AI/ML for Financial Services

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AI and ML enable innovation at scale…

“After decades of false starts, artificial intelligence is on the verge of a breakthrough, with the latest progress propelled by machine learning.”

McKinsey Global Institute, Artificial Intelligence The Next Digital Frontier? June 2017
…and could revolutionize Financial Services

Immense opportunities…

“AI could contribute up to $15.7 trillion to the global economy in 2030…. Healthcare, automotive and financial services are the sectors with the greatest potential for product enhancement and disruption due to AI.”

Sizing the prize: What’s the real value of AI for your business and how can you capitalise? PwC report, June 2017

…but huge risks of disruption

Machine-learning promises to shake up large swaths of finance

In fields from trading to credit assessment to fraud prevention, machine-learning is advancing

The Economist, May 25, 2017
The potential impact of AI/ML is enterprise-wide

AI/ML use cases are gaining traction in Financial Services

**Compliance, Surveillance, and Fraud Detection**
- Credit card/account fraud detection
- Anti-money laundering/ Sanctions
- Investigations optimization
- Sales practices/ transaction surveillance
- Compliance processes optimization
- Regulatory mapping

**Document Processing**
- Contract ingestion and analytics
- Financial information extraction
- Common financial instrument taxonomy
- Corporate actions

**Pricing and Product Recommendation**
- Loan/Insurance underwriting
- Sales/recommendations of financial products
- Credit assessments

**Trading**
- Portfolio management/ robo-advising
- Algorithmic trading
- Sentiment/news analysis
- Geospatial image analysis
- Predictive grid computing capacity management

**Customer Experience**
- Enhanced customer service through voice services and chatbots
- Call center optimization
- Personal financial management
But overall the industry has been slow to invest

An ambivalent response to AI

- Strong overall appetite for adopting AI
- History of digital investment and strong foundation for integrating AI technologies
- Large volumes of data to support model training and development
- **Comparatively low investment in AI**

What is preventing the industry from moving ahead?

AI/ML expertise is rare

Building and scaling AI/ML technology is hard

Deploying and operating models in production is time-consuming and expensive

A lack of cost-effective, easy-to-use, and scalable AI/ML services
AWS offers a range of tools to make AI/ML more accessible

Usability/simplicity: leverages AWS AI/ML expertise

Greater control: customer-specific models

These solutions are underpinned by proven, scalable AWS products and services

Amazon AI/ML Services
- Lex
- Polly
- Rekognition

Machine Learning Platforms
- Amazon ML
- Spark & EMR
- Kinesis
- Batch
- ECS

Deep Learning Frameworks
- Amazon EC2 (P2 and G2 GPUs)
- Amazon EC2 (CPUs)
- Amazon EC2 (ENA)
- Amazon S3
- Amazon DynamoDB
- Amazon Redshift
- Amazon ML
- Spark & EMR
- Kinesis
- Batch
- ECS

Amazon AI/ML Services
- AWS Lambda
- AWS IoT
- AWS Greengrass

Amazon EC2 (CPUs)
- Amazon EC2 (ENA)
The full AI/ML Stack

Our approach is to support all major frameworks and enable our customers to use the best tool for the job.
Our deep experience with AI/ML differentiates our services

Amazon has invested in AI/ML since our inception, and we share our knowledge and capabilities with our customers.

- Product recommendation engine
- Robot-enabled fulfillment centers
- New product categories
- ML-driven supply chain and capacity planning
- Natural language processing-supported contact centers
- Checkout-free shopping using deep learning
And today, enterprises across industries run AI/ML on AWS.
Amazon AI/ML Services
Amazon AI/ML Services are designed for ease-of-use

Scalable, trained, and continuously optimized services that do not require extensive AI/ML expertise

Foundational components of Amazon AI/ML services

- Amazon data science expertise
- Amazon training data
- Amazon models and learning
- Accessibility via API
Enhancing customer experience and uncovering insights

**Lex**
Conversational interfaces through natural language understanding

**Polly**
Speech-enabled products through text-to-speech conversion

**Rekognition**
Visual search and discovery through image recognition and analysis technologies

**Benefits for Financial Services Institutions**
- Customization of offerings at scale
- More personal and efficient customer interactions
- Operational efficiencies
- Novel investment/trading opportunities
Lex and Polly help personalize financial services

- **Informational bots**
  - Create chatbots for everyday consumer requests

- **Application bots**
  - Build powerful interfaces to mobile applications

- **Enterprise productivity bots**
  - Streamline enterprise work activities and improve efficiencies

- **Internet of Things (IoT) bots**
  - Enable conversational interfaces for device interactions

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<th>Use cases</th>
<th>Relevant sectors</th>
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<td>News updates</td>
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<td>Investment information</td>
<td>✓ Insurance</td>
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<td>Account information</td>
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- Book trades
- Pay bills
- Manage bank accounts

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- Check sales numbers
- Marketing performance

