AI Use Cases in Banking

This session will cover key AI categories, practical examples, and a structured approach to ideating and implementing AI/ML initiatives.

Disclaimer - The presentation contents are of presenter's designed through extensive research and with the aid of AI tools

Agenda

- Why AI in Banking?
- AI Use Cases by Models
- AI Use Cases by Functional Area
- Ideate Use Case
- Banking Use Case - Real world Implementation
- Q & A

Why AI in Banking

Enhancing Efficiency

Automating repetitive tasks to streamline operations.

Improving CX

Personalizing customer interactions and support.

Managing Risk

Detecting fraud and assessing creditworthiness more accurately.

Regulatory Compliance

Demanding faster compliance, enhanced risk management, and greater efficiency under increasing scrutiny and cost constraints.

AI Use Cases by Models

AI applications in banking can be broadly categorized into distinct types, each serving unique functions and delivering specific benefits.

1

Statistical Models

Traditional predictive analytics, e.g., credit scoring.

2

AI Models

Machine learning for fraud detection, underwriting.

3

Generative AI

Creating new content like chatbots, personalized marketing copy.

4

AI Agents

Autonomous workflows and cross-system process automation.

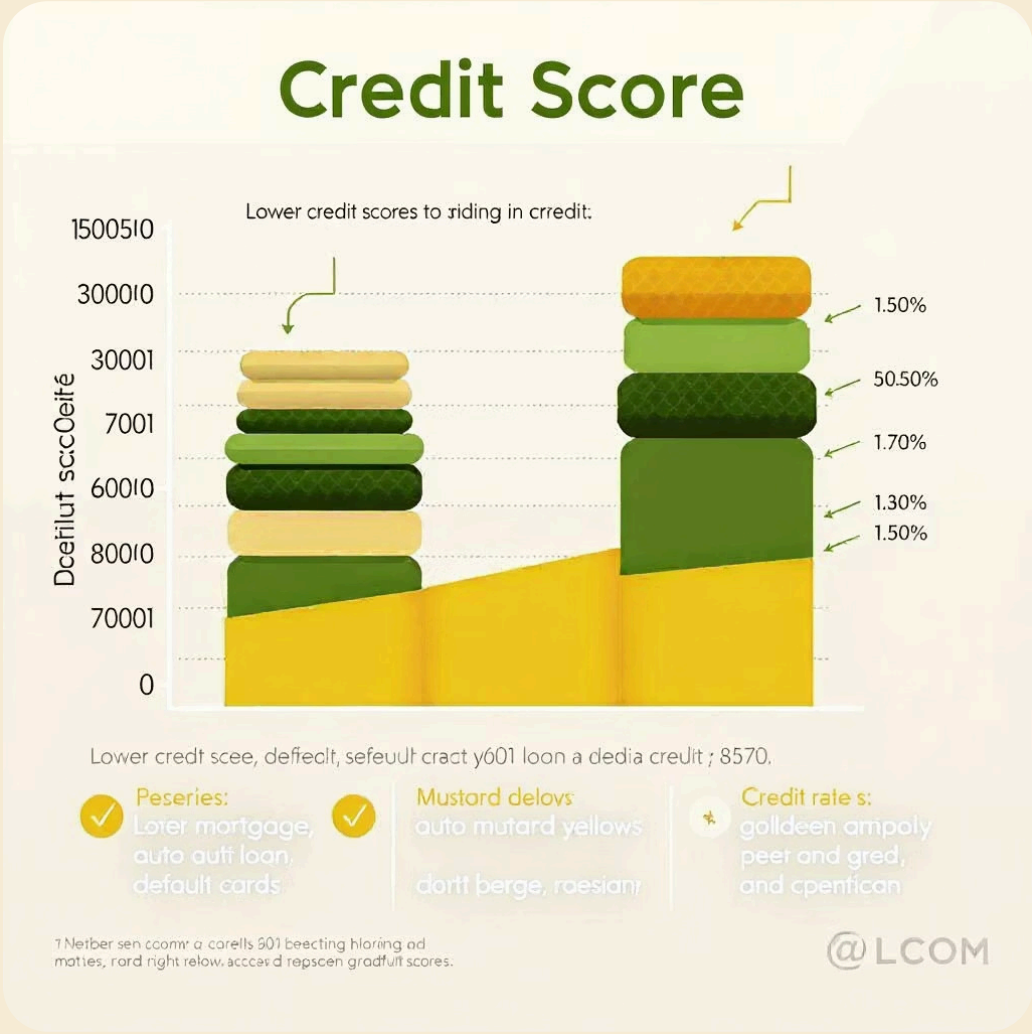
Statistical Models in Banking: What & Example

