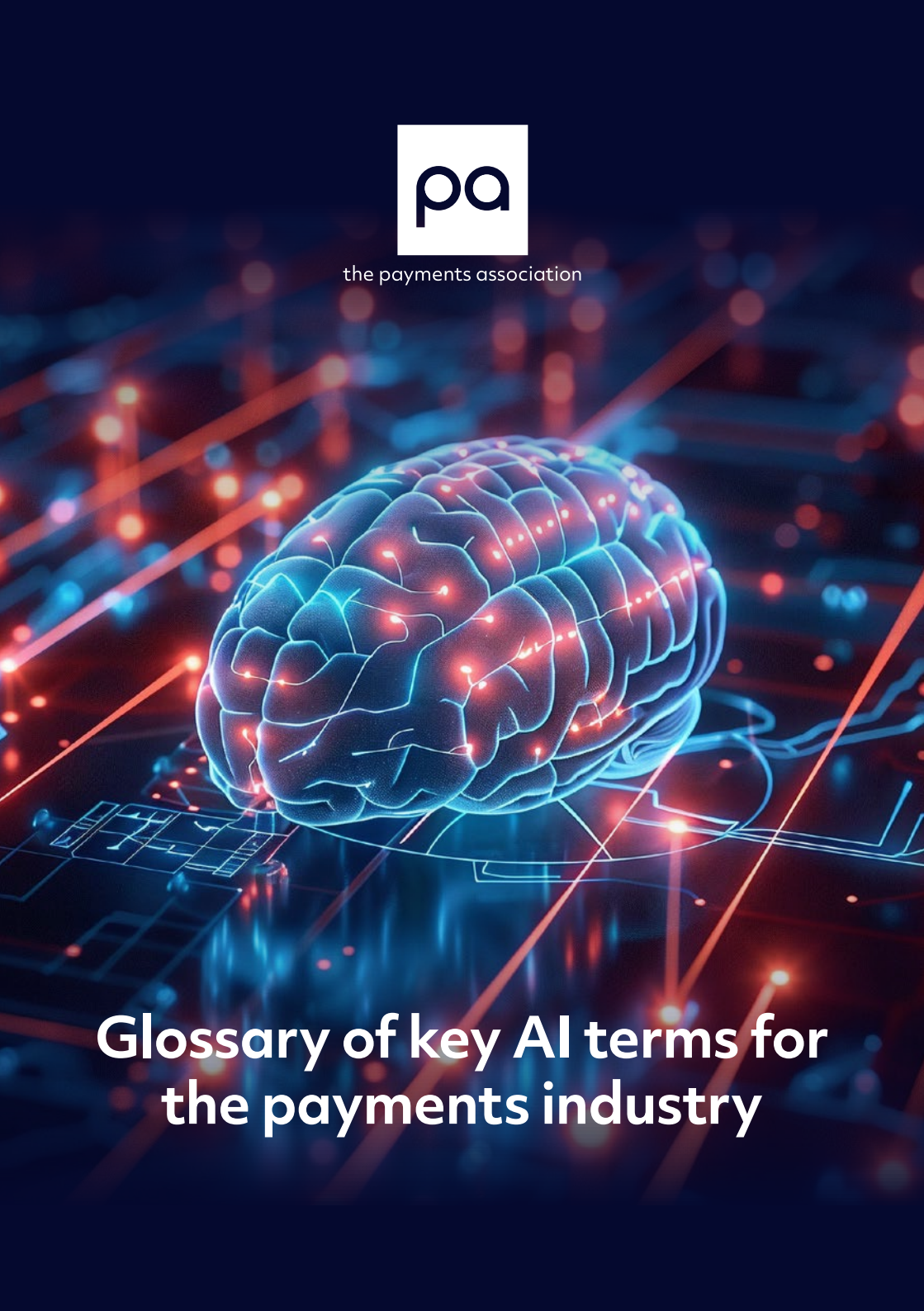
the payments association



Glossary of key AI terms for the payments industry

Foreword

This glossary has been produced by the Financial Crime Working Group at The Payments Association.

The adoption of Artificial Intelligence (AI) divides opinion and serves to remind us that humans' use of technology is not always a force for good. AI systems are powerful – they can compact and combine all the previous knowledge of humanity in their models. AI has the potential to transform our lives and will ultimately underpin our access to services. It is a disruptive technology which will increase the impact and speed of change. AI deployment clearly comes with risks and the issue facing us all is **how to develop new and amend existing policies, processes and customer journeys** to mitigate those risks and then enforce the regulation we create.

