**Adversarial attacks:**Attacks that occur when hackers intentionally manipulate data to mislead AI systems.

**Artificial Intelligence (AI):** Can be defined in many ways. However, in line with guidance from the Information Commissioner’s Office (ICO), we define it as an umbrella term for a range of algorithm-based technologies that solve complex tasks by carrying out functions that previously required human thinking.

**AI Algorithm:** An AI algorithm is a step-by-step procedure or set of rules designed for a computer to solve problems or make decisions using artificial intelligence techniques. These algorithms enable machines to learn from data, recognise patterns, and make intelligent decisions or predictions.

**AI Ambassador:** A person who is appointed to support and give advice about the University’s AI Strategy and the development of AI research activities.

**AI Applications:** Artificial intelligence (AI) applications are standalone software or systems that are designed for specific purposes for industries. They are often more comprehensive in functionality and usually operate independently.

**AI black box problem:** This refers to the lack of transparency and interpretability of AI algorithms and output. This makes it difficult to explain an outcome or replicate a result for benchmarking.  See also AI Interpretability.

**AI Ethics:**This is the field focused on ensuring that AI is used in a non-harmful way. It makes sure that AI systems will not have a negative impact on equality, diversity, privacy, social justice, and democracy.

**AI Feature:** An AI feature is a specific functionality within a larger application that uses AI to enhance or automate a particular task. It's typically integrated into the broader functionality of a main system. Example: A spell check feature in a word processor that uses AI to suggest corrections and improvements in real-time.

**AI Funding:** Investments directed to organisations researching and developing products that are based on the use of AI.

**AI Governance:**AI Governance refers to the framework of guidelines, policies, and practices put in place to ensure that artificial intelligence systems are developed, deployed, and used in a responsible, ethical, and beneficial manner. It's essentially about managing and overseeing AI to align its use with human values and societal norms.

**AI Group:**A committee that governs, manages or supports the use of AI. Within the University of Edinburgh, some AI Groups include: the University Wide AI Group, the Ethical Learning Technology Working Group (LTW), and the ISG Research Ethics Committee.

**AI Hardware:** Specialised computer parts designed to run AI programs efficiently. These parts are built to handle the complex computations and big data that AI needs. AI Hardware is important because it allows AI to work faster and tackle more difficult problems than regular computer parts can manage.

**AI Innovation:** Refers to the application of artificial intelligence technologies to create new ideas, solutions, or processes.

**AI Interface:**A component that allows users to interact with an artificial intelligence system. It varies widely in form, from simple text-based chats to complex voice and graphical interfaces, influencing an AI system’s usability and functionality, and enabling effective communication and user control over AI operations.

**AI Interpretability**: Refers to the field focused on understanding and explaining how artificial intelligence (AI) models make decisions. This field aims to shed light on the "black box" nature of many AI systems, providing insights into the processes and factors that influence AI outputs. The goal is to ensure that AI decisions are transparent, understandable, and trustworthy.

**AI Lab:**A specialised environment where experts in the field of artificial intelligence (AI) develop new systems.

**AI Models:** AI models are programs or algorithms designed to autonomously identify patterns from data and make decisions and generate artefacts without direct human input. These models use techniques from machine learning and artificial intelligence to analyse and learn from historical data, enabling them to predict outcomes or make informed choices in a variety of applications.

**AI Outputs:**The results generated by AI systems after providing some input. They can be presented in various formats depending on the input and the learned patterns of the system.

**AI Regulations:**The legal frameworks and guidelines established by organisations to manage the creation and use of artificial intelligence (AI) technology, and according to the ethics and goals of the organisation.

**AI Research:**The systematic investigation of artificial intelligence (AI) in order to reach new conclusions and establish new theories.

**AI Strategy:**An organisation’s approach to integrate and manage AI technologies to align with its broader objectives.

**AI System:** Software that adopts artificial intelligence and machine learning technologies to deliver an application or service.

**AI Techniques:** AI Techniques encompass a range of methods and practices employed in developing and refining artificial intelligence systems. These techniques include Natural Language Processing (NLP), Machine Learning (ML), Sentiment Analysis, Deep Learning, and Data Mining, among others. Each technique focuses on a specific aspect of AI functionality, from understanding human language and analysing emotions in text to extracting patterns from large datasets and replicating human neural network behaviours. These diverse methodologies are foundational in enhancing AI systems, enabling them to perform complex tasks across various domains effectively.

**AI Technologies:** Adapting machine learning methods in software development to solve problems that previously required human thinking.