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- Wearables
- Location-based personalization
- Telematics for insurance

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- Banking
- Capital Markets
- Insurance
Rekognition enables FIs to harness unstructured data

- **Facial recognition**
  - Automated account opening
  - Biometric authentication transaction security

- **Claims submission and processing**
  - Form auto-population
  - Accident confirmation
  - Damages processing

- **Document analysis**
  - Financial information extraction
  - Common financial instrument taxonomy
Machine Learning Platform
A platform designed to enable innovation

Benefits:

- **Intuitive service console** to build and explore initial models
- Robust, powerful machine learning technology based on Amazon’s internal systems
- Ability to **create models** using your data already stored in the AWS cloud
- Deployment of models to **production in seconds**
- Pay-as-you-go, **inexpensive** model
Helping FIs manage risk by recognizing patterns

• **Surveillance**
  - Credit card/account fraud detection
  - Sales practices monitoring

• **Trading/Risk Management**
  - Predictive grid computing capacity management based on market conditions

• **Compliance**
  - KYC: client-type identification
  - Alert risk-scoring to optimize investigations
Deep Learning Frameworks
Frameworks to help build intelligent systems

AMI pre-installed with deep learning frameworks to train sophisticated AI/ML models

Benefits:

• AWS Deep Learning AMI provides machine learning tools **pre-installed and configured** on a convenient Amazon Machine Image

• Provides the **freedom to use the framework of your choice**: Apache MXNet, TensorFlow, the Microsoft Cognitive Toolkit (CNTK), Caffe, Caffe2, Theano, Torch, and Keras

• Easily create managed, **auto-scaling clusters** of GPUs for **large-scale training**
Helping FIs identify hidden trends and take action

- **Pricing and product recommendation**
  - Next-best offer/customer-based predictive analytics
  - Loan/insurance underwriting

- **Trading**
  - Sentiment analysis
  - Algorithmic trading
  - Portfolio management and optimization

- **Surveillance**
  - Anti-money laundering
  - Market manipulation
Customer success stories
FIs are creating opportunities by running AI/ML on AWS

Select FS AI/ML customer stories

Major US-based financial institution
This bank is using AWS’s Lex capabilities to transform the way it interacts with and serves its customers. Conversational interfaces enable customers to ask their Alexa-enabled devices about their account balances and spending patterns and even make payments, creating a much more personal, engaging relationship with the bank while maintaining security.

LATAM-based investment bank
This bank set out to apply AI/ML techniques to its trading operations to help develop new strategies. AWS helped the bank implement a solution that automatically analyzes unstructured data sources to extract entities, identify key information, and perform sentiment analysis to generate a summary that allows traders to make informed decisions.

EU-based analytics and AI solution-provider
This start-up relies on AWS to deliver analytics and AI solutions to some of the world’s largest financial institutions. The company used AWS services such as Lambda, the Deep Learning AMI for EC2 GPU instances, and S3 to rapidly build and implement an AI solution that extracts high-value investor information from vast quantities of financial documents.
Fraud.net is running AI/ML on AWS to predict financial crime

Amazon Machine Learning helps us reduce complexity and make sense of emerging fraud patterns. We can see correlations we wouldn’t have been able to see otherwise and answer questions it would have taken us way too long to answer ourselves.

- Oliver Clark, CTO, Fraud.net

- To address its scalability needs, Fraud.net chose AWS to host its customer platform, relying on services including DynamoDB, Lambda, S3, and Redshift

- Recently, Fraud.net started using Amazon Machine Learning, which helps its developers build models and enables the use of APIs to get predictions for applications without having to deploy prediction generation code

- Fraud.net can now easily launch and train new machine-learning models to target evolving forms of fraud

- Using AWS, Fraud.net can maintain its fast application response times of under 200 milliseconds and save its customers about $1 million a week through fraud detection and prevention

Fraud.net is the world’s leading crowdsourced fraud prevention platform, aggregating and analyzing large amounts of fraud data from thousands of online merchants in real time. The platform protects more than 2 percent of all U.S. e-commerce.
Amazon Machine Learning democratizes the process of building predictive models. It’s easy and fast to use and has machine-learning best practices encapsulated in the product, which lets us deliver results significantly faster than in the past.

- Joe Emison, Founder & Chief Technology Officer, BuildFax

- BuildFax’s core customer base is insurance companies, which spend billions of dollars annually on roof losses

- The company initially built predictive models based on ZIP codes and other general data, but building the models was complex and the results did not provide enough differentiators

- BuildFax now uses Amazon Machine Learning to provide roof-age and job-cost estimations for insurers and builders, with property-specific values that don’t need to rely on broad, ZIP code-level estimate

- Models that previously took six months or longer to create are now complete in four weeks or fewer
Ready to start building?

An AI/ML discovery session with AWS Financial Services specialists can help with:

- **Building your use case**
- **Choosing the right tools**
- **Devising an implementation plan**