Companies are already using AI to obtain a competitive advantage. AI can automate processes, enhance customer service and personalisation, increase output, and analyse large populations of data **producing insights which far outperform traditional analytics**.

Unfortunately, criminals are also using AI to enhance their "business" interests. **A UCL Report** identified six crimes as most concerning: audio and video impersonation, driverless vehicles as weapons, tailored phishing, disrupting AI-controlled systems, large-scale blackmail and AI-authored fake news.

The Payments Association welcomes and is ready to support **the government's pro innovation approach to AI regulation** and its ambition to make the UK a global leader in safe AI development and deployment.

Understanding the language of AI is vital for policy makers and regulators to help them to recognise and evaluate the enormous potential of this sector. This Glossary will be reviewed and updated regularly. **We welcome your feedback**. The consistent use of terms will enable a wide-spread common lexicon that supports a robust understanding of the impacts, challenges and potential solutions generated by AI.

Introduction

AI (artificial intelligence) is the simulation of human intelligence processes by machines or computer systems.

Historical rules-based systems used a limited range of data points to offer a binary response or at best Red, Amber Green statuses.

AI can mimic human capabilities with a far more refined and wide-reaching range of responses than historical rules or logic-based software set ups, for example:

- assessment of transactions for Fraud risk against a wider range of parameters
- advanced ability to identify outliers
- trends vs a population or against known behaviour for a specific cardholder.

AI works in these instances (and more) on a wide range of parameters, spotting trends in the data and learning from it to refine logic, sharpening results e.g. fraud detection or customer outcomes.

Examples of AI in practice

Action	Legacy – simple rules-based approaches	Artificial Intelligence capability
Communication *e.g. customer service/ resolution of 'fall out' in application or payment processes*	IVR (Interactive Voice Response) with 'Press 1 for X, press 2 for Y' or basic voice recognition such as 'Please tell us in a few words what you are contacting us about'. Basic chatbots with limited word or term recognition and a high fall out rate outside of limited scenarios, often resulting in customer frustration and complaints.	Sophisticated natural language models powering multilingual customer service chatbots and handling variable wording/ grammar. **Klarna is a recent example of success.**
Learning from evolving big data sets.	Regular manual analysis or comparison of data/reports with the risk of errors or humans missing the less visible trends or those their experience/bias isn't drawn to.	AI can spot emerging trends in datasets which would not normally be seen by humans. AI will do so, provided it's correctly programmed and with non-biased datasets. *See Bias.
Decision making *e.g. KYC/KYB, fraud detection.*	Basic static rules e.g. AML, Fraud prevention (IF X happens then do Y) which required analysis of outcomes and regular rules optimisation to reduce false positives/poor customer experience.	Based on learnings from a wider range of parameters AI can allocate a score which if passing a threshold will e.g. decline a transaction, request additional CDD or recommend a review of source of funds.

Glossary

A	
Algorithm	A sequence of rules or instructions given to an AI system to perform a task or solve a problem. Common algorithms include classification, clustering, and regression. For example, an algorithm for fraud detection might classify transactions as legitimate or suspicious based on certain parameters. **See Classification, Clustering.*
Application programming interface (API)	How two applications interact, for example, using requests and responses: ■ the systems of a Card Program Manager/Issuer and those of a technology partner such as a Card Issuer Processor ■ two partner providers, such as Card Issuer Processor and a 3D Secure provider or Fraud prevention tool.
Artificial superintelligence (ASI)	ASI refers to a hypothetical AI system that surpasses human intelligence in all aspects, capable of solving problems and performing tasks beyond human capabilities. While ASI remains speculative, it is a significant topic of debate in AI research. The development and impact of ASI are deeply influenced by human values and choices.
Autonomous machine or model	An autonomous machine or model that can perform tasks without any human intervention. This autonomy necessitates careful consideration of risks and ethical implications. **See Guardrails and Ethics of AI.*

