

The cover art features a dark blue background with a complex network of glowing blue circuit lines and nodes. In the center-left, a square frame with a glowing cyan border contains the letters 'AI' in a large, white, sans-serif font. The frame is surrounded by decorative elements: a horizontal row of vertical bars above and below it, and vertical columns of dots on its left and right sides. The bottom edge of the image is a white, torn-paper-like silhouette.

AI

VIETNAM AI HANDBOOK

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Privacy
Compliance 

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Contents

Introduction of the Handbook	1
Introduction of AI	3
Impacts of AI	15
Current AI regulations	36
Case studies of AI	49
Vietnam's outlook and perspective on AI	52
About us	61

Introduction of the Handbook

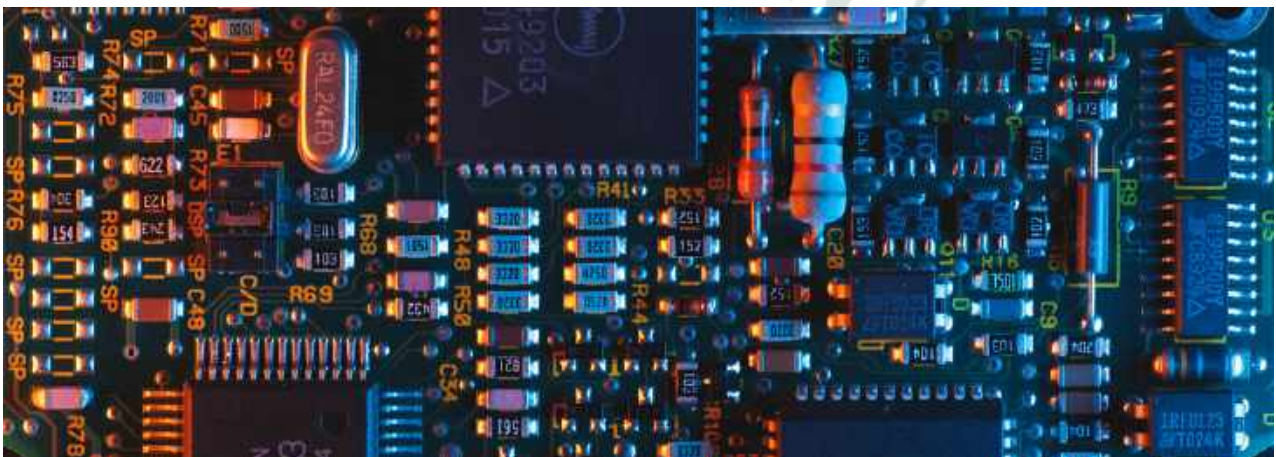
The current state of AI

Artificial intelligence (AI) is a technique that enables a computer to mimic human behavior and imitate or exceed human decision-making ability in solving complex tasks independently or with minimal human assistance [1]. AI has been contributing to a wide array of economic and societal benefits across the entire spectrum of industries and social activities.

Recent years witnessed an AI Spring, marked by notable advancements primarily led by companies, universities, and research labs based in the United States. The AI market size worldwide is increasing rapidly from about 95.6 billion US dollars in 2021 to more than 207.9 billion US dollars in 2023 and is expected to grow even stronger in the coming decade, reaching 1 trillion US dollars in 2028 [2].

Generative AI is a key component of this AI boom. In 2022, large language models were improved to where they could be used for chatbot applications; text-to-image models were at a point where they were almost indiscernible from human-made imagery; and speech synthesis software was able to replicate human speech efficiently. These advancements have unlocked novel applications for using Generative AI to tackle intricate problems, foster artistic creation, and contribute to scientific investigations [3].

The majority of AI-driven products available today fall into the category of weak AI, designed and trained for specialized tasks. GPT-4, a recent addition to Generative AI introduced in 2023, represents a significant leap towards an early version of artificial general intelligence, aiming to mimic complete cognitive abilities—a fundamental aspiration in the field of AI research.



Overview of the Handbook

This Handbook provides an overview of AI and the existing legal framework for AI. Accordingly, the Handbook includes the following main contents:



Introduction

Introducing and analyzing the concept of AI, briefly presenting the history of AI development from the mid-20th century to the present, highlighting the main types of AI, and summarizing the working mechanism of AI to get an overview of AI from a technical perspective.



Impacts of AI

Presenting outstanding and important applications of AI in the fields of health care, business, education and transportation to emphasize the benefits that AI brings to humans; examining the multifaceted challenges posed by AI across labor, ethics, legal and social impacts to comprehend its limitations and ongoing human involvement in perfecting AI.



AI legislation

Giving examples of current and upcoming legislation regarding AI in major countries, mainly focusing on the European AI Act; providing and analyzing case studies related to legal issues of AI.



Vietnam's AI outlook

Giving an overview of current state of AI in Vietnam; analyzing the problems posed by AI that Vietnam is currently facing and giving recommendations to tackle with these problems.

Introduction of AI



Definition of AI

Artificial Intelligence (AI) is a field of research within computer science and computational science in general. The term Artificial Intelligence was coined by Stanford University Honorary Professor John McCarthy in 1956, and he defined it as *“the science and engineering of making intelligent machines, especially intelligent computer programs.”*[4]

So, what qualifies as intelligence?

According to the definition of Stanford University Human-centered Artificial Intelligence, intelligence is the ability to learn and apply rational techniques to solve problems and achieve goals, adapting to an ever-changing world context. A pre-programmed robot may exhibit flexibility, accuracy, and consistency, yet it is not considered intelligent.

Experiment on digger wasp

When a digger wasp returns to its nest carrying prey, it leaves the prey at the threshold and goes inside to check for any intruders. While the wasp is inspecting the nest, the position of the prey is moved. Upon exiting, the wasp observes the altered position of the prey, then repeats its behavior, placing the prey at the threshold and re-enters the nest. If the prey continues to be moved, the wasp repeats this cycle of inspection multiple times. In this case, the wasp's behavior is not deemed intelligent due to its lack of adaptability in new circumstances.[5]

To determine whether a machine system is intelligent, besides assessing its capability for learning and adaptive problem-solving, one must also consider the extent and method of learning and problem-solving. In this regard, according to the book “Artificial Intelligence: A Modern Approach” by Stuart Russell and Peter Norvig[6], a leading textbook in the field of AI, there are four prevalent viewpoints:

Acting like a human

The goal of AI is to create machines that exhibit behavior similar to humans, behaviors that require intelligence. To determine what constitutes acting like a human, the Turing Test is employed. A computer passes the test, or is deemed intelligent, if a human interrogator, after posing questions and receiving textual responses, cannot distinguish whether the answers come from a person or a computer.[7]

Rational thinking

In reality, human beings, influenced by psychology, emotions, educational backgrounds, and cognitive abilities, do not always think and act correctly, reasonably, or toward favorable outcomes. Therefore, the concept emerged of constructing AI based on the idea of thinking and acting correctly and reasonably. Rational thinking involves a thought process based on the principles of logic, representing arguments that cannot be refuted, consistently leading to correct conclusions when given correct premises.

Thinking like a human

Intelligent behavior is only achieved if the thinking process mirrors that of a human. From this understanding, models and systems are created to simulate similar cognitive processes. For instance, Allen Newell and Herbert Simon, during the development of the General Problem Solver (GPS) model, did not intend their system to solve problems accurately. Instead, their focus was on mimicking the reasoning steps that humans undertake when addressing similar problems.

Rational action

Rational action is understood as taking actions to achieve the best possible outcome or the best expected result in situations involving uncertainty. The rational thinking approach emphasizes making correct inferences and predictions. Rational action might be based on rational thinking, but in many cases, acting reflexively, such as in dangerous situations, can lead to better outcomes than spending time on careful deliberation. This is the approach chosen by Russell and Peter Norvig for analysis and is also regarded by many as the basis for AI systems designed as rational action systems.

AI is the science and engineering of creating intelligent machines, understood as machines capable of acting rationally, aiming for the best possible outcomes suited to various changing circumstances

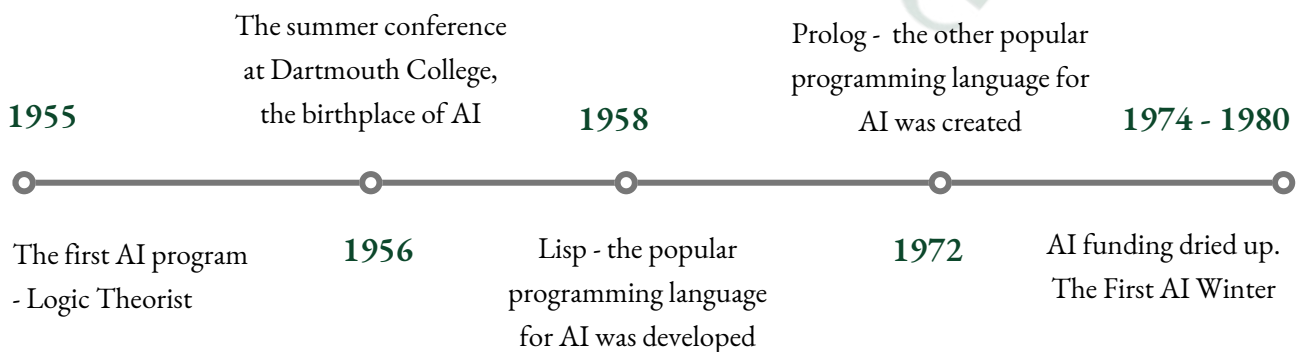
History of AI

The summer conference in 1956 at Dartmouth College, USA, is considered the birthplace of AI. Ten researchers in cybernetics, neural networks, and human intelligence conducted a two-month workshop aiming to explore ways to enable machines to use language, form concepts, think abstractly, and solve problems considered uniquely human at that time. Most attendees, including John McCarthy, Marvin Minsky, Allen Newell, became pioneering experts in the field of AI. The workshop affirmed AI as an independent scientific field with its methods and unique areas of study.

In 1955, Allen Newell, J.C. Shaw, and Herbert Simon created the Logic Theorist, the first AI program. The Logic Theorist demonstrated proofs for 38 out of 52 theorems from a math textbook, including a succinct proof for the theorem on isosceles triangles, more concise than traditional methods. In 1958, John McCarthy developed the Lisp programming language, one of the two most popular programming languages for AI. He also published a paper titled “Programs with Common Sense”, proposing the Advice Taker program, the first complete AI system capable of efficiently learning from experience like humans.[8]

In the prior AI generation, programs struggled due to a lack of deep knowledge in relevant fields, rendering them incapable of solving complex problems that demanded specialized expertise. This led to the development of an expert system, specifically designed to tackle problems within a particular domain by reasoning based on knowledge obtained from experts, represented in the form of “If...then...” rules. During this period, in 1972, Alain Colmerauer developed the Prolog language, which, alongside Lisp, became one of the most popular programming languages in AI.

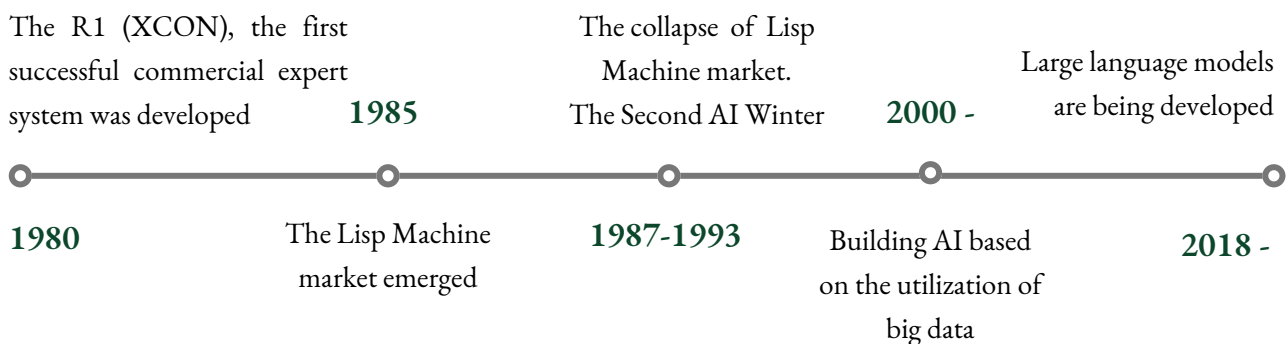
After initial success, in the early seventies, challenges related to computer power shortages hindered the AI development process, failing to meet the initial expectations. Pessimistic reports regarding the prospects of AI were presented to the governments of the UK and the US, leading to governments discontinuing funding for AI projects. From 1974 to 1980, AI funding dried up, and research came to a standstill. This period became known as the First AI Winter.



In 1980, the Digital Equipment Corporation developed the R1 (XCON), the first successful commercial expert system, initiating a surge in investment in expert systems, ending the First AI Winter. By 1985, companies were spending over a billion dollars a year on expert systems, and an entire industry known as the Lisp Machine market emerged to support them. From 1987, advancements in computing technology, emergence of cheaper alternatives, and the collapse of the Lisp Machine market led to the “Second AI Winter.”

The development of large language models, trained on massive text datasets, began in 2018. These models are capable of understanding and generating texts that closely resemble human writing. OpenAI utilized this technology to create ChatGPT, which was launched in 2022 and gained immense popularity. In 2023, OpenAI released ChatGPT-4, a large language model with enhanced capabilities across multiple tasks. It is considered an early version of artificial general intelligence, which was the initial goal of AI researchers.

During earlier phases, AI development primarily focused on constructing algorithms and systems based on expert knowledge. As we entered the 21st century, the emergence of the internet and e-commerce significantly increased the volume of digitized data. Many studies indicated that using data intelligently was more crucial than building complex algorithms. This led to a shift towards building AI based on the utilization of big data. Many applications rely on big data, such as Amazon’s recommendation system, the virtual assistant Siri, Google’s automatic translation and speech recognition.



Types of AI

Weak AI

Weak AI, also known as Artificial Narrow Intelligence (ANI), refers to AI that is trained and focused on performing specific tasks such as driving, transcribing human speech, etc. This is the type of AI we predominantly see today. Some examples of weak AI include intelligent assistants like Siri or Alexa, Gmail's spam filters, Netflix's movie recommendations, self-driving cars, etc.



Siri



Netflix's movie recommendations



Gmail's spam filters



Alexa

Examples of weak AI

Strong AI

Strong AI includes Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI). AGI is a theoretical form of AI in which machines exhibit intelligence comparable to that of humans, whereas ASI surpasses the capabilities of the human brain. In contrast to weak AI, strong AI is a machine with full cognitive abilities like humans, capable of self-awareness, learning, problem-solving, and future planning.

Currently, strong AI remains largely theoretical, existing primarily in novels or science fiction films; however, scientists predict that humans will successfully create them by the end of this century. In 2023, OpenAI introduced GPT-4, a versatile large language model. In addition to text inputs like its predecessors, it could use images as inputs, identify objects, and analyze them to generate responses. Some scientists consider GPT-4 as the initial, albeit incomplete, version of AGI.