Statistical models use mathematical techniques to analyze historical data and predict future outcomes. In banking, they are foundational for quantitative analysis.

Credit Risk Scoring

These models predict the likelihood of a loan applicant defaulting based on financial history, credit behavior, and other variables. They enable faster, data-driven lending decisions and reduce default risk.

While powerful, over-reliance without human oversight or biased data can lead to unfair outcomes.



AI Models in Banking: What & Example

AI models, particularly machine learning, learn complex patterns from vast datasets to make predictions or classifications, often surpassing traditional statistical methods in accuracy.

> ### Fraud Detection
>
> AI models analyze transaction patterns in real-time, identifying anomalies that indicate fraudulent activity. This leads to immediate alerts and significantly improves accuracy over rigid, rules-based systems.

Challenges include ensuring model transparency, proper validation, and minimizing false positives.

Generative AI Use Cases in Banking

Generative AI excels at creating new, original content by learning from existing data. This technology is revolutionizing customer interaction and document processing in banking.

AI Chatbots

Providing 24/7 customer support, answering FAQs, and guiding users through banking processes efficiently.

Automated Document Processing

Extracting information from loan applications, KYC documents, and contracts, significantly reducing manual workload.

Considerations include explainability, regulatory compliance, and data privacy.

AI Agents & Automation in Banking

AI agents are intelligent digital entities capable of executing complex, end-to-end workflows autonomously, integrating across various banking systems.

Automated KYC

Seamless, real-time identity verification and compliance checks for new customers.

Loan Processing

From application to disbursal, AI agents can drastically cut processing times from days to minutes.

Account Opening

Streamlining the entire new account setup process, reducing friction.

These agents can reduce operational costs by up to 50% through efficient cross-system orchestration.

AI Use Cases by Models

Categories of AI Use Cases in Banking

Statistical Models

Traditional statistical techniques to explain relationships and forecast outcomes

Banking examples: ***Credit risk scoring, budget forecasting***

ML Models

Learning patterns from historical data to make predictions

Banking examples: ***Customer churn, fraud detection***

Natural Language Processing (NLP)