Glossary

B	
Backward chaining	Where a machine/model works backwards from a desired output to find how to support it via data analysis.
Backpropagation	A training algorithm for neural networks that adjusts weights to minimise the error rate to improve the accuracy and efficiency of various predictive and decision-making processes. It is used in credit scoring risk assessment, fraud detection and market forecasting. **See Neural network.*
Bias	Bias in AI refers to systematic errors that result in unfair outcomes, such as the disproportionate impact on certain demographic groups. Bias can arise from skewed training data, the underrepresentation of certain groups, or developer bias. For example, a facial recognition system trained primarily on lighter-skinned individuals may perform poorly on darker-skinned individuals. Causes of this bias can be skewed training data such as the underrepresentation of certain groups/scenarios or where a developer has unfairly weighted a factor based on their perception. People can unintentionally build some types of biases, including cognitive or geographical bias, into models. **See Overfitting and Ethics of AI.*
Big data	Very large and complex datasets which are beyond the capabilities of traditional applications for processing data.
Bounding Box	An imaginary box, drawn on videos and images and with labelling, helps models recognise specific types of objects.

Glossary

C	
Chatbot	A portmanteau of 'Chat and Robot'. An application which offers a 2-way dialogue with a customer or service user mimicking human interaction using either voice or text. **See also Generative AI and Large Language Models.*
Classification algorithm	A type of machine learning algorithm used to categorise data. It analyses input data and assigns it to one of several distinct categories based on learned patterns from labelled training data. Examples include decision trees, support vector machines, and neural networks. **See Machine learning.*
Clustering	A type of unsupervised machine learning algorithm used to group similar data points into clusters based on their characteristics or features. Unlike classification, clustering does not use labelled data. Instead, it identifies natural groupings or patterns within the dataset. Examples include k-means, hierarchical clustering, and DBSCAN. **See Machine learning.*
Cognitive computing	The use of computerised models to simulate human thought processes in complex situations where the answers are ambiguous. An alternative way of saying Artificial Intelligence (AI). Some feel that it demystifies AI, but others would say AI is now so widely known that it is the more accessible term for the wider population. Cognitive computing uses a range of processes in conjunction with self-learning algorithms, data analysis and pattern recognition to teach computing systems. Cognitive computing is particularly useful in fields such as healthcare, finance and retail.
Computational learning theory	An area of artificial intelligence in which the primary objective is to create and analyse machine learning algorithms.

Glossary

Computer vision/ image recognition	Identifies and analyses objects, people, text, scenes, and activities in images. This technology leverages machine learning algorithms to interpret visual data from photos or videos, enabling automated understanding and categorisation of visual content. This can result in the automation of some activities human vision would have previously performed such as, passport control and security monitoring (see **Transport for London trial**). Computer vision also facilitates some entirely new processes, such as video recordings by applicant customers in KYC processes.
Convolutional neural network (CNN)	A type of deep neural network primarily used for processing structured grid data like images. **See Neural network.*
Corpus	A large dataset of textual or spoken content used to train a machine to perform linguistic tasks.

D

Data mining	The process of sorting through/conducting deep analysis of large data sets to identify patterns which might improve models, uncover new potential opportunities or solve challenges.
Data science	An interdisciplinary field (a combination of computer science, information science, and statistical analysis) that analyses large amounts of data using algorithms and processes to gain insights and discover patterns.
Dataset	A collection of related data points composed of separate elements which can be handled as a unit by a computer. Data is usually tagged and placed in a uniform order.
Deep learning	A function of AI that imitates the human brain by learning from how it makes decisions based on the structuring and processing of information. Examples of unstructured data are images and speech.

Glossary

E	
Emergent behaviour	When an AI system shows unpredicted or unintended capabilities, for example, through the interaction of rules or feedback loops modifying behaviour. Emergent behaviour can be a positive development adapting to new situations and coming up with solutions that humans have not considered. However, as AI becomes more prevalent in areas like healthcare or even some financial services products, it is essential emergent behaviours are understood and monitored carefully.
Entity annotation	The process of labelling unstructured sentences with information so a machine can read them. This could involve labelling all people, geographical locations, teams/organisations, for example.
Entity extraction	Enables a machine to read data by adding structure to data. Entity extraction can be carried out by a machine learning model or humans.
Ethics of AI	Owners/operators of AI tools and those using them in public sector/government institutions have to carefully consider any potential adverse impact of AI. In particular, they have to consider how the models underpinning AI will affect stakeholders, for example: ■ Loan, credit card or bank account applicants ■ Service users, such as government benefit recipients or people receiving healthcare. Some current ethical concerns include: ■ Biases in algorithmic decision-making ■ Privacy violations ■ Worries over job displacement. Ensuring fairness, accountability, and ethical use of AI technologies is crucial for addressing these issues.