GPT-4, considered as the incomplete version of strong AI

Mechanism of AI

AI works by combining large amounts of data with fast, iterative processing and intelligent algorithms, allowing the software to learn automatically from patterns or features in the data. In a simple view, the mechanism of AI can be indicated as follows:

- AI systems require large amounts of data which can be text, images, videos, or any other relevant information. AI algorithms process this data to recognize patterns, correlations, and trends. Different AI techniques handle different types of data and tasks, such as machine learning for recognizing patterns or natural language processing for understanding human language.
- Each AI technique has its own method of training AI, for example in supervised learning, models are trained on labeled datasets to recognize patterns. Through supervised learning, algorithms learn to make predictions or classifications based on this labeled data.
- AI models adjust themselves iteratively, improving accuracy with each iteration. They learn from mistakes and successes, refining their understanding based on feedback.
- Once trained, AI models can make predictions, recommendations, or decisions based on new or existing data, using their learned patterns and rules. Many AI systems also have a feedback loop where the outcome or decision is used to further train and refine the model, ensuring continuous learning and improvement.

Some notable methods to enable and train AI include:[9]

Machine learning

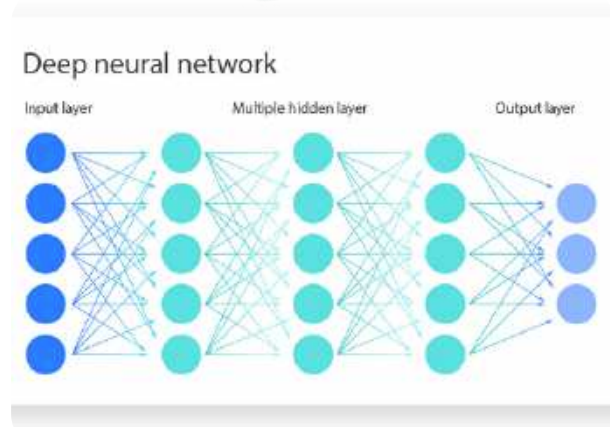
Machine learning automates analytical model building. It uses methods from neural networks, statistics, operations research, and physics to find hidden insights in data without explicitly being programmed for where to look or what to conclude. This includes supervised learning (using labeled data), unsupervised learning (finding patterns in unlabeled data), and reinforcement learning (learning through trial and error based on feedback).

Deep learning

Deep learning uses huge neural networks with many layers of processing units, taking advantage of advances in computing power and improved training techniques to learn complex patterns in large amounts of data. Common applications include image and speech recognition.

Neural network

Neural network is a type of machine learning that is made up of interconnected units (like neurons) that process information by responding to external inputs, and relaying information between each unit. The process requires multiple passes at the data to find connections and derive meaning from undefined data.



Responsible AI

Responsible AI is an approach to developing and using AI from both an ethical and legal standpoint, with the goal of using AI in a safe, trustworthy, and ethical way that increases transparency and reduces AI-related issues such as bias.[10] There are no universal criteria to define responsible AI, but each AI developer will come up with their own criteria that suit their mission and values.

According to Google, the criteria of responsible AI are:[11]

- Beneficial to society;
- Avoid creating or reinforcing bias;
- Built and tested for safety;
- Be accountable to people;
- Integrate privacy design principles;
- Maintain high scientific standards;
- Use for purposes consistent with the above principles.

According to the European Commission's Ethics Guidelines for Trustworthy AI, the criteria to determine a trustworthy AI system are:[12]

- *Human agency and oversight*: including ensuring fundamental rights, human agency, and oversight;
- *Technical robustness and security*: including attack resistance and security, contingency plans and general safety, accuracy, reliability, and reproducibility;
- *Privacy and data governance*: including respect for privacy, data quality, integrity, protection, and access;
- *Transparency*: including traceability, explainability, and communication;
- *Diversity, inclusiveness, and fairness*: including avoidance of bias, universal accessibility and design, and stakeholder engagement;
- *Social and environmental well-being*: including sustainability and environmental friendliness, social impact, society, and democracy;
- *Accountability*: including the ability to audit, minimize, and report on negative impacts, trade-offs, and remedies.

AI developers need to build a set of AI rules that align with their goals and values and provide the necessary requirements/actions/implementation steps during the AI development process to implement each principle. In addition, companies can make reports on the status of applying these principles in creating, training, testing, and putting into use AI each year to create trust and assure customers.

Some AI principles of large companies/organizations include Google AI Principles, European Commission Ethics Guidelines for Trustworthy AI, Microsoft Responsible AI Standard, IBM's Principles for Trust and Transparency, etc.

Curent popular AIs



Chat GPT

ChatGPT is a chatbot based on the Generative Pre-trained Transformer (GPT) language model, which was first introduced by OpenAI in 2018 and trained to follow instructions in a prompt and provide a detailed response.

Operation mechanism

ChatGPT employs a deep neural network structure with layered transformers designed specifically for handling sequential data, particularly natural language text to generate human-like and coherent outputs. To train ChatGPT, a vast amount of text data is inputted into the model to enable it to learn the patterns and relationships among words, phrases, and sentences. The model undergoes iterative refinement as it encounters more data, continuously improving its comprehension. After training, ChatGPT can be fine-tuned for specific tasks or applications like content generation or language translation.[13]

The operation of ChatGPT follows a series of steps. Initially, the user inputs a query or prompt into the system. This input is then processed by the model, leveraging its understanding of language patterns and associations to generate a response, which is then returned to the user. The user can further continue the conversation or pose additional questions.

Advantages & Disadvantages

ChatGPT has the advantage of natural language generation, enabling it to craft responses that closely resemble human language and maintain coherence. However, ChatGPT might struggle to identify and react to emotional cues like sarcasm or humor, potentially leading to responses that might seem tone-deaf or insensitive.

ChatGPT can be applied in several aspects such as enhancing customer support services by offering tailored assistance to customers through creating virtual agents, identifying and preventing cyber-attacks by analyzing the language used in the email, improving healthcare services by providing personalized assistance to doctors, etc. After a year in operation, over 180 million people have created a ChatGPT account and the ChatGPT website gets around 1.5 billion visits each month.[14]



Chat GPT



Midjourney

Midjourney is a Discord-based generative AI program for generating images with the text-to-images method, created and hosted by San Francisco-based independent research lab with the same name, Midjourney, Inc. The tool is currently in open beta, which it entered on July 12, 2022.

Operation mechanism

Midjourney uses algorithms to generate images from text. Moreover, the algorithm is able to take user input and make unique pictures based on it, as well as customize images and adjust colors, shapes, and textures. Midjourney AI can create amazing art in different styles like cyberpunk, steampunk, ink, oil painting, and anime that looks like it was made by a master artist.

Midjourney operates exclusively within Discord, functioning as a bot accessible through the official server or by inviting it to other servers. To generate images, users use the /imagine command and type in a prompt. The bot then returns a set of four images. From there, users can select specific images they wish to upscale for enhanced quality or size. The results generated by Midjourney have codes known as seeds so users can track and make another image generated using offered seeds based on their past results. These codes can be searched in the mid-journey databases for future text-to-image generation.[15] Midjourney extends its functionalities beyond the text-to-images tool, offering users a range of applications, such as the remix tool, which enables users to merge two images or the expand tool which provides users with suggestions on expanding the horizons of the original images.

Advantages & Disadvantages

Midjourney is used widely by graphic designers and architects. Designers use Midjourney to find ideas for creating graphic publications. The program was used by the designers of The Economist to create the front cover for an issue in June 2022 or in Italy, the newspaper Corriere della Sera published a comic created with Midjourney in August 2022. Architects can use Midjourney as a starting prototype and brainstorm for shape and material ideas. After researching the user needs and boundaries for the exact plan, Midjourney can help architects to generate early design options which are starting points for future development.

However, Midjourney still has some limitations such as the images generated can be biased, racist or conspiratorial. Midjourney can also be used for creating fake images, contributing to spreading fake news, for example, the image of Pope Francis wearing a white puffer coat or the fictional arrest of Donald Trump.



An image generated by Midjourney

Replika

Replika is a generative AI chatbot created by Luka, a San Francisco-based technology company.

Operation mechanism

Replika is designed to be a personal AI friend or companion. It utilizes machine learning techniques to adapt to users' preferences, behaviors, and interests, aiming to create a personalized experience. Its primary focus is on conversational interactions, providing users with someone to talk to, share thoughts with, and engage in meaningful conversations. Users can communicate with Replika using free text, voice, or even augmented reality (AR) on their devices. Replika's goal is to offer companionship, provide emotional support, and encourage self-reflection and personal growth through its conversational interactions. It is often used by individuals seeking a non-judgmental space to express themselves or improve their mental well-being by sharing thoughts and feelings through conversations. The AI learns from these conversations, aiming to understand the user better and respond more appropriately over time.

Advantages & Disadvantages

Replika was launched in November 2017 and witnessed a remarkable development in the number of users, from more than 6 million users in 2019, the Replika website claimed it had over 10 million registered users in 2022.[16] Replika is used in journaling and self-reflection, overcoming grieving periods, understanding emotions, sleep aids and research on human psychology and AI-human interaction.

Despite numerous advantages, Replika has been criticized for using users' sensitive data and the exposure of unscreened minors to sexual conversation. In February 2023 the Italian Data Protection Authority banned Replika from using users' data and then, the application had to remove the ability for the chatbot to engage in erotic talk.





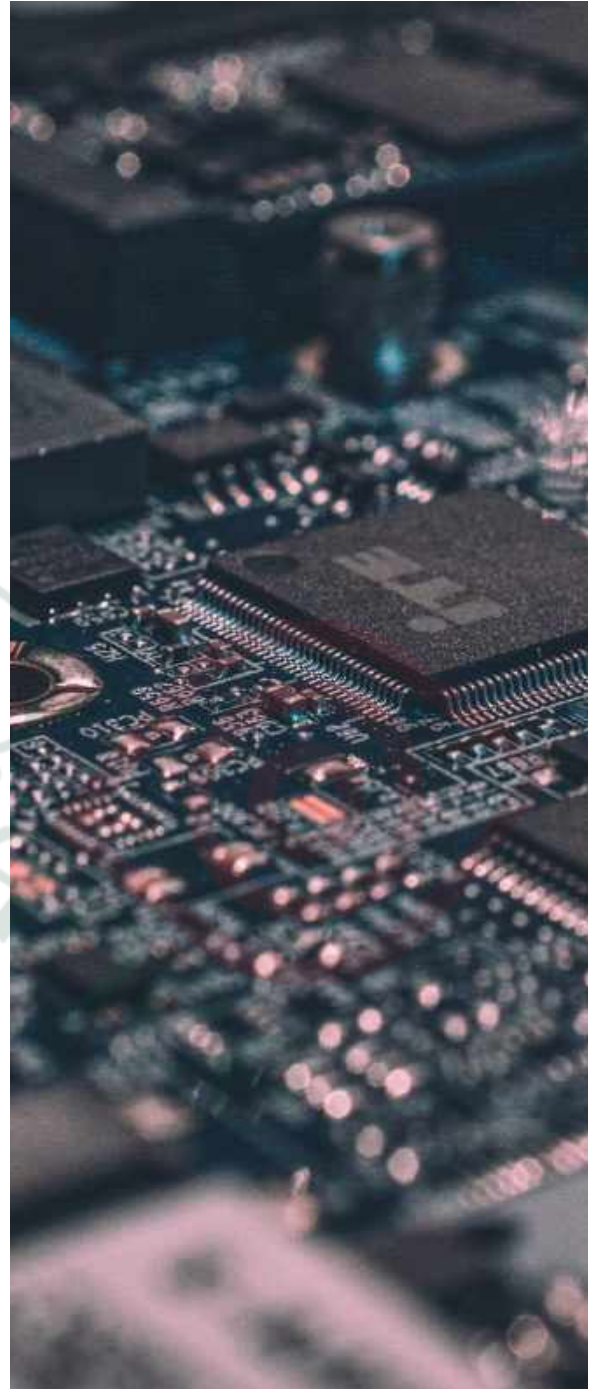
Gemini

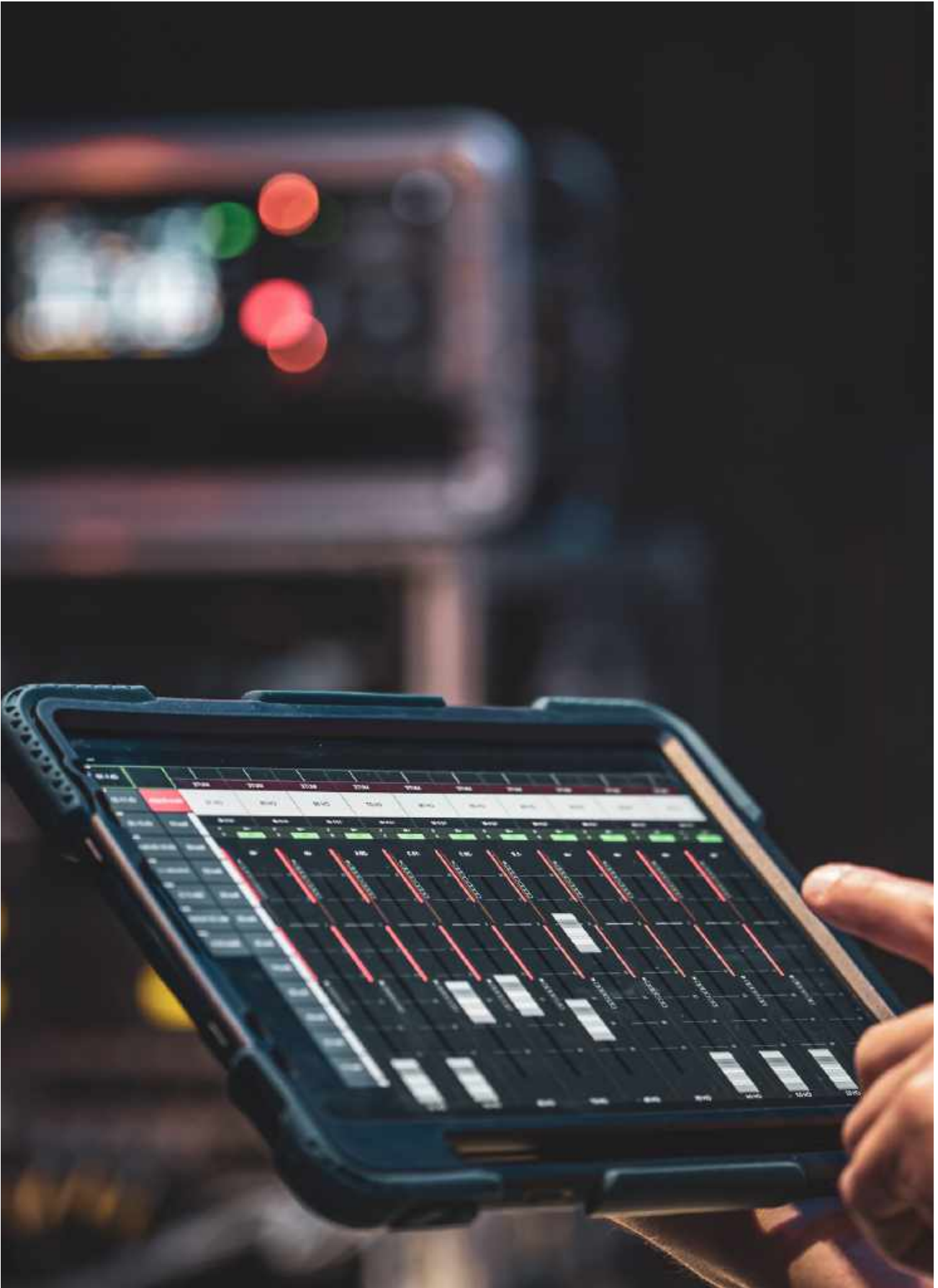
Gemini is a family of multimodal large language models developed by Google DeepMind, which launched the first version on December 6, 2023, positioned as a contender to OpenAI's GPT-4.

