

Artificial Intelligence (AI) and Banking: *Transforming the Financial Landscape*



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“How would you describe AI to bankers?”

“AI is a branch of computer science that deals with the creation of intelligent agents, which are systems that can reason, learn, and act autonomously...In the field of banking, AI is being used to automate tasks, improve risk management, and provide personalized customer service.”

– Gemini

- AI is rapidly transforming the banking industry, bringing about significant advancements in efficiency, customer experience, and risk management
- AI-powered technology enables banks to
 - Automate repetitive tasks
 - Personalize services
 - Make better-informed decisions
 - Leading to a more streamlined and customer-centric experience

Computational Intelligence

| Feature | AI | Machine learning (ML) | Algorithms | Boolean logic |
|------------------|--|--|--|--|
| Scope | Broad field of intelligent machines | Subset of AI focused on learning | Specific instructions for tasks | System of reasoning with True / False values |
| Learning ability | Some, but not all, can learn | Focuses on learning from data | No learning or adaptation | No learning or adaptation |
| Complexity | Highly complex, various approaches | Complex, specific learning algorithms | Varies based on task | Relatively simple, fundamental |
| Applications | Diverse: healthcare, finance, robotics, etc. | Powers applications like image recognition, etc. | Used in various contexts, calculations, etc. | Digital circuits, programming, logic puzzles, etc. |
| Relationship | Overarching goal | Techniques within AI | Tools used in AI and ML | Building block for computational systems |

Related but not the Same

- AI aims to create intelligent machines that can perform tasks typically associated with human minds
- ML is a specific type of AI that uses algorithms to learn from data and improve its performance over time
- Algorithms are step-by-step instructions for solving a problem or performing a task
 - Can be used in AI and ML
- Boolean logic deals with reasoning using only two values, True and False and does not involve learning or adaptation



- AI is the factory building intelligent machines
- ML is 1 of the assembly lines
- Algorithms are the tools and instructions
- Boolean logic is a set of basic building blocks used by some of the tools

Types of AI

- Traditional
 - Supervised learning and training on large data sets (ML)
 - Spam filters
 - Image recognition
- Advanced
 - Can handle more complex data and solve more intricate problems
 - Learn and improve performance over time
- Generative
 - Unsupervised learning
 - Focus on creating new content instead of analyzing or manipulating existing data



- Chef analogy
 - Traditional – the chef can follow a recipe
 - Advanced – the chef can adapt a recipe
 - Generative – the chef can invent entirely new dishes

Generative AI Expanded

- Text

- Create original writing with different styles
- Chatbots
- Coding

- Image

- Deepfakes
- Mimic the style of others
- Photorealistic

- Music

- Create original pieces in different styles
- Write song lyrics
- Change a song to a different style or instrument

Who is the real Luke Skywalker?



Top Uses of AI in Finance

- Customer service automation
- Personalized financial advice
- Wealth management and trading algorithms
- Credit scoring and loan underwriting
- Risk management
- Cybersecurity
- Fraud detection and prevention

Customer Service Applications

- AI-powered chatbots and virtual assistants
 - Provide 24 / 7 support
 - Answer questions
 - Resolve issues
 - Personalize interactions
 - Self-service
 - Cost reduction
 - Personal experiences
- Seamless switch to human expert

Financial Recommendations

- Personalized financial advice
 - Analyze customer data and spending patterns to recommend tailored financial products and services
 - Cater to individual needs and preferences
- Financial literacy and education
 - Simulations can allow users to practice decision making
 - Adaptive learning platforms can track progress and suggest content
- Wealth management and trading
 - Provide personal investment advice based on habits
 - Automate repetitive tasks such as portfolio rebalancing

Credit Scoring and Loan Underwriting

- More accurate scoring and underwriting
 - Analyze large amounts of data
 - Can look at non-traditional data, such as utility bill payments and online behavior
- Make faster decisions on approvals
- Reduce bias
 - Mitigate discriminatory factors like zip code and race
- Detect suspicious activity
 - Uncover possible fraud before loan approval

Risk Management

- Enhance risk detection by analyzing vast amounts of data
 - Market trends
 - Money laundering
- Streamline compliance by automating
 - Regulatory reporting
 - Know your customer (KYC)
- Personalized risk management by tailoring strategies to individual accountholders or portfolios
- Operational risk management
 - Identify and manage risks associated with internal processes and technology

Cybersecurity

- Automate incident response
 - Isolate compromised system
 - Notify security team
- Automate repetitive tasks
 - Log analysis
 - Patch management
 - Vulnerability scanning
- Predictive analysis can learn from past attacks and take a proactive approach to mitigate future attacks

Fraud Detection

- Purchase profiles – what does typical behavior look like?
 - AI determines if a transaction fits the profile or needs to be flagged
- Fraud scores – based on prior legitimate transactions
 - Based on the score, accept, flag for review, or reject
- Fraud investigation – use augmented intelligence in analysis
 - Not intended to replace the human element
 - Intended to remove human error and bias from an investigation
- KYC – verify documentation, fingerprints, or other biometrics almost instantaneously

How Fraudsters Use AI

| | |
|--|---|
| Synthetic identity fraud | Fabricated personal info & deep fakes |
| Socially-engineered scams | Chatbots can convincingly impersonate trusted figure |
| Pattern recognition | Analyze vast amounts of data to identify patterns in legitimate transactions and exploit weaknesses |
| Market and trading manipulation | Manipulate stock prices or exploit loopholes in automated trading systems |
| Deep fakes | Executives or other authorized personnel |
| Credential stuffing | Try stolen login credentials across multiple platforms |
| Phishing | Personalize phishing emails and spam messages |
| Money laundering and terrorist financing | Hide flow of illegal funds and make it harder for authorities to track suspicious activity |

Convergence of AI and Blockchain

- Enhanced smart contracts
 - Combine programmable contracts with AI's decision-making capabilities
 - Automated escrow release upon fulfillment of specific conditions
- Data security
 - Combine tamper-proof ledgers with AI's analytic abilities
 - Ensure data integrity and identity management
- Supply chain management
- Connect your internet-of-things (IoT) network
 - Your home learns your routines and automatically adjusts to your behavior

Challenges of AI Use in Banking

- Data security and privacy
 - Ensure protection of customer data is paramount
 - “Black box problem”
- Algorithmic bias
 - AI algorithms must be carefully designed and monitored to avoid potential biases that could lead to unfair or discriminatory outcomes
- Human / AI collaboration
 - Finding the right balance between human expertise and AI automation is crucial for optimal performance and decision making
- Regulatory compliance
 - Users need to adhere to evolving regulations and guidelines related to AI usage in the financial sector

Benefits of AI Use in Banking

- Improved efficiency
 - Streamline operations, reduce costs, and enhance productivity
 - Lead to overall efficiency gains
- Enhanced customer experience
 - Personalized services, 24 / 7 support, and tailored product recommendations
 - Improve customer satisfaction and loyalty
- Reduced risk
 - Fraud detection, risk assessment, and predictive analytics
 - Minimize financial risks and protect against losses
- Data-driven insights
 - Extract valuable insights from vast amounts of data
 - Enables informed decision making and strategic planning