Glossary

F	
Feature extraction	The process of transforming raw data into numerical features that can be processed while retaining relevant information.
Forward chaining	Where a machine/model needs to work from a problem towards a solution by analysing several hypotheses. AI will ascertain which hypotheses are relevant to the problem.
Fuzzy logic	A form of logic that deals with reasoning that is approximate rather than fixed and exact. It aims to solve problems through an imprecise range of data which can give an array of conclusions. Some consider that the imprecision/range/continuum of fuzzy logic is a closer match for real life societal challenges than binary yes/no or true/false responses.

G	
Generative adversarial network (GAN)	A class of machine learning frameworks where two neural networks contest with each other to produce better outputs. *See Machine learning.
Generative AI	Technology that uses AI to create new content, including text, images, and videos, by learning patterns from existing data. Generative AI is widely used in applications such as customer service chatbots and content creation tools. Examples of generative AI include DALL-E (image generation), StyleGAN, GPT/ChatGPT (text generation), Google DeepMind's WaveNet (audio generation).
Guardrails	Restrictions and rules placed on AI systems which ensure data is handled appropriately. For example, they ensure AI systems do not generate offensive or inappropriate content/responses.

Glossary

H	
Hallucination	When an AI system provides information which is proven to be false or incorrect in a response and presents it as factual information.
Hyperparameter	A parameter usually set manually outside of a model and affects the way an AI model learns, for example the learning rate or the number of branches in a decision tree.

I	
Instance-based learning	A type of learning algorithm that compares new problem instances with instances seen in training rather than performing explicit generalisation.
Intent	Defines the action or outcome to follow what is requested by the user in a natural learning model. For example, 'Increase my credit limit', 'Credit increase please' or 'Need more credit' would see an assessment of the additional amount a financial institution would be willing to lend the customer followed by the response.

L	
Large language model (LLM)	An AI model trained on extensive text datasets to understand and generate human-like language. Large language models (LLMs) can perform tasks such as text generation, translation, and summarisation. They are widely used in applications like customer service chatbots and virtual assistants. *See Chatbot.

Glossary

M	
Machine learning	Machine learning (ML) is a subset of AI. Machine learning can make predictions or decisions based on data and developing algorithms. ML learns from the data rather than being programmed.
Machine translation	Translating text or speech with no human involvement. Can be from text to speech or vice versa and between languages.
Model	The outcome of machine learning algorithms running on training data, which apply algorithms to data to recognise patterns, make predictions or make decisions without human intervention.

N	
Narrow AI (Weak AI)	AI systems designed and trained to perform specific tasks. Narrow AI (or Weak AI) cannot generalise beyond its intended functions. Examples include autonomous vehicles, Apple's Siri, and Amazon's Alexa.
Natural language generation (NLG)	Converts structured data into human-readable text or speech. NLG systems generate narratives from data, such as reports on fraud risk assessment or automated responses to customer queries. For instance, generating a detailed report from financial data or responding to a request like 'Cancel the Direct Debit to my gym, please.' **See Natural language processing (NLP).*
Natural language processing (NLP)	Enables computers to understand, interpret, and respond to human language, both written and spoken. NLP powers features like text analysis, speech recognition, and language translation. Examples include virtual assistants like Apple's Siri and Amazon's Alexa, which understand and respond to voice commands.

Glossary

Natural language understanding (NLU)	A branch of NLP that focuses on enabling computers to comprehend the meaning of human language, including variations in wording, spelling, grammar, and the subtleties of context. NLU is crucial for applications such as chatbots and virtual assistants that need to interpret user intent accurately. *See Natural Language Processing (NLP).
Neural network	A deep learning model designed to mimic the human brain's structure and function. Neural networks consist of layers of interconnected nodes (neurons) that process data in complex ways to identify patterns and make decisions. Applications include image and speech recognition, fraud detection, and autonomous driving. *See Convolutional Neural Network (CNN), Deep Learning.

O

Overfitting	Occurs when a machine learning model learns the details in the training data to the extent that it performs well on this data but poorly on new, unseen data. This happens because the model becomes too complex and captures the specific patterns of the training data rather than generalising to broader patterns. *See Machine learning.

P

Parameters	The internal variables of a model that are learned from the provided training data. These variables define the model's behaviour and performance.
Pattern recognition	Computer algorithms are used to analyse, detect, and label regularities in data. Data is thus categorised accordingly.