Capabilities

Gemini is Google's largest and most capable AI model — able to generalize and seamlessly understand, operate across and combine different types of information including text, code, audio, image and video. Gemini is also Google's most flexible model yet — able to efficiently run on everything from data centers to mobile devices. Gemini is optimized for three different sizes including Gemini Ultra - for highly complex tasks, Gemini Pro - for scaling across a wide range of tasks and Gemini Nano - for on-device tasks.[17]

Gemini Ultra is the first model to outperform human experts on MMLU (massive multitask language understanding), which uses a combination of 57 subjects such as math, physics, history, law, medicine and ethics for testing both world knowledge and problem-solving abilities. It can recognize and understand text, images, audio at the same time and extract insights from hundreds of thousands of documents through reading, filtering and understanding information. Another outstanding capability of Gemini is that it can understand, explain and generate high-quality code in the world's most popular programming languages, like Python, Java, C++, and Go.[18]





Impacts of AI

Overview of impacts of AI

AI has emerged as a pivotal technology in this century, profoundly influencing various aspects of our lives. The rise of AI has ushered in an era of automation, restructuring labor forces, altering healthcare methodologies, transforming our ways of communication, and sparking concerns regarding potential impact of AI on society.

Advantages

It is undeniable that AI has been supporting humans in alleviating several pressing problems of the world. AI-powered tools and systems are utilized in almost every field of life, including business, health care, education, transportation, and environmental protection. AI aids in diagnosing diseases, predicting outbreaks, enabling early disease detection, and more precise treatments. AI-powered tools customize learning experiences, offering personalized tutoring, enhancing accessibility, and streamlining administrative tasks for educators. AI helps monitor environmental changes by analyzing large datasets, facilitating more accurate weather forecasts, and enhancing sustainability practices. By leveraging AI technologies, humans can address critical global challenges more efficiently, offering promising solutions and shaping a better future for various aspects of society.

With regard to the workforce, the impact of AI is significant. Automation facilitated by AI is rapidly replacing human workers, especially in routine and low-skilled occupations. While this transformation has potential for efficiency improvement and cost reduction, it also raises concerns about job displacement.

It is crucial to acknowledge that AI is not solely a job disruptor; it is a job transformer. By handling repetitive and low-value tasks, AI liberates human workers to concentrate on higher-order tasks demanding creativity, critical thinking, and empathy. This shift reshapes the employment landscape rather than simply eliminating positions.[19]

Disadvantages

Firstly, AI is used to collect and analyze huge amounts of data of various natures, including data relating to character and behaviors of each person, which has created great concerns over data protection, cyber security as well as data privacy.

Secondly, AI's decision-making abilities can create ethical dilemmas, especially in areas like healthcare and criminal justice where human lives are affected.

Thirdly, another significant worry revolves around unintentionally amplifying biases and fostering discrimination within AI systems. These systems rely on extensive datasets that might inherently embody biases derived from past human choices. Consequently, AI can reinforce gender, racial, or socioeconomic biases, resulting in discriminatory consequences, notably in domains like employment, lending, and the justice system.[20]

Fourthly, the borderless and personhood complexities of AI also present significant challenges for jurisprudence. The current legal landscape in many countries struggles to categorize AI entities, addressing concerns related to accountability, liability, and rights. The status of AI within legal systems worldwide remains uncertain, leading to a lack of appropriate frameworks to govern its actions and mitigate potential risks.

Applications of AI

Applications of AI in health care



Medical diagnostics

AI algorithms have demonstrated exceptional capabilities in analyzing medical images, enabling the rapid processing of X-rays, MRIs, and CT scans, empowering healthcare professionals to obtain precise and comprehensive insights from diagnostic scans. AI algorithms excel in analyzing extensive collections of medical images, specifically in identifying and categorizing tumors associated with cancer. These AI systems provide oncologists with crucial insights into the tumor's stage, growth rate, and likelihood of metastasis, facilitating the creation of personalized treatment strategies for patients.[22]

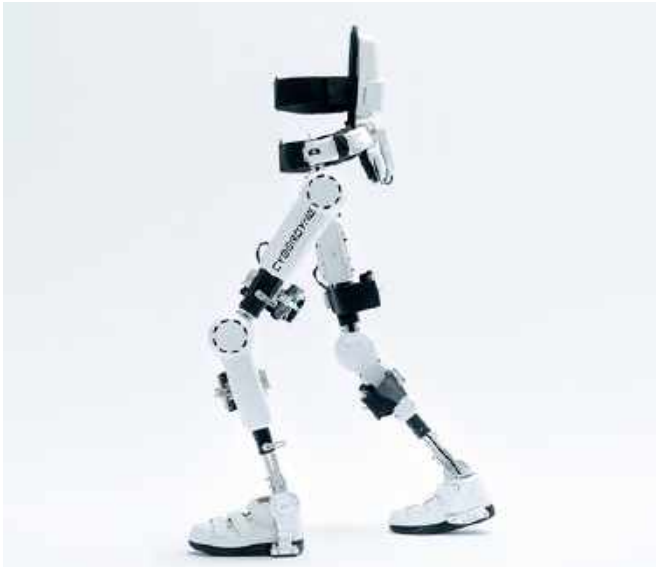
Secondly, AI's role in early disease detection is pivotal, as it can analyze vast patient records and find minute patterns and abnormalities that may indicate a disease's presence. AI is able to generate personalized health risk assessment by evaluating genetic data in relation with bio-signals, vital signs, medical history or living environment.[23]

Drug discovery and development

Machine learning techniques have been employed to evaluate drug molecules' biological activity, absorption, distribution, metabolism, excretion characteristics, and physicochemical properties, which is essential in assessment of drug molecules' behavior on the human body. For example, DeepTox is a deep learning-based model utilized to assess the toxicity of compounds based on a dataset comprising numerous drug molecules.

Besides, AI is applied in evaluation assessment of drug–target interactions by creating tools for automatic molecular docking. Molecular docking refers to a molecular modeling technique employed to examine how two molecules bind and form complexes, which is valuable in identifying interactions between a drug compound and a specific target. For instance, AutoDox is a suite of automated docking tools designed to predict how small molecules, bind to a receptor of known 3D structure. [21]





Patient assistants

Assistive robots support the physical limitations of elderly and impaired people by assisting them in daily tasks and serving as an additional pair of hands or eyes. These robots play a versatile role, aiding in mobility, household tasks, medication management, eating, grooming, bathing, and facilitating social interactions. For instance, RIBA, an assistive robot equipped with human-like arms, was specifically designed to assist patients in lifting and moving heavy objects or Cyberdyne's Hybrid Assistive Limb exoskeleton, is designed to help patients rehabilitate from conditions that lead to lower limb disorders, by using sensors placed on the skin to efficiently detect electrical signals in the patient's body and responding with movement at the joint.[24]

Some AI-based platforms can help patients to recover from their cognitive abilities decline. Virtrael is one of such platforms that serves to assess, stimulate, and train various cognitive skills that experience a decline in the patient. The Virtrael program matches the patient with a therapist, allows the patient to communicate with the therapist and other patients and sets challenges to help patients practice their memory, attention and planning abilities.[25]

Intelligent personal health records

Wearable Health Devices (WHDs) are an emerging technology facilitating continuous monitoring of human vital signs such as heart rate, blood pressure, body temperature, etc. throughout daily life, whether at work, home, or engaged in sport activities with minimal interference and discomfort during normal activities.

This type of intelligent personal health recording equipment helps users proactively monitor their own health status, detect early signs of illness, monitor the recovery process after medical interventions and provide data supporting doctors in accurately diagnosing and offering appropriate treatment for each individual. WHDs are also very useful in sport activities/fitness to monitor athlete's performance or even in first responders or military personnel to evaluate and monitor their body response in different hazardous situations and to better manage their effort and occupational health.[26]



Applications of AI in business



Customer service assistants

AI is applied in developing virtual receptionists and customer answering services. Virtual receptionists are able to carry out various tasks including answering customer queries and requests, taking phone calls, booking appointments, taking orders, discharging other inbound services in multichannel and also reporting and analyzing data collected from the calls. For example, Ruby receptionist is one of the leading multichannel customer communication solutions for small businesses, whose key features are 24/7 live phone and chat answering, call recording and notification, spam chatters and callers prevention.

Virtual receptionists are based on machine learning, answering questions by identifying keywords and previously identified patterns. AI can direct all calls that cannot be answered by AI to the human operator and answer all questions that are repeated or frequently asked. Employing virtual receptionists decreases the time taken for customers to receive answers, increasing customer satisfaction and loyalty. This application can also be used to substitute human labor, lower business costs and collect different customers' data, customer behavior analysis in marketing and sales.[27]

Investment management

Many companies, especially major financial institutions rely on AI to bolster their investment strategies.

For instance, BlackRock utilizes its AI engine, Aladdin, internally and for clients to aid investment choices. Aladdin employs natural language processing to assess textual data like news, broker reports, and social media updates, swiftly sifting through millions of articles and diverse content sources, aiming to pinpoint shifts in public sentiment or interest. It evaluates sentiment related to mentioned companies and assigns scores, which support investors in making more accurate decisions.

Additionally, banks like UBS and Deutsche Bank leverage SQREEM (Sequential Quantum Reduction and Extraction Model) to mine data, create consumer profiles and align them with wealth management products.





Targeted marketing

AI can help marketers understand consumer behavior, actions, and indicators and therefore, target the right group of customers in a timely and effective manner. Facial recognition software, one of AI-driven tools, aids in tracking customers' in-store visits and linking images to their social media profiles. AI is used to analyze customer data collected from these tools and cookies collected when Internet users access any websites or pages, to segment audiences by factors such as basic demographics, shopping interests, or browsing behavior, and then create unique advertisements tailored to each audience segment.[28]

By learning customer routines and interests, AI platforms have the capability to swiftly determine how to allocate expenses across various media channels. They ensure continuous client engagement and optimize campaigns to maximize value of marketing campaigns. [29] Marketers may also use AI technology to detect microtrends and even anticipate trends and create marketing campaigns based on these predictions to be the frontrunner in upcoming trends.

Applications of AI in education



Automated grading

AI-powered grading software utilizes natural language processing and machine learning techniques to replicate the grading patterns employed by human teachers in educational settings. Automated grading systems can handle various types of exercises such as multiple choice questions, short answers and even essays, based on assessment criteria and standards set by teachers. Automated grading systems bring numerous advantages including consistent and accurate evaluation, fairness, teachers' workload reduction and instant feedback.

There are many education companies using AI-driven grading tools for creating automated learning platforms such as Prep, an English test practicing platform in Vietnam, that automatically corrects students' faults on grammar, spelling, coherence; and grades the work based on each test's own standards and give detailed feedback on better rewrite options.

VR-based learning

Virtual Reality enables active learning, a teaching approach centered on engaging students actively in the learning process. It encourages their complete involvement and participation by immersing them in interactive experiences where they learn by "doing" rather than passively absorbing information like in traditional lectures.[30] With access to VR-based content, students can engage in experiences that might be unavailable for them. Using Google Expeditions, students can go on virtual field trips to visit historical sites, explore nature landscapes or participate in traditional festivals in countries across the world without physically leaving their classroom.

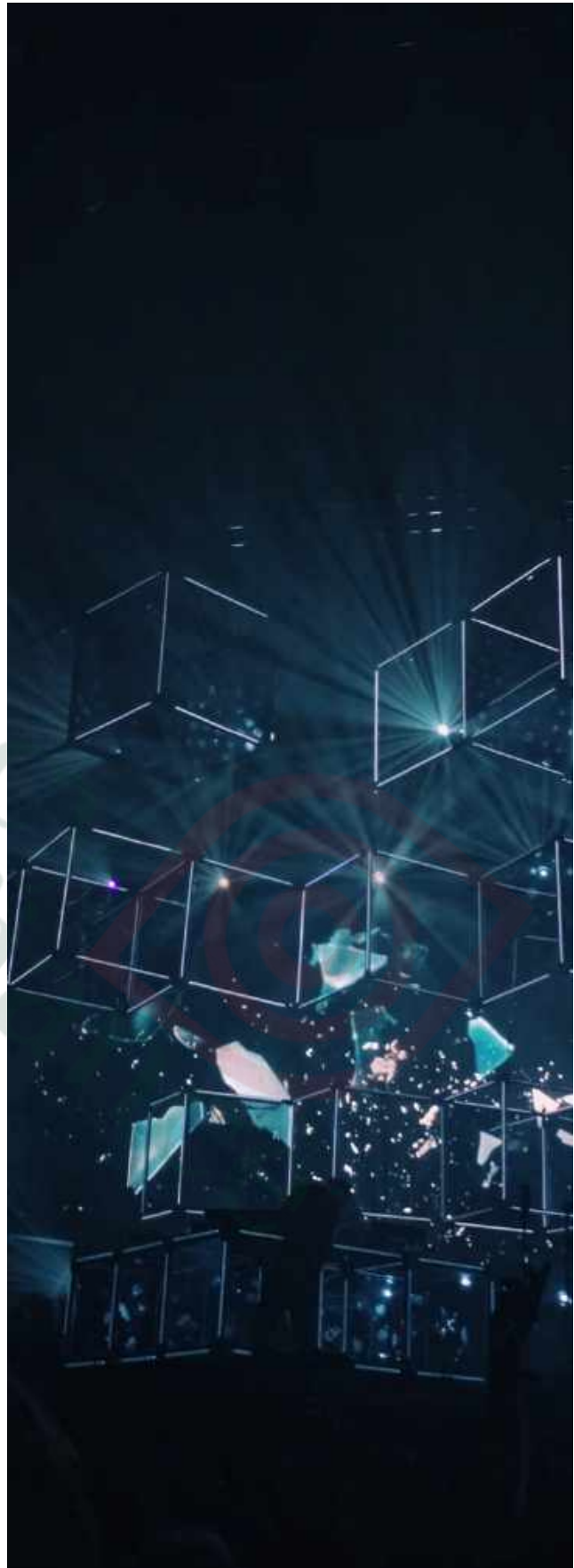
Skyview app allows students to look at the stars in the night sky, learn about their shapes, formations and other physical characteristics visually. VR in schools can be instrumental in aspiring students to pursue careers related to STEAM by providing a platform for them to practice real-world skills and scenarios. For instance, with Visual Body, students can have a virtual trip through the human blood flow to discover how inner organs work without having to step inside a hospital.