Understanding and processing human language input

Banking examples: ***Document classification, chatbots***

Reinforce-ment Learning

Optimizing decisions via trial-and-error feedback

Banking examples: ***ATM cash optimiz-ation, personalization***

Rule-Based Systems

Automation using predefined rules and logical conditions

Banking examples: ***AML alerts, data validation***

Category	Use Case	Description
Statistical Models	Credit Risk Scoring	Use logistic regression to estimate probability of default
Statistical Models	Time Series Forecasting	Predict future NPA, interest rate spreads, revenue
Statistical Models	Branch Performance Analysis	Use correlation/statistics to identify factors affecting performance
Statistical Models	Budget Forecasting	Use ARIMA or exponential smoothing for quarterly expense projections
Statistical Models	Market Risk Sensitivity	Use variance-covariance matrix for portfolio risk modeling
Machine Learning Models	Loan Default Prediction	Classification models trained on historical loan data
Machine Learning Models	Customer Churn Prediction	Predict likelihood of account closure or inactivity
Machine Learning Models	Credit Card Limit Optimization	Regression model to optimize customer limit allocation
Machine Learning Models	Revenue Leakage Detection	Classification models to find under-billed transactions
Machine Learning Models	Product Recommendation	Predict best-fit products for individual customers based on profile
Machine Learning Models	Suspicious Transaction Detection	Outlier detection (e.g., Isolation Forest) for fraud screening
NLP Models	Document Classification	Classify mortgage/KYC docs using text extraction + model
NLP Models	Virtual Assistants	Customer query handling using intent classification
NLP Models	Complaint Categorization	Automatically route or tag complaints based on email content
NLP Models	Regulatory Update Analysis	Extract relevant keywords/entities from circulars and map to impacted business processes
NLP Models	Contract Entity Extraction	Extract key clauses and financial terms from ISDA agreements
NLP Models	Sentiment Analysis	Gauge customer satisfaction from reviews or support chats
Reinforcement Learning Models	Next Best Action in CRM	Agent learns which offer yields the best engagement
Reinforcement Learning Models	Dynamic Offer Personalization	Adaptively recommends products during user journey
Reinforcement Learning Models	ATM Cash Replenishment	Optimize when and how much cash to refill, balancing cost vs. demand
Reinforcement Learning Models	Portfolio Rebalancing	Learn strategies for dynamic asset allocation over time
Reinforcement Learning Models	Loan Repayment Incentives	Offer dynamic incentives to encourage on-time repayment
Rule-Based Systems	AML Alert Thresholding	Rules like “> INR 10L cash deposit triggers alert”
Rule-Based Systems	Login/Transaction Controls	Block transactions with repeated password failures
Rule-Based Systems	Fixed Document Checklists	Validate mandatory document fields for loan processing
Rule-Based Systems	Early Warning Systems	IF balance drop AND high utilization THEN flag risk
Rule-Based Systems	Regulatory Mapping	Use keyword rules to tag regulatory clauses to business functions

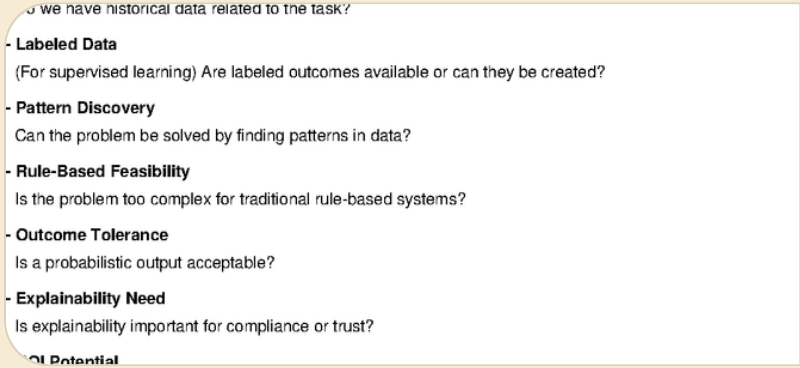
AI Use case by Functional Areas

Area	Example Use Cases
Retail Banking	Personal finance advisory, churn prediction, product recommendations
Corporate Banking	Supply chain finance risk scoring, credit exposure modeling
Risk & Compliance	Fraud detection, Anti-Money Laundering (AML), regulatory monitoring
Operations	Document classification, ticket routing using NLP
Treasury	Forecasting liquidity, stress testing under macroeconomic variables
Marketing	Customer segmentation, campaign targeting optimization

Ideating AI/ML Use Cases: Checklist for Project Managers

Before diving into development, ensure your proposed AI/ML use case is viable and impactful. Use this checklist for effective ideation.

- **Repetitive & Data-Rich Tasks?** Is the process manual and involves large datasets?
- **Measurable Business Outcome?** Can you quantify the ROI or efficiency gain?
- **Quality Data Available?** Is there sufficient, clean, and relevant data for training?
- **Automation or Augmentation?** Can AI truly automate or significantly assist the process?
- **Compliant & Ethical?** Does it meet all regulatory and ethical standards?
- **Stakeholder Buy-in?** Do you have clear ownership and support from key stakeholders?



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Pre-Build Steps Before ML Model Development

A solid foundation before coding begins is crucial for successful ML project delivery. These steps ensure alignment and mitigate risks.

Define Objectives

Clear business goals and measurable success metrics.

Data Assessment

Detailed plan for data collection, cleaning, and preprocessing.

Tool Selection

Choose appropriate AI/ML platforms (cloud services, AutoML, open source).

Risk & Validation

Plan for model validation, bias testing, and comprehensive risk management.

