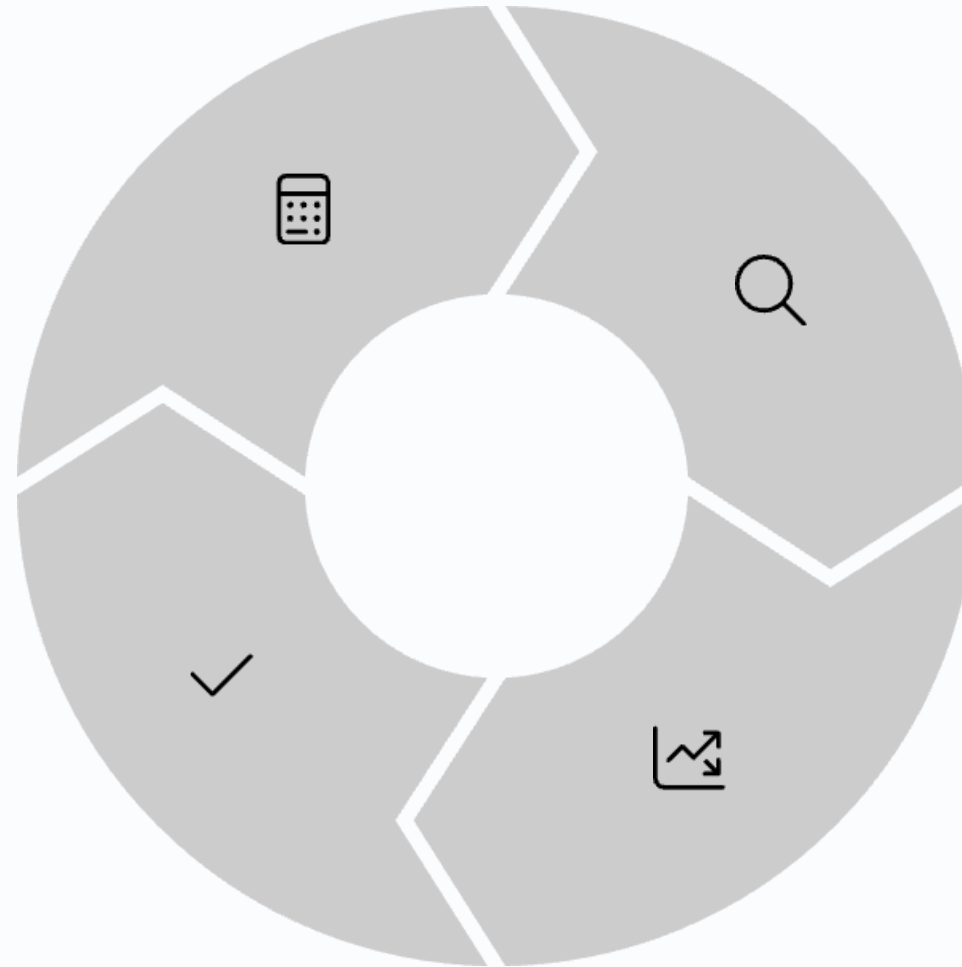
Predict, Price & Process – Privately

Enhanced Pricing

Refine risk assessment with granular data insights, maintaining full privacy.

Efficient Processing

Accelerate and improve payout accuracy with privacy-preserving technology.



Fraud Detection

Instantly identify suspicious activities through automated and secure data analysis.

Actuarial Enhancement

Supercharge traditional models with AI while ensuring privacy-first methodologies.



Responsible AI is Hard — Here's How to Make It Work

Data Challenges

Siloed data sources and inconsistent formats complicate AI model training.

Privacy Balance

Balancing data utility with privacy protection requires careful tradeoffs.

Compliance Complexity

Navigating multiple regulatory frameworks across jurisdictions is challenging.

Governance Requirements

Effective AI governance demands cross-functional oversight and clear accountability.

AI-Driven ETL: Smarter Scheduling, Lower Cost, Higher Efficiency



Fig. 1. Impact of Anomaly Detection on Cost and Performance

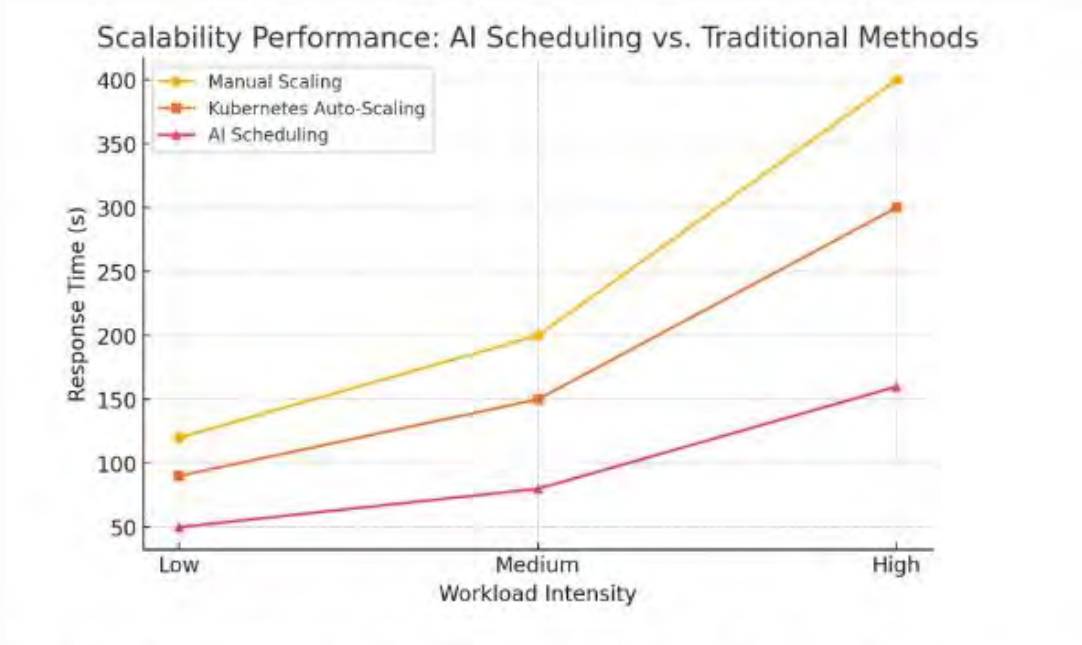


Fig. 2. Scalability Performance: AI Scheduling vs. Traditional Methods

The Responsible AI Stack for Finance



Audit & Monitoring

Governance tracking throughout lifecycle



Security Infrastructure

Enclaves, tokenization, encrypted storage



Privacy Tools

Google DP, OpenMined, IBM DiffPrivLib



Platform Foundation

Azure Confidential ML, AWS SageMaker FL





First Steps Toward Responsible AI in Finance

Assess Readiness

Evaluate data, governance, and infrastructure.

Pilot Use Cases

Start with fraud detection or credit scoring.

Build Teams

Include data, legal, and risk experts.

Monitor Outcomes

Track accuracy, compliance, and ROI.

Trust is the Currency of AI



Trends

Explainable AI, Secure multi-party AI, Real-time privacy enforcement are essential trends



Regulatory evolution

AI Act, SEC guidance, RBI compliance drive regulatory evolution.



Start now

Begin with small, secure, and strategic initiatives for AI adoption.



Future-ready AI starts with data privacy at the core.

Thank you!