Learning experience personalization

AI-based platforms have the capability to gather and assess student data on interactions with educational materials, completion times for exercises, test outcomes, and overall academic performance. This information enables a comprehensive understanding of each student's attitudes and requirements. Leveraging this data, AI tools can craft individualized learning paths and dynamically adjust them based on the learner's progression.

For instance, when an AI-driven system detects a student's struggle in completing specific tasks, including tests and exercises, it can recommend alternative study materials, switch the order of exercises, or slow down the pace of the learning process. Simultaneously, the system can suggest self-assessment tests tailored to the materials the student has studied, fostering a more personalized learning experience.[31]

Companies like Carnegie Learning have developed smart platforms that use AI to provide personalized learning and feedback to students from pre-K to college. Their intelligent instruction design can identify knowledge gaps, redirect to new topics and create learning contents catering to individual needs. [32]



Applications of AI in transportation



Self-driving vehicles

AI integration into self-driving cars is crucial for their development, ensuring they can navigate safely and efficiently in real-world conditions. AI algorithms process data from various sensors like cameras, lidar, radar, and ultrasonic sensors to perceive the car's surroundings and machine learning helps to identify objects, pedestrians, road markings, and other vehicles. AI-powered systems, then, interpret the data collected and analyze the surroundings, predict possible scenarios, and choose the best course of action, such as accelerating, braking, or steering. AI also assists in creating detailed maps for navigation and localization, it helps the car understand its precise location on the road and plan routes effectively. Moreover, AI is used extensively in simulations and testing environments to simulate diverse driving scenarios and fine-tune algorithms without physical risks. With AI, companies have successfully brought self-driving vehicles to the market. In December 2018, Waymo was the first to commercialize a robo-taxi service, in Phoenix, Arizona and now offers services in various US cities.

In March 2021, Honda was the first manufacturer to sell a legally approved Level 3 car[33] and Nuro was approved for Level 4 in Palo Alto in August 2023.

Road condition monitoring

Computer vision in AI transportation is able to detect damage to the road surface by looking for changes in the asphalt and concrete. By utilizing computer vision algorithms, it becomes possible to identify potholes and cracks on the road as well as show exactly how much road damage there is in order to alert the relevant authorities to take action and improve road maintenance. The algorithms function by gathering image and video data and processing it to create automated systems for detecting and classifying cracks. There are numerous AI-driven road maintenance products currently in operation, including EyeVi. EyeVi consists of a sensor-agnostic car-mounted mapping hardware set and a software package that includes automatic feature recognition and data processing.

Captured data is run through EyeVi DataFlow software which is an automated data processing pipeline to produce georeferenced panoramic images, HD orthophotos, point cloud datasets and can extract data about cracking, network cracking, edge defects, fretting, potholes, patching, weathering of the roads.

Driver monitoring

AI-powered systems have now been integrated into car cabins to enhance and ensure safer driver monitoring. This technology utilizes face detection and head pose estimation to detect signs of drowsiness and distraction of the drivers, significantly contributing to the prevention of numerous crashes and fatalities each year. AI-driven technology can alert drivers when fatigue significantly affects their driving, prompting them to pull over and take a break or when detecting a driver is distracted, maybe by his phone, the AI system can remind them to stay focused.[34]

One of the remarkable driver monitoring products is Smart Eyes, which uses sensors, such as in-car cameras, computer vision, and AI to bring insight into the driver's state and behavior. Smart Eyes enables a wide variety of features for improved road safety and driver convenience, including tracking the driver's eyes, head and face movement, tracking how the driver is sitting, moving or interacting with objects or interfaces of the vehicle to detect and prevent fatigue and distraction while driving.



Challenges posed by AI

Legal challenges

Intellectual Property (IP)

This is an especially hotly debated topic in recent years due to the rise of generative AIs like ChatGPT, MidJourney, DALL-E, etc. Content creators have been fiercely fighting against these AIs with multiple lawsuits underway. This is one of, if not the most contentious issue relating to AI that has captured the global zeitgeist on AI. Such challenges could be classified into 02 broad areas:

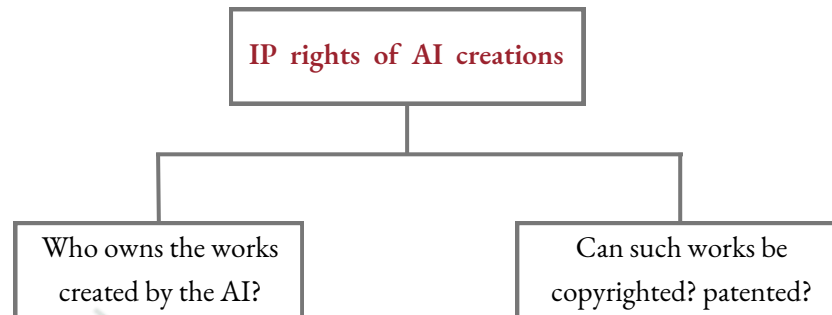


- **Training data**

In the simplest terms, generative AIs collect and analyze a large set of data in order to recognize patterns in the data and when prompted by the user, it would create new data based on the patterns it has observed and the prompt of the user. This means that for the AI to function, it would require a huge amount of training data on all subjects and topics imaginable. It is unavoidable that the training materials used for the AI would also include copyrighted works of content creators.

Thus, content creators such as artists have been alleging that AIs unfairly profit from their works. However, the legal battle to determine whether using copyrighted works as training data for AIs constitutes an infringement of IP rights or not is very much ongoing. With many different legal systems and laws on IP, there are many views on the usage of copyrighted works as training data for AI. Lawsuits are still being waged as of the writing of this Handbook.

- Ownership/IP rights of AI creations



Who owns the works created by the AI?

The answer could be entirely dependent on the terms and conditions of the AI that was used to generate the works. For example, in the Terms of Service of MidJourney effective as of July 21, 2023[35], it is stated that:

“ Subject to the above license, You own all Assets You create with the Services, provided they were created in accordance with this Agreement...If You are not a Paid Member, You don’t own the Assets You create. Instead, Midjourney grants You a license to the Assets under the Creative Commons Noncommercial 4.0 Attribution International License (the “Asset License”). ”

“ By using the Services, You grant to Midjourney, its successors, and assigns a perpetual, worldwide, non-exclusive, sublicensable no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute text, and image prompts You input into the Services, or Assets produced by the service at Your direction. This license survives termination of this Agreement by any party, for any reason. ”

This means that if you are not a paid member, you shall be granted a license to use the images under Asset License. If you are a paid member, you would own the images, however, in all cases, Midjourney would still retain the copyright license to the images. These are only the terms and conditions of one company and are not indicative of the inherent legal status of ownership of AI works. The reason this issue has not been at the forefront of the AI IP debate could be that it is still being debated whether AI creations can be copyrighted or owned at all.

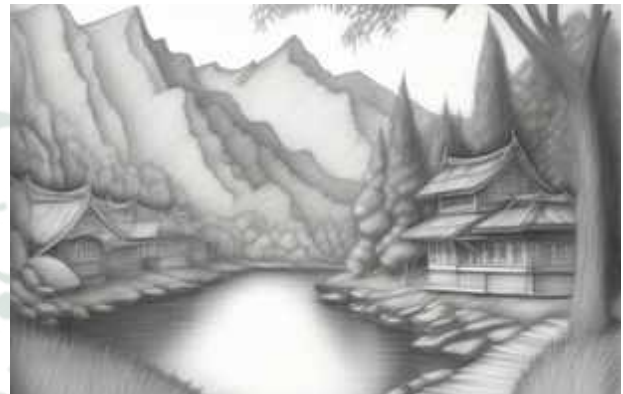
Can such works be copyrighted? patented?

There have been images, texts, music, articles, programs, codes, and inventions made entirely by AI. There has been much debate surrounding the issue of whether AI creation can be copyrighted or not. Recently, in August 2023, a US District Judge ruled that AI-created inventions cannot be protected and thus affirmed the US’s stance that a work can only be copyrighted if it has been created by a human for only a human can be the copyright holder.[36]

However, on the other hand, in February 2023, artist Kris Kashtanova’s AI-generated graphic novel “Zarya of the Dawn” was granted copyright by the US Copyright Office since it was deemed that there has been human input and the novel was not entirely created by AI. The graphic novel was therefore considered “AI-assisted” and not “AI-generated”. While the novel itself was granted copyright, the AI-generated images in the novel were not.[37] As such, it would be prudent for AI users to modify their AI creations enough to give them a human element before attempting to copyright them.



Water color landscape picture



Pencil drawing landscape picture



A realistic cute dog



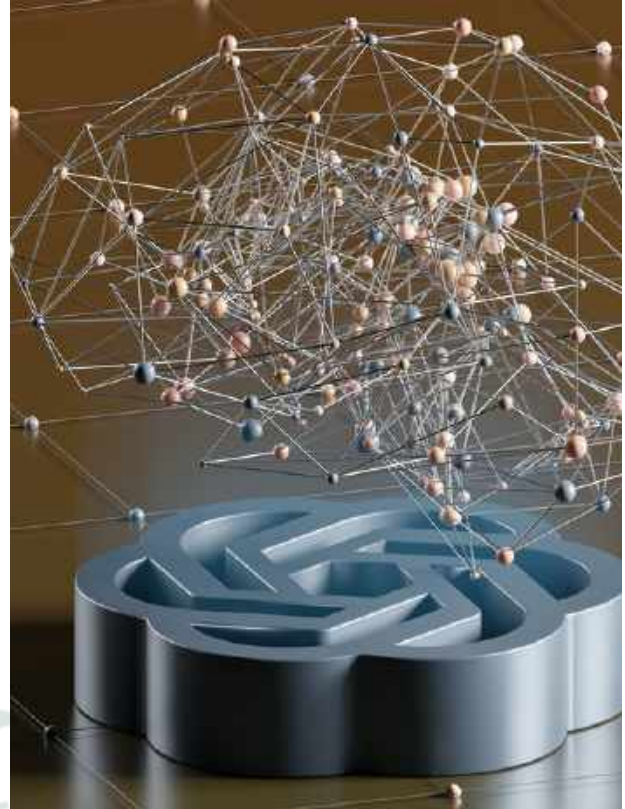
3D wings

Examples of AI artworks

Legal liability of AI

An AI has the capacity to incur damages to the users or third parties, either by providing false, inaccurate and biased information. The question would then become: Who would be liable for such mistakes and who would compensate for the damages (if any) resulting from such mistakes? Would it be the creator of the AI? the user? or the AI itself? As AI is not recognized as having the legal status of a human in most countries, it cannot take legal responsibility for its actions. As for the creators, it is possible that they could be held accountable for the damages caused by the AI by virtue of them being the manufacturers and the AI being their product. However, that is difficult to determine in real life.

The issue is still very much ongoing, with differing stances on the matter. As such, users of AI should be very cautious when employing the use of AI to assist with their work.



Jones v. W + M Automation, Inc.

In *Jones v. W + M Automation, Inc.* in 2002, the New York's Appellate Division dismissed a plaintiff's complaint against a manufacturer and programmer of a robotic loading system for product defect. The court viewed that the defendants were not liable for plaintiff's injuries at the GM plant because these defendants were able to demonstrate that they "manufactured only non-defective component parts." As long as the robot – and associated software – was "reasonably safe when designed and installed," the defendants were not liable for plaintiff's damages.

However, if GM modified the hardware or software, they could still be liable for the injuries and damages. The implication is that creators of AI software or hardware aren't liable for any injuries as long as these products were non-defective when made. Whether the AI is defectively made will depend on prevailing industry standards.[38]

Data privacy



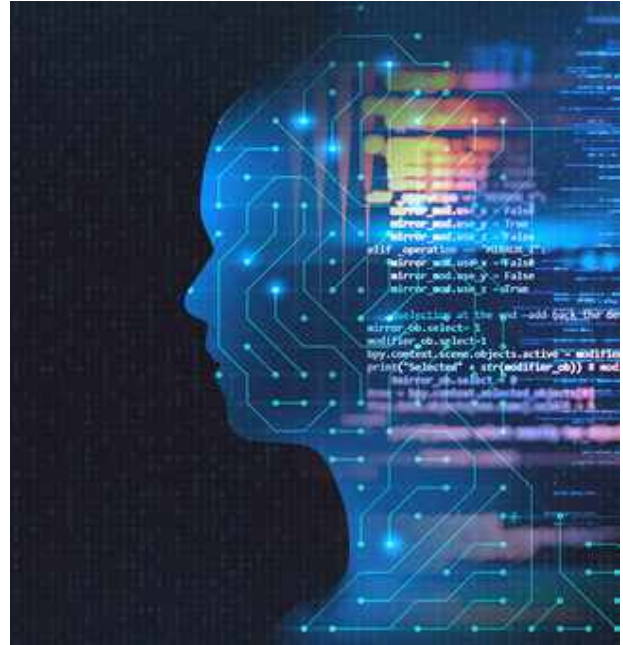
AI relies on a vast quantity of data in order to function and improve. It is unavoidable that such data would contain personal data. The protection of data privacy has been a hotly debated topic in the field of AI. The data collected by the AI could be used to identify or profile individuals. They could be used to predict, influence, or manipulate human behavior which would have a dangerous impact on the rights and freedoms of individuals.

Many countries have enacted legislation to combat this issue. For example, the EU issued the General Data Protection Regulation (GDPR) in 2018 for the explicit purpose of protecting the personal data of individuals by stipulating the rights of data subjects, obligations of data controllers and processors, and sanctions against violations.

Recently, the EU has also been working on an AI act that will regulate the use of AI in the EU, in which, AI systems with “unacceptable risks” such as those that manipulate the cognitive behavior of people or specific vulnerable groups, classify people based on behavior, socioeconomic status or personal characteristics would be banned.[39] This is to further protect the personal data of data subjects from being misused or taken advantage of by AI for risky and dangerous operations.

Discrimination by AI

AI can also be used to make decisions on humans, such as evaluating, and profiling people. This creates a risk of discrimination since the algorithms of the AI could have inherent racial, gender or ethnic biases, either intentional or unintentional. This could be particularly destructive in many different situations since many countries have laws prohibiting the discrimination of certain characteristics and groups of people. For example, discrimination based on race and gender in employment would be illegal in most countries. As such, using AI to screen applicants may result in discriminatory employment practices if the AI is biased toward a certain race or gender.