Governance & Oversight

Establish clear compliance checkpoints and human oversight protocols.

Pilot & Rollout

Prepare for initial pilot testing and a phased implementation strategy.

Banking Use Cases

Internal

External

📊 Fraud Detection & Security

Use Case	Description	Source
Adaptive fraud checkout	AI-powered real-time risk scoring during transactions	TickPick regained $3M
Real-time anomaly detection	ML monitors transactions for fraud patterns	Detect suspicious behavior
AML monitoring	AI flags money-laundering behaviors	AML use cases
Biometric auth	Face/voice match for login/transactions	Fair AI use cases
Transaction fraud AI	Multi-model monitoring reduces false positives	DigitalDefynd case studies

💼 Credit & Lending

Use Case	Description	Source
AI loan underwriting	Uses transaction data to assess borrower risk	**Abound's AI loans**
Credit scoring ML	Improves fairness and accuracy with XAI	**Explainable credit scoring**
Instant credit decisions	GenAI-driven loan approvals	**GenAI use cases**
Debt-collection bots	Personalized repayment recommendations	**GenAI examples**
Underwriting for thin files	ML assesses borrowers with limited credit history	**Upstart/ZestFinance on wiki**

🤖 Customer Experience & Chatbots

Use Case	Description	Source
AI-powered chatbots	24/7 support across channels	Commonwealth Bank AI chat
Virtual financial advisor	GenAI provides budgeting/spending advice	GenAI in banking
Complaint/ticket routing	NLP classifies customer issues	DigitalDefynd AI case studies
Document search via app	Conversational query across transactions	Bunq's Finn
Research chatbots for advisors	Internal LLM tool for market insights	Morgan Stanley "AskResearchGPT"

📈 Analytics & Risk Management

Use Case	Description	Source
Credit risk forecasting	ML predicts default and NPA trends	GenAI banking use cases
Market risk analysis	AI simulates scenarios for VaR/P&L	DigitalDefynd analytics
Liquidity forecasting	AI projects cash requirements dynamically	Citizens Bank trends
Portfolio optimization	RL-based asset allocation models	Applications of AI wiki
Continuous auditing	Auto-detect anomalies in financial logs	AI in fraud detection wiki

Operations & Automation

Use Case	Description	Source
Digital employees	AI “agents” automate payments and ops	BNY Mellon digital workers
Document classification	NLP categorizes KYC/loan files	DigitalDefynd case studies
Back-office automation	AI handles compliance and data tasks	HSBC AI bots pilot
Code-review bots	AI assists in coding, docs, memos	JPMorgan code AI
Regulatory summarization	Generative AI digests compliance documents	Citi regulation bot

🧠 Generative AI & Personalization

Use Case	Description	Source
Pitchbook automation	AI drafts executive summaries	GenAI use cases
Equity analyst avatars	Deepfake AI presents research videos	UBS avatar pilots
Personalized notifications	GenAI crafts tailored alerts	Commonwealth Bank personalization
Trading strategy design	AI suggests tailored investment strategies	Generative AI fintech
Portfolio risk insights	ML analyzes portfolio vulnerabilities	GenAI risk assessment

💻 Agentic AI & Autonomous Workflows

Use Case	Description	Source
Agentic workflow bots	AI performs multi-step tasks autonomously	Agentic AI wiki
AI code generators	Bots generate and test code modules	Digital workers in dev
Cyber threat auto-response	AI agents detect and act on threats	Agentic AI applications
Internal LLM copilots	Assist staff in document drafting & retrieval	Goldman AI assistant
Workflow orchestration	AI coordinates inter-departmental tasks	EconomicTimes on agentic AI

Conclusion & Key Takeaways

- Not all AI solution requires Generative AI, Agentic AI, MCP
- If you have a thought but facing challenge in ideating the Problem statement and build a solution around that, TFG can help you.
- Before working on solutioning part, understand Bank MRM, Compliance, available and possible Infrastructure and Tools, don't reinvent, prepare to be Scalable (ie., not a complete product in Sprint 1 itself)
- Make use of Github Copilot since AI is no more a specialized skillset and it is democratized