**AI Tool:** An AI tool is a piece of software that uses artificial intelligence to perform a particular function or set of related functions in order to complete a specific task.  It's typically more focused and task-oriented than a full AI application, but more standalone than an AI feature.

 *Example:  An AI-powered image editing tool that can automatically remove backgrounds or enhance photo quality.*

**Algorithm:** The guidelines that a computer follows to solve a problem. They are essential for the creation of AI systems.

**Algorithmic Instability or Drift:** The result of changes in input data or environmental conditions over time that degrade the accuracy of AI systems.

**Application Programming Interface (API):** A service that acts as a bridge between different software systems and allows them to work together. It provides a set of protocols, routines, and tools for developers to interact with a particular application or platform. This allows developers to access certain features or data from the service without needing to understand all of its internal complexities.

**Artificial system:** A man-made system that is powered by artificial intelligence to replicate the functioning of a natural system. It can be scaled up or down to operate at different levels of autonomy to resolve tasks or generate predictions.

**Automation:** The use of machines to complete tasks with minimal human intervention. This concept dates back to ancient civilisations to ease repetitive tasks. There is a number of types of automation category based on complexity and requirements.

**Azure OpenAI:** This is a specialised service that's part of the larger Azure platform. The Azure platform itself is an overarching cloud infrastructure that hosts numerous services, including Azure OpenAI.

**Big Data:** A large set of data that cannot be analysed by traditional data processing tools due to its volume, velocity and diversity. Advanced algorithms are needed to reveal meaningful patterns.

**Chat GPT:** ChatGPT is an advanced chatbot developed by OpenAI that leverages artificial intelligence to engage in text-based conversations. Powered primarily by sophisticated natural language processing technologies, ChatGPT can understand and generate human-like responses, enabling it to participate in meaningful interactions on a wide range of topics.

**Chatbot:** A chatbot is a computer program that chats with people, acting like a human. It uses rules and AI to understand and respond to what users say.

**Computer Vision:** A branch of computer science that investigates the technology that mimics human vision. It locates and comprehends objects and people in captured images or media content using algorithms and AI models.

**Cyber-attack:**A malicious attack by hackers to harm a computer system or network in an aim of gaining unauthorised access to information.

**Data Privacy:** The part of data protection that ensures an appropriate access and storage of different forms of data by individuals, protecting confidentiality in compliance with data protection policies and regulations.

**Data Protection Act (DPA):**The legislation that states the responsibilities of organisations in working with personal data to ensure that data protection laws are not breached.

**Data Protection Impact Assessment (DPIA):**A process used by the university to identify and minimise privacy risks of personal data in new projects. It is a standard requirement under data protections laws.

**Data Science:** The field that focuses on the study of methods and algorithms to analyse data. It is a multidisciplinary process that combines computer engineering, artificial intelligence, mathematics and statistics.

**Data Security:** Data security involves protecting digital information from unauthorised access, corruption, or theft throughout its lifecycle. It ensures that data are handled in compliance with various protection policies and legal regulations.

**Deep Learning:** A subcategory of machine learning that uses deep neural networks inspired by the human brain to model complex patterns. The term ‘deep’ refers to the large number of hidden layers in the neural network, which can be thousands of layers. This improves tasks such as automation.

**Deep Neural Networks**: An AI model with a large number of layers that can learn complex patterns. It is used for example in speech recognition and image recognition.

**Digital Learning Applications and Media (DLAM) Service Team:**  A team within the University of Edinburgh responsible for managing digital learning tools and resources effectively.

**Digital Technology:** This encompasses the range of electronic systems and devices that are used to process information. It includes computing devices, software, the internet, artificial intelligence, etc.

**Educational Technology (EdTech):** Educational technology or EdTech is the combined use of computer hardware, software and educational theory and practice to facilitate learning. It is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources.  See also Learning Technologies.

**Environmental Impact of AI:** The environmental impact of AI concerns the resources required to operate AI technologies, particularly electricity and water, used in vast quantities by data centres that train and run AI models. AI operations often demand significant computational power, which, in turn, requires cooling systems that consume large amounts of water. Compared to non-AI methods, the reliance of AI on powerful hardware can contribute substantially to energy consumption and environmental strain, prompting an ongoing discussion about sustainable practices in AI development and deployment.

**Ethical AI:** See AI Ethics

**Ethical Learning Technology Working Group (LTW):** A group within the University of Edinburgh.

**False training data:**False training data refers to datasets used to train AI models that are incomplete, outdated, or contain errors. This kind of data can lead to inaccuracies and biases in the AI systems, affecting their performance and reliability.