Some countries have already taken precautions against this method of automated decision-making. For example, the EU's GDPR states that the data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.[40]



Regulations on AI

- The speed of judicial advancement can not quite keep up with that of AI. As of the writing of this Handbook, there is no comprehensive legal framework for regulating AI in general currently in effect. This has left the AI scene, largely unregulated and is forcing the judicial branch to rely on outdated regulations that were not designed to accommodate AI.
- The regulation has to be broad enough to cover future advancements in the field of AI instead of constantly playing catch up. This is an endeavor that few nations can hope to tackle by themselves and is one of the greatest challenges that AI poses to governments around the world.

2021 proposed European AI Act - most notable effort in regulating AI

- Like with GDPR for personal data protection, this AI Act hopes to become the first and most comprehensive legal framework for AI. The proposal aims to ensure that AI systems used in the EU are safe, transparent, traceable, non-discriminatory, environmentally friendly and overseen by humans rather than fully automated.
- The proposed law would classify the AIs by the risks they pose to the public and provide corresponding levels of control to mitigate such risks.[41]
- However, this will be a long road and the end is not yet in sight. Nevertheless, when such a regulation is passed, there is no doubt that other countries will try to emulate and modify it for their own.



Labor challenges

85

million jobs globally would be taken away by AI by 2025

97

million new jobs in the IT sector would be generated by 2025 [42]

Higher entry requirements for workers

Naturally, when entry-level jobs can be replaced by AI, it means that in order to secure a position in the labor market, the worker must be skilled. However, gaining skills is an often time and resource-consuming task that creates an entry barrier for new workers. This in turn creates more unemployment and further exacerbates the situation of income inequality. While AI is also expected to create new jobs, the barrier to entry into these positions would be too great for less privileged workers with no access to higher education.



Job displacement

AI has the processing power that no human can hope to achieve. What used to take weeks or even months of work by a team of humans can now be accomplished in minutes by a single AI. This makes them especially proficient in low-level, repetitive jobs, and unlike humans, AIs require no break and they do not make demands or unionize. While the price of entry is high, AI automation is one of the modern trends to cut labor costs. However, this trend also leads to widespread job displacement, though not all services and industries are hit the same. Positions such as customer service, simple data analysis, content creation, etc. would be most vulnerable to replacement.

Instability in the workforce

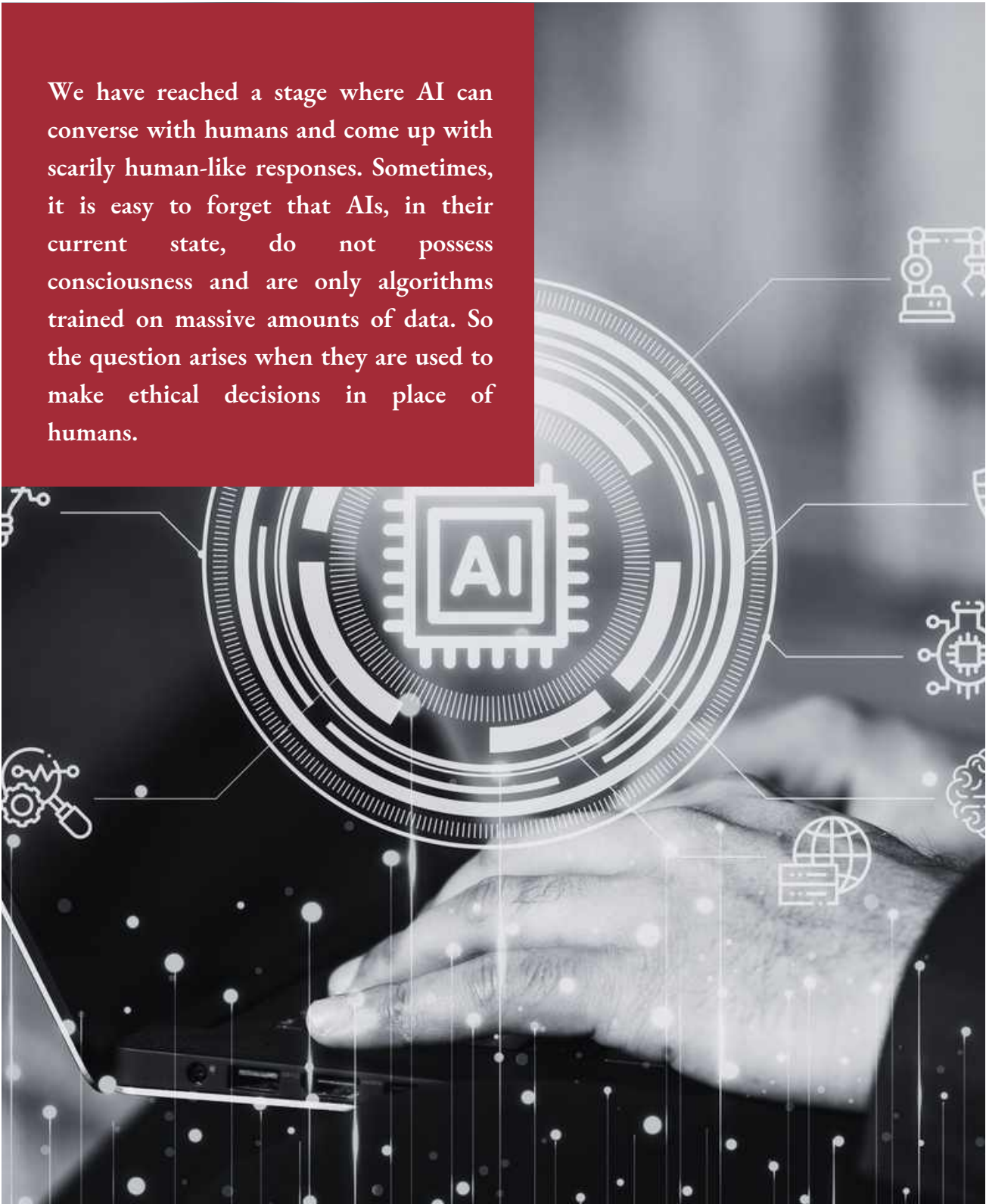
The displacement of a massive number of workers in one sector can lead to a massive influx of workers into other sectors causing further instability in the workforce as a whole. While it may be easy for new workers to learn new skills, expecting experienced workers to learn new skills, move to a different economic sector and be competitive is unrealistic.

Worsening labor conditions

The possibility of being replaced by AI and becoming unemployed could create stress for the workers leading to worsening mental and physical conditions. Also, the employer could capitalize on this fear of being replaced of the workers in order to perpetuate bad working conditions and drive down wages.

Ethical challenges

We have reached a stage where AI can converse with humans and come up with scarily human-like responses. Sometimes, it is easy to forget that AIs, in their current state, do not possess consciousness and are only algorithms trained on massive amounts of data. So the question arises when they are used to make ethical decisions in place of humans.



Responsibility of making ethical decisions of AI

An example of this is self-driving cars using AI. Should the car prioritize the life of the driver or that of bystanders? This question is becoming more and more prevalent given that self-driving cars are becoming more and more advanced. As of 2022, car makers have been able to produce cars that can perform all driving tasks and monitor the driving environment without needing attention from the drivers.[43] This means that the AI can almost drive the car itself. The ethical dilemma of self-driving cars has been around for a while and thankfully, we have never had to deal with such a situation in real life. However, there has been an example where overreliance on AI has had fatal consequences.

Fatal consequences due to overreliance on AI-powered self-driving car

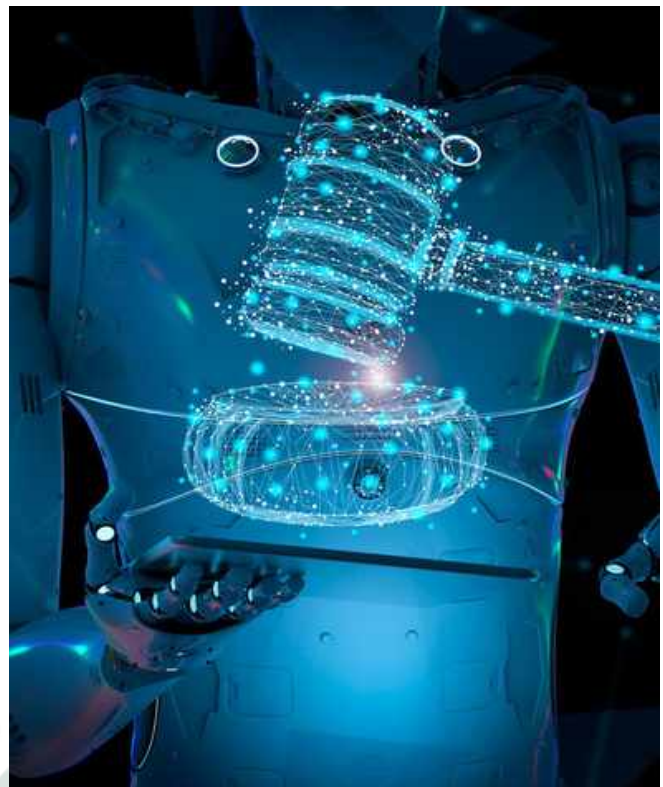
In 2018, an Uber self-driving car struck a pedestrian resulting in the first fatality in a crash related to a fully-autonomous vehicle. The AI detected the victim but failed to determine that she was a person or that she was moving in the path of the vehicle. In the end, the driver of the car was charged with negligent homicide because she was using her phone at the time of the incident and failed to apply the brake in time.[44]



“Ultimately, the human must still be responsible for the actions of AI, especially when there are real risks involved”

Bias

As AI learns from its training materials, its output is determined by the materials it is fed. Much like humans being fed misinformation, an AI can be provided with false information which, in turn, results in false responses. Aside from illegal forms of discrimination, AI could also further social discrimination by outputting discriminatory content. For example, the training materials of AI could be filled with racist content, either by accident or intentionally. The users could ask AI questions about racial issues and receive answers that are racist. Sometimes, it could be also due to algorithmic errors. This could have long-lasting and widespread impacts on society. For example, if an AI that has biases against people of a certain skin color or gender is used to screen applicants for a company, it could result in unfair and discriminatory hiring practices.



Examples of AI biases in certain sectors:[45]

Health care	Advertising	Art
Underrepresented data of women or minority groups can skew predictive AI algorithms, in some cases, computer-aided diagnosis (CAD) systems have been found to return lower accuracy results for black patients than white patients	Independent research at Carnegie Mellon University in Pittsburgh revealed that Google’s online advertising system displayed high-paying positions to men more often than to women	When asked to create images of people in specialized professions, Midjourney showed both younger and older people, but the older people were always men, reinforcing the gender bias of the role of women in the workplace



All in all, AI, while advanced as they are, should not be entirely relied upon to make decisions on behalf of humans. There are still many uncertainties in the application of AI that necessitate human oversight.

Environmental challenges

AI is a powerful tool and with great power comes great energy consumption. As AIs become more and more complex, the energy they require to function also increases to the point that the carbon footprint of AI can no longer be considered negligible.

14% of the global emissions by 2040 is the expected emissions from Information and Communications Technology (ICT). [46]

626,000 pounds of carbon dioxide is produced by AI Training which is the equivalent of around 300 round-trip flights between New York and San Francisco. [47]

50,000,000 tonnes of electronic and electrical waste (e-waste) is produced each year with only 20% formally recycled.

120,000,000 tonnes of e-waste is expected be produced each year by 2050.[48]

In all, it is clear that handling electronic waste has been an ongoing issue in recent years. However, the rapid advancement of AI is further exacerbating the situation since more and more resources are being used to fuel AI development and usage. It is paramount that a sustainable solution is reached to ensure an equilibrium between technological advancement and environmental protection.

Current AI regulations

European Union



In April 2021, the European Commission proposed the first EU regulatory framework for AI (“Regulation”) with the goal of ensuring that AI systems in the EU are safe, transparent and traceable, non-discriminatory and environmentally friendly. It says that AI systems will be analyzed and classified according to the risks they pose to users. The different risk levels will correspond with more or less regulation. Once approved, the document will be the world’s first comprehensive rules on AI. The EU Parliament also wants to establish a technology-neutral, uniform definition for AI that could be applied to future AI systems.[49] As with GDPR, it would seem that the EU is once again, the leading force in the global legislative effort.

Scope [50]

The Regulation will apply to:

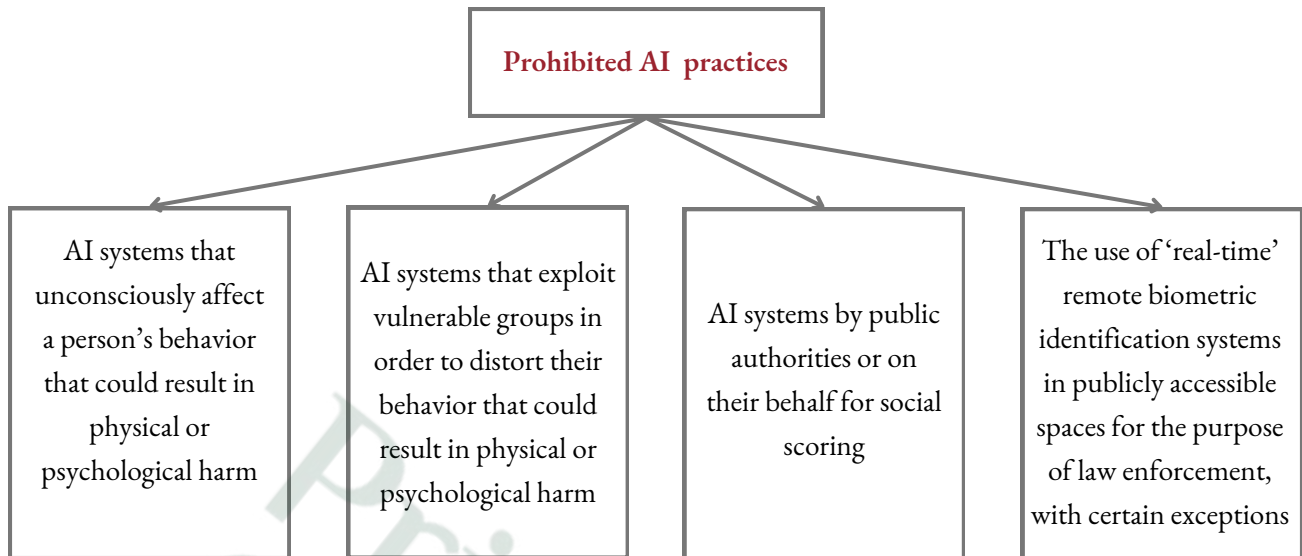
- providers, in and outside of the EU, placing on the market or putting into service AI systems in the Union;
- users of AI systems located within the Union;
- providers and users of AI systems that are located in a third country, where the output produced by the system is used in the Union.

with the exception of AI systems developed or used exclusively for military purposes.