Glossary

Predictive analytics	Analytics using historical data and patterns to make predictions in given time frames.
Prescriptive analytics	Helping organisations make better decisions using technology to analyse data for possible situations and scenarios (for example, a sudden increase in bad debt) based on past and present performance.

R

Reinforcement learning	A type of machine learning in which an algorithm is set a goal without specific metrics. The model tests different scenarios. Human feedback nudges the model to adjust the subsequent scenario to improve results. *See Machine learning.
Robotics	Combines AI with mechanical engineering to create machines (robots) that can perform tasks autonomously or with minimal human intervention. Robotics encompasses a range of applications, including industrial automation, healthcare, and space exploration.

S

Sentiment analysis	Using AI to analyse the tone and opinions in a given text. This could be used to denote bias or if the interaction could be misleading. This technology may not perform well on interactions with low text volume and limited phrases, such as in a chatbot or message exchange with a customer.
Structured data	Data that is defined and searchable. This includes data like dates, postal codes, and merchant IDs.

Glossary

Supervised learning	A machine learning approach where the model is trained using labelled data, meaning the input data is paired with the correct output. Supervised learning algorithms learn to map inputs to outputs based on this training data. It is more common than unsupervised learning, where the data is not labelled. *See Machine learning.
Support vector machine (SVM)	A supervised learning model used for classification and regression analysis. *See Supervised learning.

T

Token	A basic unit of text used by large language models to understand and generate language. A token can be an entire word or parts of a word.
Training data	An AI system is given examples of information which enable it to learn, find patterns, and create new content. For example, this could be historical transaction data, including flags denoting confirmed money laundering or fraudulent use of card details. *See Overfitting and Bias.
Transfer learning	A machine learning system that takes existing and previously learned data and applies it to new tasks and activities. One example might be using data on predicted customer volumes from one product to help predict those on a different type of product. *See Machine learning.

Glossary

Transformer model	A type of neural network architecture which leverages self-attention mechanisms to model dependencies in sequential data efficiently. It is the basis for many natural language processing models. **See Natural Language Processing (NLP) and Neural network.*
Turing test	A test created by Alan Turing to evaluate a machine's ability to exhibit intelligence equal to humans, particularly in language and behaviour. A human evaluator assesses conversations between a human and a machine. The Turing test is considered passed if it is not possible to differentiate between humans and machines.

U

Unstructured data	This data is undefined and unstructured, meaning searching is difficult beyond a basic level. Photos, audio and video are good examples.
Unsupervised learning	A type of machine learning that deals with data with no labels and seeks to find the underlying structure in the data.

V

Voice recognition	Also called speech recognition, voice recognition is a method of human-computer interaction in which computers listen and interpret human dictation (speech) and produce written or spoken outputs. Examples include primitive IVRs (Interactive Voice Response systems in call centres at the turn of the 21st century or voice-activated dialling on 1990s mobile phones), and, more recently, Apple's Siri and Amazon's Alexa.

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About The Payments Association

The Payments Association is the largest community in payments. Founded in the UK in 2008, the association now operates communities in the UK, EU and Asia, helping almost 300 companies enhance their commercial interests, solve societal problems such as financial exclusion and evaluate new opportunities for innovation in payments.

Our purpose is to empower the most influential community in payments, where the connections, collaboration and learning shape an industry that works for all.

We operate as an independent representative for the industry and its interests, and drive collaboration within the payments sector in order to bring about meaningful change and innovation. We work closely with industry stakeholders such as the Bank of England, the FCA, HM Treasury, the Payment Systems Regulator, Pay.UK, UK Finance and Innovate Finance.

Through our comprehensive programme of activities for members and with guidance from an independent Advisory Board of leading payments CEOs, we facilitate the connections and build the bridges that join the ecosystem together and make it stronger.

These activities include a programme of monthly digital and face-to-face events including our annual conference PAY360 and awards dinner, CEO round tables and training activities.

We run six stakeholder working Project groups: Inclusion, Regulator, Financial Crime, International Trade, Digital Currencies and Open Banking. The volunteers within these groups represent the collective view of The Payments Association members at industry-critical moments and work together to drive innovation in these areas.

We conduct exclusive industry research. This research is not legal advice. It is made available to our members through our Insights knowledge base to challenge and support their understanding of industry issues. This include monthly whitepapers, insightful interviews and tips from the industry's most successful CEOs.

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