**General Data Protection Regulation (GDPR):**This can refer to (i) a privacy law drafted and passed by the European Union in 2018, regulating how personal data should be processed within the Union, or (ii) the UK’s derivative of this privacy law, adopted following its exit from the Union.

**Generative AI:** A type of artificial intelligence (AI) deep learning model that can originate new content based on the data that it was trained on.

**Graphics Processing Units (GOUs):** Graphics Processing Units, commonly known as GPUs, are specialised hardware designed to accelerate the rendering of images, videos, and animations. They are essential for managing complex graphical tasks quickly, making them a critical component in video game development, as well as in fields requiring intensive visual processing.

**Information Commissioner’s Office (ICO):**  An independent authority in the UK tasked with upholding information rights and data privacy for individuals. It provides guidance on data protection practices, promotes data privacy for individuals, and enforces regulations regarding the safe use, storage, and handling of personal data. (Note that there is a separate Scottish Information Commissioner who has responsibility for Freedom of Information in Scotland but not for data protection.)

**Image Recognition:** Image recognition is a technology under the broader field of computer vision that enables computers to identify and process objects, people, places, and other variables in images. It involves analysing visual inputs using algorithms to detect patterns and features that correspond to predefined categories or labels.

**ISG Research Ethics Committee:** An AI group within the Information Services Group (ISG) of the University of Edinburgh.

**Labelled data:** Labelled data refers to datasets where each entry is tagged with one or more labels that identify characteristics or categories pertinent to those data. This annotation process is critical for training machine learning models, as it provides a clear guide for the algorithms to learn from specific examples and make accurate predictions

**Large Language Models (LLMs):** These are computer programs that have learned from processing large amounts of text. They can understand and write text that seems human-like. Some examples are BERT (made by Google) and LLaMA (made by Meta, the company that owns Facebook).

**Learning, Teaching and Web Services (LTW):** A department within the University of Edinburgh that supports the use of technology in teaching and learning environments.

**Learning Technologies:** Learning technologies encompass a broad array of digital tools and resources designed to enhance the processes of teaching and learning. These technologies can include educational software, online learning platforms, virtual classrooms, interactive whiteboards, and mobile apps, among others.  See also Educational Technology

**Machine Learning (ML):** The branch of artificial intelligence (AI) that develops computer systems that use algorithms to train AI to imitate human performance without explicit instructions.

**Massive Open Online Courses (MOOCs):**MOOCs consist of free online courses available to the public. They allow millions of people around the world to gain new skills and advance in their careers.

**Metadata**: Metadata refers to data that provide information about other data. They act like a label or a descriptor, detailing characteristics such as the author, creation date, file size, and format. Metadata are crucial for organising, managing, and retrieving data efficiently.

**Microsoft Azure OpenAI:** This is a service from Microsoft that puts OpenAI's AI tools on Microsoft's cloud system called Azure. It includes things like ChatGPT, DALL-E for making images, and Whisper for understanding speech. Companies can use these AI tools easily with their existing Microsoft setup. It might have extra security and features that work well with other Microsoft products.

**Multi-dimensional space**: In machine learning, a multi-dimensional space is like a big room with many directions. Each direction, or dimension, represents a different characteristic of the data. This setup helps AI systems to look at many details at once, which helps in finding patterns and connections between different data points. This is especially useful in solving complex problems where the relationship between different types of information matters.

**Multidisciplinary research**: Multidisciplinary research involves bringing together experts from different fields to study a common topic from various perspectives. Each discipline may work independently, but communicating their findings in the multidisciplinary team contributes additional insights to the collective understanding of the topic. This approach enriches the research by incorporating a diverse range of knowledge and methods, leading to more comprehensive results.

**Natural Language Processing (NLP):** The branch of artificial intelligence that allows computers to recognise and comprehend human language. It is used for example in virtual assistants and chatbots to respond to an input in real time and autonomously.

**Neural Network:** A neural network in artificial intelligence is a computational model designed to mimic the structure and function of the human brain. It consists of layers of interconnected nodes, like neurons, that work together to process and analyse data. Neural networks learn from vast amounts of data by adjusting the connections between nodes, allowing them to make informed decisions and predictions. This technology is fundamental to many modern AI applications, including voice recognition, image analysis, and autonomous driving.

**Neural Processing Units (NPUs):**Neural Processing Units, or NPUs, are specialised hardware designed to accelerate tasks related to artificial intelligence (AI) and machine learning (ML), particularly those involving neural networks. NPUs enhance the processing of complex AI algorithms, such as voice recognition and image analysis, by efficiently handling the computation-heavy tasks required. These units enable faster and more energy-efficient processing than general-purpose CPUs, making them critical for real-time AI applications in various tech devices like smartphones, cameras, and smart home systems

**Open Source Software:** Software that is freely available to use, modify, and distribute. Its source code is open, meaning it's accessible to the public, allowing developers to examine, improve, and build upon it.