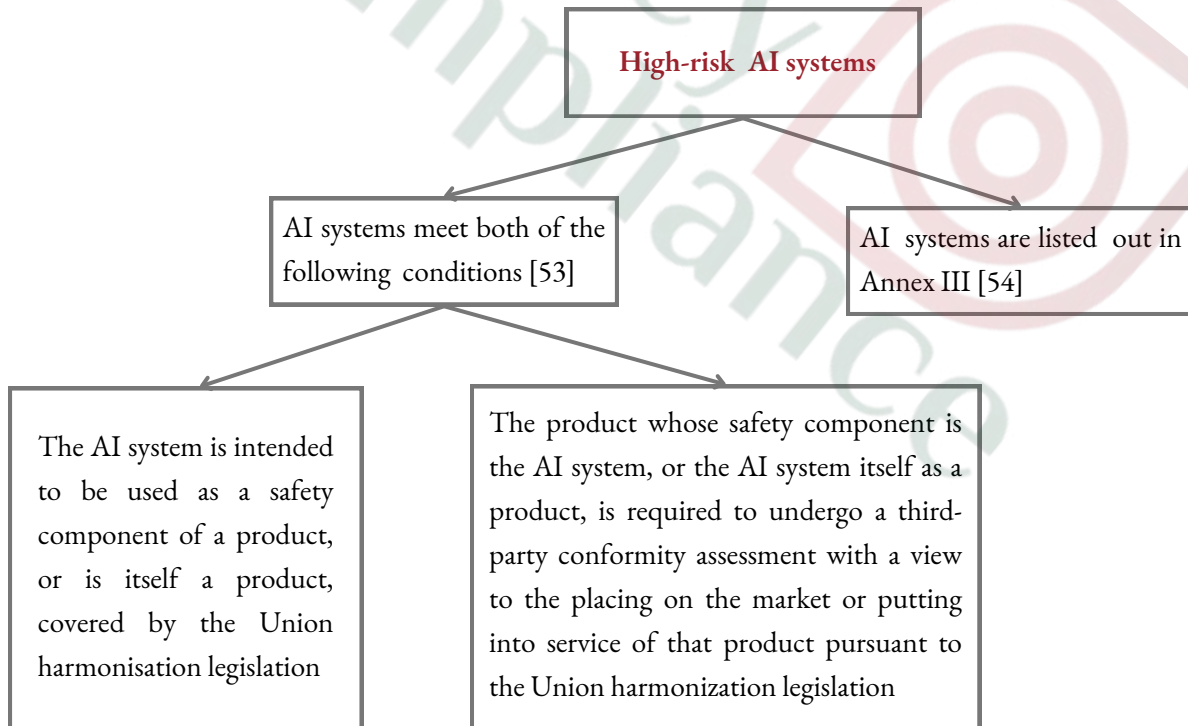
Definitions [51]

AI system	software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with.
Provider	a natural or legal person, public authority, agency or other body that develops an AI system or that has an AI system developed with a view to placing it on the market or putting it into service under its own name or trademark, whether for payment or free of charge.
User	any natural or legal person, public authority, agency or other body using an AI system under its authority, except where the AI system is used in the course of a personal non-professional activity.
Importer	any natural or legal person established in the Union that places on the market or puts into service an AI system that bears the name or trademark of a natural or legal person established outside the Union.
Distributor	any natural or legal person in the supply chain, other than the provider or the importer, that makes an AI system available on the Union market without affecting its properties.

Prohibited AI practices [52]



High-risk AI systems



Requirements for high-risk AI systems:

- Establish, implement, document and maintain a risk management system;[55]
- High-risk AI systems which make use of techniques involving the training of models with data shall be developed on the basis of training, validation and testing data sets that meet the quality criteria detailed in the Regulation;[56]
- The technical documentation of a high-risk AI system shall be drawn up before that system is placed on the market or put into service and shall be kept up-to date;[57]
- High-risk AI systems shall be designed and developed with capabilities enabling the automatic recording of events ('logs') while the high-risk AI systems is operating;[58]
- High-risk AI systems shall be designed and developed in such a way to ensure that their operation is sufficiently transparent to enable users to interpret the system's output and use it appropriately;[59]
- High-risk AI systems shall be designed and developed in such a way, including with appropriate human-machine interface tools, that they can be effectively overseen by natural persons during the period in which the AI system is in use;[60]
- High-risk AI systems shall be designed and developed in such a way that they achieve, in the light of their intended purpose, an appropriate level of accuracy, robustness and cybersecurity, and perform consistently in those respects throughout their lifecycle.[61]

Obligations of subjects related to high-risk AI systems

Providers	have a quality management system, draw up technical documentation, keep logs, and conform with relevant conformity assessment procedures among other obligations.[62]
Importers	carry out appropriate conformity assessment procedures and ensure that it shall not place high-risk AI systems that are not in conformity with the Regulation on the market.[63]
Distributors	verify that the high-risk AI system bears the required conformity marking, shall not make available on the market high-risk AI systems that are not in conformity with the Regulation. take corrective actions if it has reason to consider that a high-risk AI system that has been made available on the market is not in conformity with the requirements under the Regulation.[64]
Users	use the systems in accordance to the instructions, ensure that input data is relevant for the intended purposes of the systems, inform the provider or distributor when there is a risk when using the system in accordance with instructions, and keep logs automatically generated by that high-risk AI system.[65]

Transparency obligations for certain AI systems

Aside from high-risk AI systems, certain AI systems also have to comply with certain transparency obligations:[66]

- Providers shall ensure that AI systems intended to interact with natural persons shall inform its users that they are interacting with an AI system.
- Users of an emotion recognition system or a biometric categorization system shall inform the operation of the system to the natural persons exposed thereto.
- Users of an AI system that generates ‘deep fake’ shall disclose that the content has been artificially generated or manipulated.

Penalties

<p>Non-compliance with the prohibition of AI practices and data governance</p>	<p>administrative fines of up to 30,000,000 EUR or, if the offender is a company, up to 6 % of its total worldwide annual turnover for the preceding financial year, whichever is higher.[67]</p>
<p>Other non-compliance under the AI Act</p>	<p>administrative fines of up to 20,000,000 EUR or, if the offender is a company, up to 4 % of its total worldwide annual turnover for the preceding financial year, whichever is higher.[68]</p>
<p>The supply of incorrect, incomplete or misleading information to notified bodies and national competent authorities in reply to a request</p>	<p>administrative fines of up to 10,000,000 EUR or, if the offender is a company, up to 2 % of its total worldwide annual turnover for the preceding financial year, whichever is higher.[69]</p>

Recent Update

Recently, after the fifth round of triilogue talks on December 9, 2023, the European Council presidency and the European Parliament's negotiators have reached a provisional agreement on the proposal on the harmonized rules on artificial intelligence. This provisional agreement has some new elements and certain modifications compared to the initial proposal of the European Commission submitted in 2021. According to the press release of the European Council, notable contents of the provisional agreement include:[70]

1. Clarification that the regulation does not apply to areas outside the scope of EU law and should not, in any case, affect member states' competences in national security or any entity entrusted with tasks in this area. The Act would not apply to AI systems used for the sole purpose of research and innovation, or for people using AI for non-professional reasons;
2. The provisional agreement provides for a horizontal layer of protection, including a high-risk classification, to ensure that AI systems that are not likely to cause serious fundamental rights violations or other significant risks are not captured. AI systems presenting only limited risk would be subject to very light transparency obligations;
3. A wide range of high-risk AI systems would be authorised, but subject to a set of requirements and obligations to gain access to the EU market. These requirements have been clarified and adjusted so that they are more technically feasible and less burdensome for stakeholders to comply with;
4. The provisional agreement also includes changes clarifying the allocation of responsibilities and roles of the various actors, in particular providers and users of AI systems. It also clarifies the relationship between responsibilities under the AI Act and responsibilities that already exist under other legislation, such as the relevant EU data protection or sectorial legislation;
5. New provisions have been added to take into account general-purpose AI, and where general-purpose AI technology is subsequently integrated into another high-risk system. The provisional agreement also addresses the specific cases of general-purpose AI (GPAI) systems;
6. Specific rules have been also agreed that foundation models - large systems capable of competently performing a wide range of distinctive tasks, must comply with specific transparency obligations before they are placed on the market. A stricter regime was also introduced for 'high impact' foundation models;

7. A revised governance structure is introduced with some enforcement authority at the EU level;

9. A fundamental rights impact assessment is to be conducted before a high-risk AI system is put on the market by its deployers. The provisional agreement also provides for increased transparency regarding the use of high-risk AI systems. Notably, some provisions of the Commission's proposal have been amended to indicate that certain users of high-risk AI systems that are public entities will also be obliged to register in the EU database for high-risk AI systems. Moreover, newly added provisions put emphasis on an obligation for users of an emotion recognition system to inform natural persons when they are being exposed to such a system;

8. The option for law enforcement agencies to use remote biometric identification in public areas, provided certain protections are met;

10. The provisional agreement also introduces an expansion of the list of prohibited items, such as, cognitive behavioral manipulation, the untargeted scrapping of facial images from the internet or CCTV footage, emotion recognition in the workplace and educational institutions, social scoring, biometric categorization to infer sensitive data, and some cases of predictive policing for individuals;

11. Amended penalties. This would be €35 million or 7% of the offending company's global annual turnover in the previous financial year, whichever is higher, for violations of the banned AI applications, €15 million or 3% for violations of the AI act's obligations and €7,5 million or 1,5% for the supply of incorrect information. However, the provisional agreement also provides for more proportionate caps on administrative fines for SMEs and start-ups in case of infringements of the provisions of the AI Act.

The existence of this provisional agreement is a huge step forward in the legislative process and is a sign that the final draft of the first-ever AI legal framework is within sight and could be passed as soon as early 2024. However, even then, there would be a 02 year grace period after entry into force, thus, at the soonest, the EU AI act would be enforceable in early 2026. This means that the upcoming time is an extremely precious transitional period for AI providers, importers, distributors, and users to catch up with the new piece of legislation and ensure compliance. Whatever the case may be, there is no doubt that we are witnessing the birth of a new age of AI legislation that will affect not only the EU but the entire world for years to come.

United Kingdom



As a neighbor of the EU, the UK is also aware of the importance of AI in the coming age and thus, it has also made some legislative moves of its own. One of the more notable actions taken by the UK was in the spring of 2023 when the UK government published its policy paper on “A pro-innovation approach to AI regulation”. The consultation period of the policy paper ended on 21 June 2023. The UK government has also set out five principles that will underpin the UK’s AI regulatory approach:

- Safety, security and robustness;
- Transparency and explainability;
- Fairness;
- Accountability and governance;
- Contestability and redress.[71]

Recently, on 22 November 2023, the AI (Regulation) Bill was introduced into the UK’s Parliament’s House of Lords. The Bill generally focuses on the creation of an “AI Authority”, regulatory sandboxes for AI which would allow businesses to test their AI innovations. The Bill also imposes certain obligations on the UK Secretary of State. Currently, the Bill is still in the legislative process,[72] however, given that this is a private member’s bill, it is unlikely that it will be passed, however, it could spark an interesting debate on AI regulations in the UK.[73]

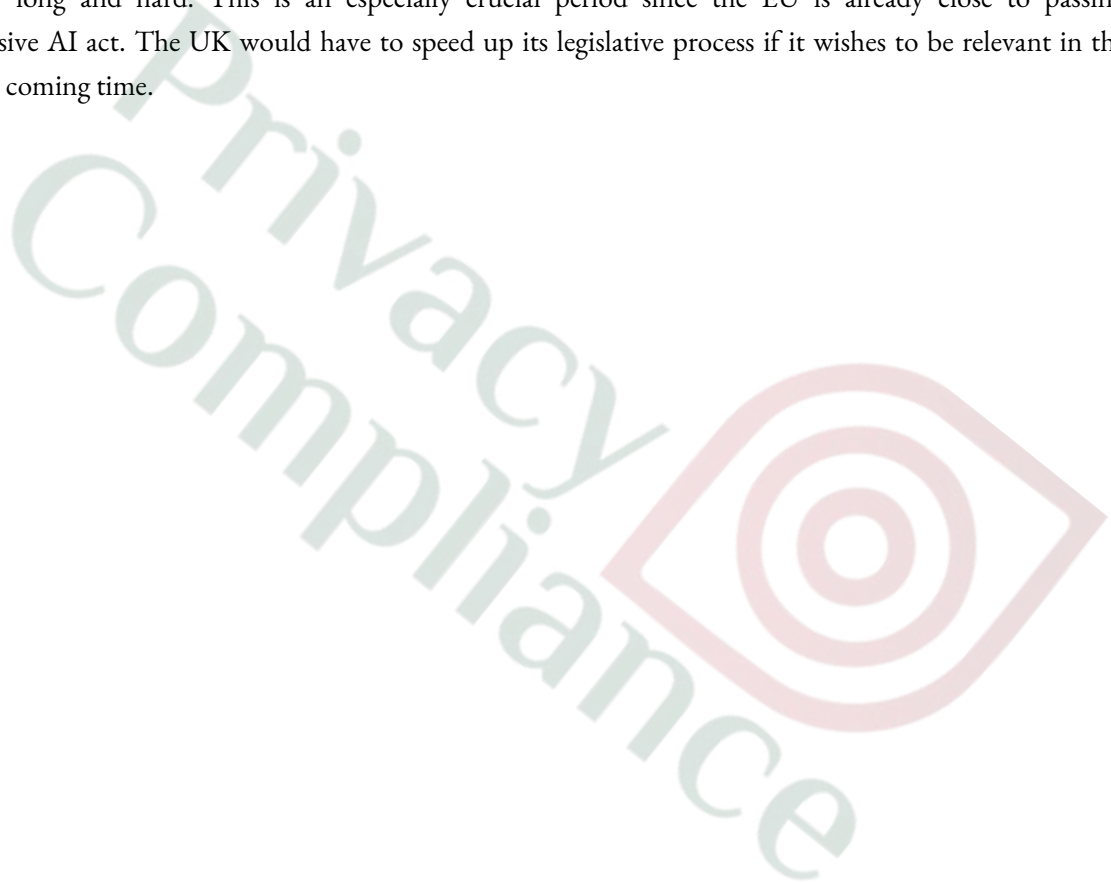
To go into details, the proposed Bill stipulates the following contents:[74]

- **Establishment of an AI Authority** that is designed to ensure regulators take into account AI, and ensure alignment of the approach of regulators regarding AI, coordinate review of legislation to address the challenges and opportunities of AI, monitor and evaluate the overall regulatory framework’s effectiveness and the implementation of the principles, support testbeds and sandbox initiatives, etc.
- **Regulatory principles** which include principles for AI regulations, AI businesses, and AI applications such as transparency, compliance, safety, and anti-discrimination.
- **AI responsible officers** shall be designated by businesses that develop, deploy, or use AI to ensure the safe, ethical, unbiased, and non-discriminatory use of AI by the business and that the data used is unbiased.
- **Regulatory sandboxes** shall be constructed by the AI Authority in collaboration with relevant regulators which will allow businesses to test innovative propositions in the market with real consumers.
- **Public engagement.** The AI Authority must implement a program for meaningful, long-term public engagement about the opportunities and risks presented by AI, and consult the general public and such persons as it considers appropriate as to the most effective frameworks for public engagement, having regard to international comparators.

- **Transparency, IP obligations, and labeling.** Any person involved in training AI must— (i) supply to the AI Authority a record of all third-party data and intellectual property (“IP”) used in that training; and (ii) assure the AI Authority that they use all such data and IP by informed consent and that they comply with all applicable IP and copyright obligations; (iii) any person supplying a

product or service involving AI must give customers clear and unambiguous health warnings, labeling and opportunities to give or withhold informed consent in advance; and (iv) any business which develops, deploys or uses AI must allow independent third parties accredited by the AI Authority to audit its processes and systems.

The proposed Bill serves as a good starting point for the UK to refine its regulations on AI, however, the road ahead is still very long and hard. This is an especially crucial period since the EU is already close to passing its comprehensive AI act. The UK would have to speed up its legislative process if it wishes to be relevant in the AI scene in the coming time.



United States 

Unlike the EU, the AI legislative process in the US usually takes longer despite the US having some of the most cutting-edge AI technologies. This is partially due to the partisan political climate of the US. As of the writing of this Handbook, the US has not passed any federal legal framework regulating AI despite numerous bills that have been proposed by both the Senate and the House.[75] However, in October 2023, President Biden issued an Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence which establishes new guidelines for AI safety and security, safeguards Americans' privacy, improves civil rights and equity, defends the interests of workers and consumers, encourages innovation and competition, advances American leadership globally, among other things. [76]



It should be noted that an executive order should not be mistaken for legislation since it requires no approval from Congress. An executive order is a directive by the President of the United States directing the operations of the US federal government.[77] However, this is a clear sign that the Biden administration is very concerned about the issue of AI. It would not be far-fetched to assume that sooner or later, Congress would have to follow suit and issue a legal framework to address AI on a federal level.

On a state level, many states have enacted their own regulation regulating AI however, there has not been any AI-specific law that provides a comprehensive legal framework as a whole. Most regulations on AI at the state level are embedded in privacy acts such as the California Privacy Rights Act, Colorado Privacy Act, Connecticut Data Privacy Act, Virginia Consumer Data Privacy Act, etc. The main attentions of these acts are still privacy and personal data protection which include protection against automated decision making and profiling.[78]

In essence, the legislative landscape of the US on the issue of AI is still very much barren with sparse effort and little concrete direction for a holistic legal framework. However, considering the efforts of other economic hubs such as the EU and the rapid advancement of AI on its very soil, there is a high chance that the US will have to soon make its move to capitalize and regulate this technology of the future.



China



The People's Republic of China (PRC) is currently emerging as one of the most technologically advanced countries in the world with great attention being paid to the development of the new technologies. AI has not escaped the attention of the PRC's leaders and in recent years, the PRC government has issued multiple first-of-its-kind AI-related legislation. This is an indication that China recognizes and understands the importance of AI and is ready to face it head-on. In the past two years, the PRC has passed a number of AI-related regulations which include:

- The Administrative Provisions on Algorithm Recommendation for Internet Information Services which came into force on March 1, 2022 (Algorithm Recommendation Regulation) focuses on the use of algorithm recommendation technologies (including, among others, generative and synthetic algorithms) to provide Internet information services in the PRC;
- The Provisional Provisions on Management of Generative Artificial Intelligence Services (Generative AI Regulation), published on July 13, 2023, which came into force on August 15, 2023, broadly regulates the development and use of all generative AI technologies that provide services in the PRC;
- The Provisions on Management of Deep Synthesis in Internet Information Service (Deep Synthesis Regulation), which came into force on January 10, 2023 focuses on the use of deep synthesis technologies (a subset of generative AI technologies) to provide Internet information services in the PRC;
- The Trial Measures for Ethical Review of Science and Technology Activities (Draft Ethical Review Measure), published on April 14, 2023, for public consultation which closed on May 3, 2023 focuses on the ethical review of, among others, the research and development of AI technologies in the PRC.

These regulations impose obligations on service providers, technical supporters, and users, as well as certain other entities, including online platforms. They ultimately aim to address the risks related to AI-generated content and to protect national and social security in China. There is also an AI law that is currently in the works which could be released soon.[79] There can be no doubt that the PRC has its sight set on conquering this legal behemoth.



Obligations of generative AI service providers [80]

In the development and use of generative AI services

- not generate illegal, false or harmful contents;
 - take measures to prevent the generation of discriminatory contents;
 - not use advantages in algorithms, data, or platforms to gain monopoly or engage in unfair competitive behaviors;
 - not infringe on others' portrait rights, reputation rights, honour rights, privacy rights and personal information rights;
 - take effective measures to increase the transparency of generative AI services and the accuracy and reliability of generative AI content.
-

Regarding training data for generative AI

- use data and foundation models from legitimate sources;
 - not infringe on others' intellectual properties;
 - obtain personal data with consent or under situations prescribed by the law or administrative measures;
 - take measures to increase the quality, truthfulness, accuracy, objectivity and diversity of training data.
-

When providing generative AI services

- bear cybersecurity obligations as online information content producers and personal information protection obligations as personal information handlers;
 - enter into service agreements with registered generative AI service users which specify the rights and obligations of both parties;
 - guide users on the legal use of generative AI technology and take measures to prevent users from over-reliance on or "addiction to" the generated AI service;
 - not collect non-essential personal information, not illegally retain input information and usage records which can be used to identify a user and not illegally provide users' input information and usage records to others;
 - receive and settle data subjects' requests;
 - tag generated content such as photos and video as pursuant to the Administrative Provisions on Deep Synthesis of Internet-based Information Services;
 - if illegal content is discovered, take measures to stop the generation and transmission of and delete illegal content, take rectification measures such as model improvement, and report to the relevant competent authorities;
 - where users are found to use generative AI services to conduct illegal activities, take measures to warn the user, or restrict, suspend or terminate the service, retain the records, and report to the relevant competent authorities;
 - establish a mechanism for receiving and handling users' complaints.
-

In relation to other legal obligations and enforcement supervision

- if the generative AI service comes with a public opinion attribute or social mobilisation ability, carry out a safety assessment obligation and (within ten working days from the date of provision of services) go through record-filing formalities pursuant to the Administrative Provisions on Algorithm Recommendation for Internet Information Services;
- cooperate with, explain the source, size and types of the training data, tagging rules and the mechanisms and principles of the algorithm and provide necessary technology and data, etc. to the relevant competent authorities when they perform supervisory checks on the generative AI service.

It is clear from the above that the Generative AI Regulation of the PRC was created to protect social order and individual privacy. The specific selection of generative AI to regulate shows that the PRC understands the security and privacy risks that generative AI and its applications such as deepfakes pose. The Generative AI Regulation also provides protection for copyrighted works. There can be no doubt that this regulation will have profound impacts on the AI scene, in both China and around the world due to its extraterritorial effect. The effect and actual impacts, however, remain to be seen.

On the international scene, there are already standards for AI management such as:

ISO/IEC 42001: 2023 Artificial Intelligence Management System (AIMS)

ISO/IEC 42001 is an international standard that specifies requirements for establishing, implementing, maintaining, and continually improving an Artificial Intelligence Management System (AIMS) within organizations. It is designed for entities providing or utilizing AI-based products or services, ensuring responsible development and use of AI systems.

ISO/IEC 42001 is the world's first AI management system standard providing valuable guidance for the rapidly changing field of technology. It addresses the unique challenges AI poses, such as ethical considerations, transparency, and continuous learning. For organizations, it sets out a structured way to manage risks and opportunities associated with AI, balancing innovation with governance.

Benefits of ISO 42001:

- Framework for managing risk and opportunities;
 - Demonstrate responsible use of AI;
 - Traceability, transparency and reliability;
- AI development cost savings and efficiency gains.[81]

Case studies of AI

Authors Guild v. OpenAI

In September 2023, the Authors Guild and 17 authors filed a class action lawsuit against OpenAI in New York for alleged copyright infringement of their works which were used to train OpenAI's ChatGPT. The plaintiff claimed that the copyrighted works of the plaintiff contributed greatly to the defendant's AI yet they did not give permission for such utilization of their works nor did they receive any compensation for such contributions.

The plaintiff also reasoned that the AI should only be trained on information in the public domain, if copyrighted materials are used then the authors must be paid royalty. The suit came after the Authors Guild's realization of the existential threat that AI poses to the livelihood of human authors.[82] The suit is still ongoing and is currently one of the biggest lawsuits against generative AI.

J.L. v. Alphabet Inc.

In July of 2023, Google was accused in a class action lawsuit of misusing vast amounts of personal data and copyrighted materials to train its AI systems. The complaint was filed by eight people seeking to represent millions of internet users and copyright holders claiming that Google's data scraping practices violated privacy and property rights. The complaint also claimed that the company could owe at least \$ 5 billion.

Google pushed back by saying that it uses data from public sources — like information published to the open web and public datasets – to train the AI models behind services like Google Translate, responsibly and in line with its AI Principles, and that US laws support the fair use of information.[83] The case is still in the judicial process and is unlikely to reach a conclusion soon.

Anderson v. Stability AI

A number of artists banded together to make a case against Stability AI, Ltd. alleging that the art AI of the company used copyrighted images from the internet to produce new images without asking for permission or crediting the artists. The artists also argued that this practice in turn unfairly profited the company while depriving the artists of their commission.[84]

In August of 2023, the judge was inclined to dismiss the IP infringement case on the grounds that the creations of the AI bear no “substantial similarity” to the works of the artists and that it is implausible that the artists' works were involved since the systems have been trained on “five billion compressed images”.[85]

Doe v. GitHub

In November 2022, two developers filed a putative class action lawsuit claiming that Copilot (a programming AI by GitHub) and Codex (a programming AI by OpenAI) were trained on their copyrighted computer code.

The plaintiffs were unable to claim that using their code as training data violated their rights because it was made available under open-source licenses, which typically do not impose restrictions on usage. This means that other copyright holders whose works are licensed under proprietary licenses could make the same claim and use the plaintiffs' code as training data without permission. Instead, they argued that developers on GitHub have the option to utilize open-source licenses, which mandate that every derivative work or copy of the licensed work must include attribution to the owner, a copyright notice, and a copy of the open-source license that licenses the code. The plaintiffs claimed such attribution was missing when their code was utilized as training data and that some of their copyrighted code was also included.

The claims of the suit range from violations of the Digital Millennium Copyright Act (DMCA), GitHub terms of use to unfair competition; as well as claims of sensitive personal data violations.

In the Court Decision in May 2023, the Court dismissed the claim on privacy violations since the plaintiff failed to identify the sensitive or private information in the claim. On the claim of property rights, the Court found that there was insufficient basis for injury since the plaintiffs cannot demonstrate that their code had been included in the output of the AI.[86] The Court also dismissed other claims of the plaintiffs, however, the Court allowed the claims of DMCA violation, breach of OSS licenses, unjust enrichment, and unfair competition to proceed, some with amendments by the plaintiffs. On June 8, 2023, plaintiffs filed an amended complaint.[87]



EEOC v. iTutor

August 2023, an applicant of a tutoring company suspected the company of discrimination and took their complaint to the US's Equal Employment Opportunity Commission (EEOC), which filed a lawsuit against the employer on behalf of more than 200 applicants, alleging age and gender discrimination. The lawsuit claimed the company illegally screened out women applicants over 55 and men over 60 using AI.

The company denied the claims, however, it eventually entered into a voluntary settlement with the EEOC. The company would pay \$365,000 to a group of more than 200 rejected applicants and agreed to adopt antidiscrimination policies and conduct employee training to ensure compliance with equal employment opportunity laws. The company also must consider anew all the applicants who were purportedly rejected because of their age.[88]

From the examples above, it could be observed that the legal battles on the issues of AI are still very much raging across all fronts without a decisive conclusion. However, it would seem that judges are leaning toward the side of AI in the copyright battle since several judges have dismissed the claims of copyright violation. In the future, we are bound to see even more disputes raging over the various aspects of AI implementation. Furthermore, the uncertainty of the outcomes of these legal battles once again highlights the need for a solid legal framework in order to adequately and fairly judge new advancements in AI instead of relying on older legislation that is not equipped to deal with them.



VS



Vietnam's outlook and perspective on AI

State of AI in Vietnam

While not as technologically advanced as other nations in the West, Vietnam is very proficient at adapting to changes in the international scene. AI is also no exception with various signs in both the public and private sectors.

Vietnam already has a **national strategy for the research, development and application of AI until 2030** in which AI is recognized as a field in the 4.0 industrial revolution which will create great developments in production capacity, and national competitiveness and promote economic growth. Vietnam's objective is to be within the top 4 leading countries within the ASEAN sector and top 50 leading countries worldwide regarding the development, research, and application of AI by 2030. To achieve this, Vietnam plans to create a legal framework to regulate AI, build data infrastructure, develop an AI eco-system, push for the application of AI and encourage international cooperation. This will require a comprehensive effort from all ministries and the private sector.[89]

Applying AI technology to production and service provision is classified as high technology application encouraged for development according to Decision No. 38/2020/QĐ-TTg of the Prime Minister. Accordingly, **businesses applying AI will enjoy many incentives related to tax policies, capital mobilization**, etc.

There have also been mentions of AI in recently issued legal documents of Vietnam.