**OpenAI**: This is a research foundation (OpenAI Inc.) with a commercial subsidiary (OpenAI Global LLC) that creates advanced AI, especially ones that work with language. Their AI tools can be accessed through the Azure OpenAI API, or directly through OpenAI’s own service.

**Pattern Recognition:**The process by which computers recognise patterns in data. In artificial intelligence, this is accomplished by training AI models.

**Personal Information:**  Information that could directly or indirectly identify an individual natural person.  Personal information about living individuals is protected by legislation (See Data Protection Act and GDPR).

**Public AIs:** Artificial intelligence systems that are accessible to the general public. These systems offer a wide range of services and functionalities, such as virtual assistants, translation tools, and interactive chatbots, which can be used by individuals and businesses alike.

**RAG Status (Red, Amber, Green Status):**A toolthat is used in project management to indicate a status. Red is equivalent to a critical matter, amber to potential concerns, and green to no concerns. This system helps project managers, stakeholders, and team members to assess and respond to project developments and potential risks quickly.

**Robotics:** The scientific and engineering discipline focused on the design, construction, and operation of robots. The field aims to develop machines that can perform tasks with minimal human input, enhancing efficiency and productivity in various industries such as manufacturing, healthcare, and agriculture. Robotics integrates multiple disciplines including mechanical engineering, electrical engineering, computer science, and artificial intelligence to create robots that can interact with their environment and make autonomous decisions.

**Scoping AI in EdTech at Edinburgh (SADIE):**Scoping AI in EdTech at Edinburgh (SADIE) is a project undertaken in 2024 that builds on the existing knowledge gathered by Learning, Teaching and Web Services (LTW) to understand the current Artificial Intelligence (AI) developments and opportunities available within EdTech at Edinburgh. These AI developments may take the form of new tools or functionality being offered by our existing vendor partners, or new products being offered to us by new vendors.

**Semantic Data Model:** A metadata model used in artificial intelligence to interpret text and concepts while also incorporating the semantics into the analysis, mimicking how humans would understand these meanings. One of its major applications is in natural language processing (NLP) and natural language understanding (NLU).

**Sensitive Information:** Sensitive information refers to any data regarding students, staff, or operations that require confidentiality and limited access to protect privacy and ensure security. This includes but is not limited to student records, such as grades, disciplinary actions, and personal details like health information and contact details. Similarly, sensitive information for staff might consist of employment records, salaries, and personal data.

**Sensitive Personal Data:**  see Special Category Data.

**Service Team:**A group within the University of Edinburgh responsible for the maintenance of a specific service ensuring their alignment with user needs.

**Special Category Data:** a subset of personal data (see Personal Data) that are identified in data protection legislation as being particularly sensitive and that are given extra protection by law.  The categories include data that might reveal ethnic or racial origin; political opinions; religious or philosophical beliefs; trade union membership; genetic data; biometric data; and data concerning a person’s health, sex life or sexual orientation.

**Speech Recognition:**  An AI model that allows artificial intelligence to understand and respond to spoken words.

**Supervised Learning:**A subcategory of artificial intelligence (AI) and machine learning (ML) that uses labelled datasets to make predictions based on the recognition of patterns.

**Tensor Processing Units (TPUs):** A specialised AI hardware developed by Google designed to accelerate machine learning tasks, specifically those involving deep learning and neural networks. TPUs are optimised to handle the large volumes of data and complex mathematical computations required in training and running deep learning models, offering significant improvements in processing speed and efficiency.

**Third-Party AI Services:**Artificial intelligence solutions that are provided by external companies rather than developed in-house. These services often specialise in specific functions such as data analytics, natural language processing, or image recognition, which might be complex or cost-prohibitive for even a larger organisation to develop on its own. By leveraging third-party AI services, companies can access advanced AI capabilities quickly and efficiently, enhancing their operations without the need for extensive investment in AI research and development.

**Training Data:**Datasets used to train an artificial intelligence (AI) model. These data are vital because they include examples that help define what the AI should learn in order to perform a specific task.

**University Wide AI Group:** An AI group within the University of Edinburgh.

**Unpredictable Output:** Results generated by an AI system that cannot be easily explained or anticipated based on the input data and the model structure. This issue is often associated with the "black box" problem within AI.

**Unsupervised Learning:**A subcategory of artificial intelligence (AI) and machine learning (ML) that is trained with data that have not been labelled, meaning that it has to identify patterns on its own.