In the Consumers' Rights Protection Law of 2023, it is stated that in online transactions with consumers, traders that establish and operate large digital platforms have the responsibility to periodically evaluate the implementation of regulations on the handling of fake accounts, use of artificial intelligence, and fully or partially automated solutions.[90]

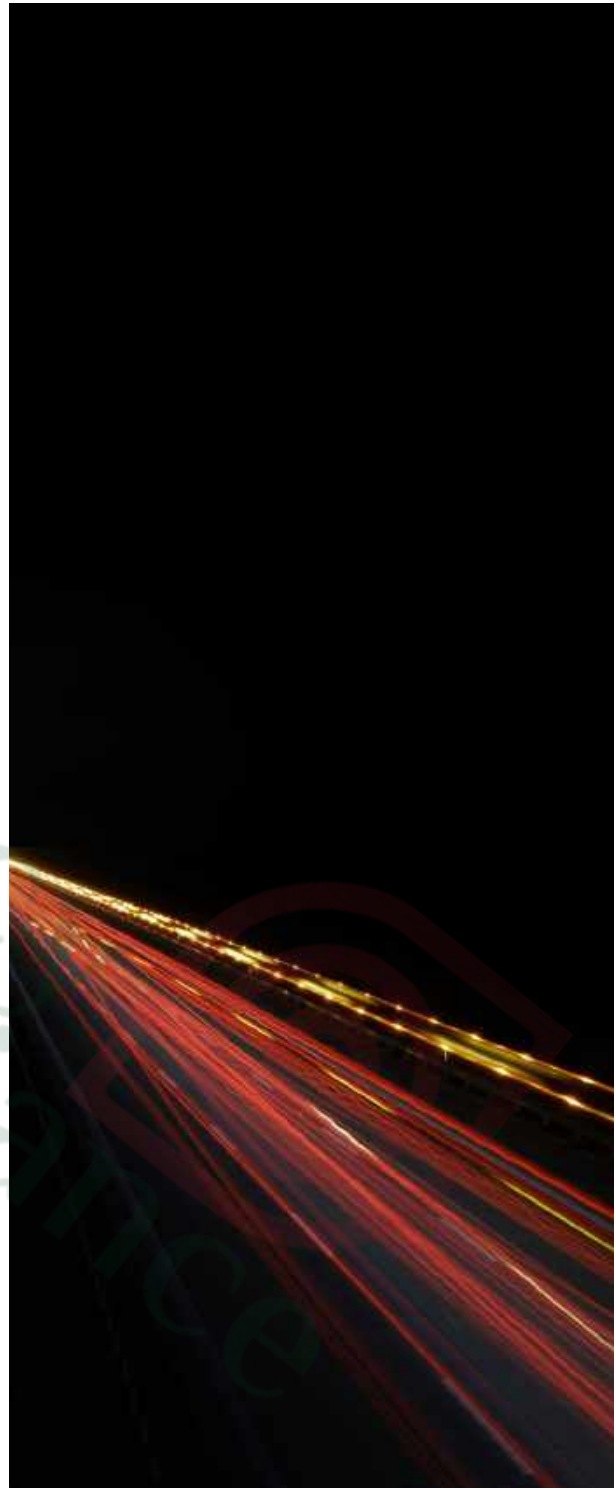
In the 2018 Law on Cybersecurity, it is recognized that AI is a part of the national cyberspace infrastructure.[91] The law also stated that a national security information system shall have technical measures for monitoring and protecting cybersecurity and measures for protecting the automatic monitoring and control system, the Internet of Things (IoT), mixed reality systems, cloud computing, big data, rapid data, and artificial intelligence systems.[92]

Decree No. 91/2020/ND-CP on fighting spam messages, emails, and calls also mentions that providers of telecommunications services, Internet services and organizations establishing private telecommunications networks have the responsibility to establish and operate anti-spam systems that apply artificial intelligence, big data, and technological advances.[93] While not explicitly mentioning AI, the Law on Insurance Business 2022 sets out requirements for IT applications in the insurance industry.[94]

These are signs that the Vietnamese legislators have taken notice of the rise of AI and are currently in the process of integrating AI into the legal system.

All of the above are evidence that Vietnam is moving forward with AI in mind and has devised a plan to develop the country's AI sector. While the pace of new developments may be slow, there is no doubt that Vietnam has a long-term plan for the development of AI. **Some public institutions have already implemented AI assistants** to provide information and help citizens with carrying out procedures. However, according to the Government AI Readiness Index 2023, Vietnam ranks 59 globally, lower than Thailand, Malaysia and Indonesia.[95] This shows that Vietnam's capacity to utilize the recent development of AI is still lacking. The government must, therefore, immediately begin to develop a legal framework to create a stable and sustainable basis for the growth of AI.

In the private sector, AI is already a highly sought-after item given its popularity and utilities. The application of AI is not new, however, recent developments have enabled new applications such as in the banking industry where chatbot assistants are being used to provide certain services to clients or eKYC technology is being used for credential certification. In the medical field, VinGroup – one of the biggest corporations in Vietnam has introduced VinDr – an AI that assists doctors in medical diagnosis. In December 2023, VinAI also introduced “Phở GPT” a new AI large language model developed by Vietnamese.



Pho GPT

VinAI trained the PhoGPT model from scratch using Mosaicml llm's llm-foundry library and a pre-trained Vietnamese data warehouse with a capacity of up to 41GB. This corpus includes 1GB of Wikipedia text and a 40GB deduplicated variant from the news dataset (version 05/21/2021). The research team at VinAI adapted PhoGPT by using a dataset containing 150,000 Vietnamese command and response pairs.

This dataset was built by combining from sources such as: 67,000 pairs of words from the Vietnamese subset of Bactrian-X, 40,000 pairs of ShareGPT words without codes and mathematical formulas, translated from English to Vietnamese based on to VinAI Translate, adding to the data set are 40,000 prompts focusing on awareness of hate, insults, harmful content and safety issues, with the majority compiled in Vietnamese and in addition are 1,000 data pairs used to train the PhoGPT model on a variety of tasks. There are 500 pairs of data to answer questions based on context, 500 pairs to create poetry, 500 pairs to write essays, 500 pairs to check and correct spelling errors and finally, 500 pairs to summarize content of documents.[96]

The Technology Director of FPT – one of Vietnam's leading high-tech companies has stated his belief that there is not a great gap between the levels of AI research and application in Vietnam and other countries in the region.[97] FPT has long been investing hundreds of billions of VND in AI technology by developing its human resources, infrastructure, and data sets.

A prominent AI product of FPT is FPT.AI - a well-rounded AI platform that provides an AI chatbot, automated customer care center, smart document control, eKYC, human resources management and development. The AI ecosystem has been implemented in 100 enterprises in 15 countries in many sectors such as finance-banking, insurance, etc. [98]

Dr. Andrew Ng – a top 100 AI expert in the world shared at the 2023 FPT Techday that he is very optimistic about the future of AI in Vietnam. He stated that Vietnam is a very promising destination for AI development and application.

“The AI market has enough opportunities for everyone, from big players to startups. AI applications will certainly be successful, and famous and bring in huge profits for enterprises in the future” – said Dr. Andrew Ng.[99]



Besides the giants in the tech industry, Vietnamese start-ups are also jumping into the race to develop AI and make this field more exciting than ever. Some names that can be mentioned include:

- AIV's Mindmaid virtual assistant development platform,
- AICycle - an AI application specializing in insurance,
- Vbee.ai - a conversational virtual assistant,
- PrivacyChatbot - an AI privacy assistant.

AIV's Mindmaid

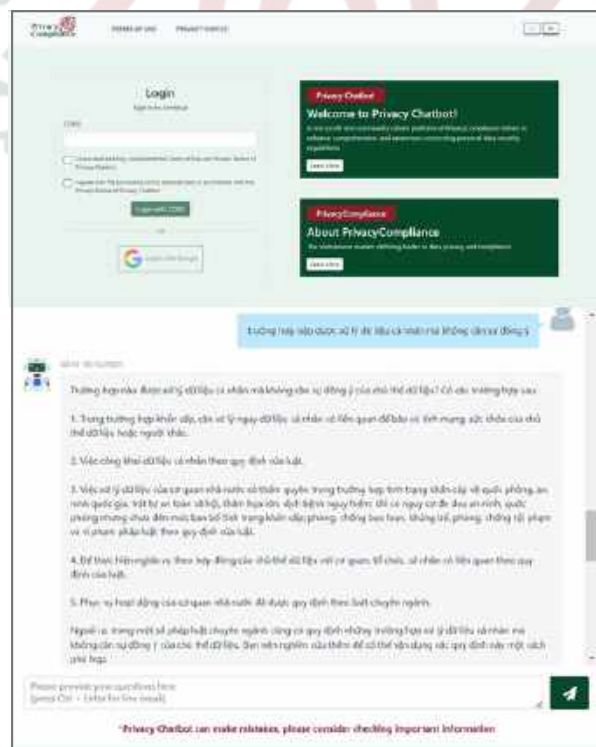
Mindmaid is a virtual assistant AI chatbot designed by the AIV Group. Mindmaid allows users to create their own customized AI chatbot by feeding it specific training data. The AI platform provides a wide selection of AI applications such as personal virtual assistant, customer service virtual assistant, enterprise virtual assistant, etc. The AI can perform a wide array of tasks such as data analysis and information provision. Mindmaid also supports integration into many different platforms and messaging apps for easy and convenient access. The implementation of the AI can have many benefits such as improved working efficiency, better time management, faster workload processing, etc.[100]



AIV's Mindmaid

PrivacyChatbot

As Vietnam's first product in the field of privacy and personal data developed by the PrivacyCompliance team, Privacy Chatbot applies AI to provide users with free background knowledge and understanding on personal data security as well as provide examples for specific issues, especially issues related to Decree No. 13/2023/ND-CP effective from July 1, 2023 (“PDPD”) – Vietnam's most complete and comprehensive legal document ever on the collection, processing, and exploitation of personal data. Privacy Chatbot is currently designed to be able to respond in both English and Vietnamese. The application is expected to improve each individual's understanding of their privacy and data rights as well as support businesses in training and raising awareness about protecting the organization's information “resources”.[101]



PrivacyChatbot

Challenges



Intellectual property

Vietnam’s current IP laws make no mention of AI, as such, questions regarding using copyrighted works as training data for AI, and the copyrightability of AI works are still very much in the air. Moreover, there have not been any legal precedents regarding the issue. This, in essence, makes the AI sector very much a free-for-all zone with very little oversight based on outdated regulations.

Personal data and privacy

Vietnam has just made some considerable progress with the enactment of PDPD which provides general protection for data subject rights and stipulates obligations for personal data controllers and processor. This is a good starting point to ensure that the personal data of individuals is well-protected, especially against the processing by AI. However, it seems that the PDPD does not have any provisions specifically regulating automated decision-making. In all, the PDPD is a step in the right direction, however, there is much to be done in anticipation of AI data processing.



Civil liability

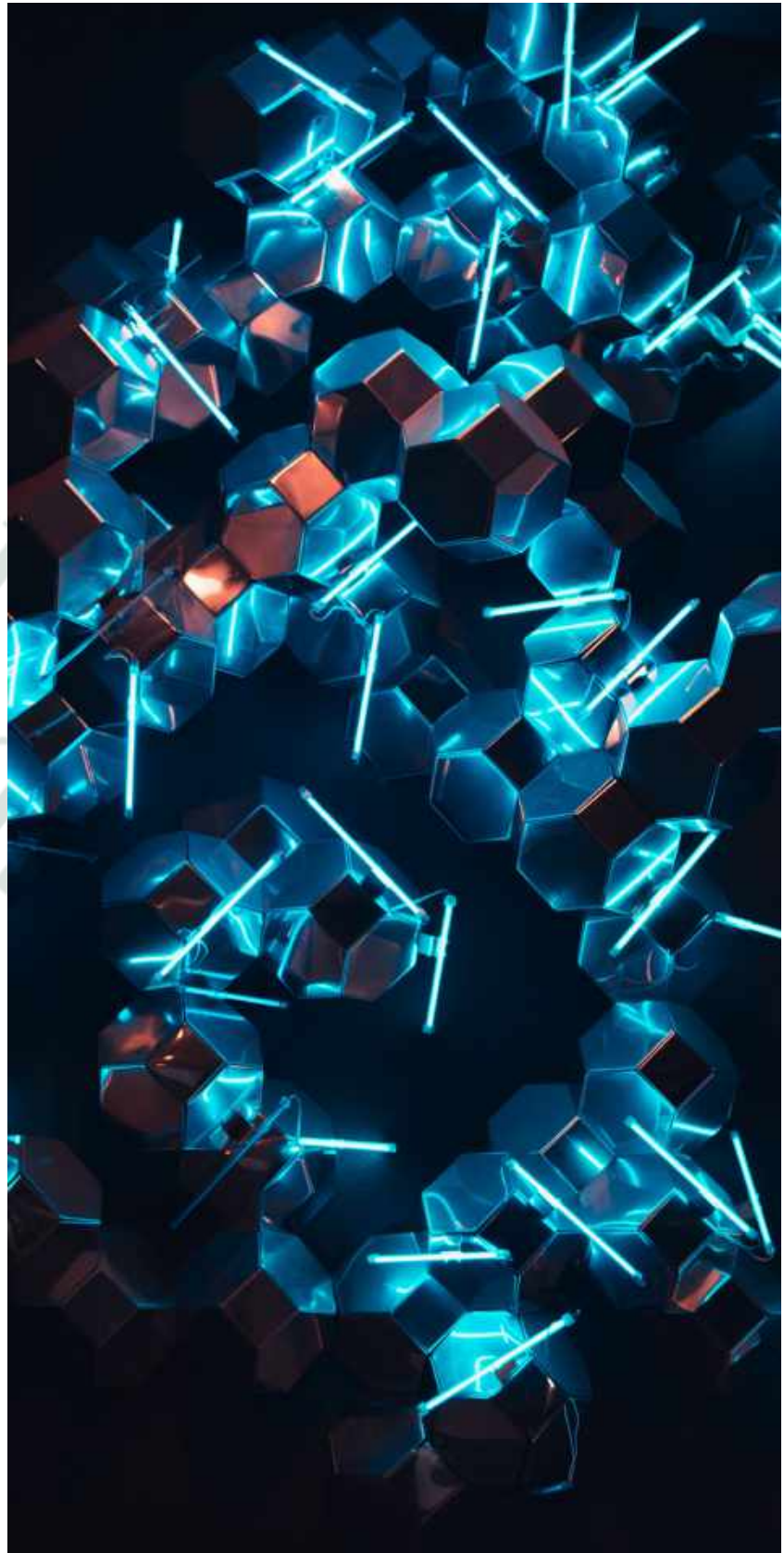
Vietnam also has no provision specifically regulating AI. However, if we view AI as a product then under the Law on Product and Goods Quality 2007, producers and importers shall pay compensation to sellers or consumers when their goods cause harm to the latter due to their failure to ensure the goods quality.[102] However, this only applies in cases where the goods quality was not ensured, leading to damage. In the case of AI, it would be very hard to prove that the AI was of “bad quality” leading to faulty results. Moreover, in reality, the situation would be much more complicated and with no precedent to draw from, the issue of AI liability remains an uncertainty.

“AI is largely unregulated in the legal field of Vietnam”

Labor force

Vietnam's labor force is still largely unskilled,[103] and thus, prone to automation. As such, if unregulated, AI could cause widespread labor displacement or unemployment. Especially with recent advancements, AI can now perform tasks such as data entry and analysis, content creation, and marketing, threatening the livelihood of a sizable portion of workers. Even though the rate of replacement is slow now, the government must be able to anticipate the future and take appropriate actions.

On the side of AI development, this also means that Vietnam is in need of high-tech workers. This shortage of AI workers is one of the reasons why Vietnam is lagging behind other countries in term of AI development. To be competitive in this age of technological advancement, Vietnam must cultivate skilled workers, especially in the fields of IT and AI.



Recommendations

Legal oversight

- 1 Vietnam must clearly **determine the legal nature of AI** and from there, **construct a legal framework that covers all aspects of legislation** such as civil, IP, etc. Perhaps an AI Decree or an AI Law might be necessary to clearly stipulate the issues surrounding AI such as development, implementation of AI, prohibited AI models, etc.
- 2 Vietnam could **update and further strengthen its regulations on data protection to protect the privacy of users of AI and owners of AI training data**. Vietnam can refer to other AI-related regulations around the world to get a better understanding of the current legal landscape and update its own legislation appropriately.
- 3 Vietnam could **construct a regulatory sandbox for AI**. A regulatory sandbox allows for the development of new ideas in the field of AI in a controlled environment and thus, also minimizes the risks. Such a system could attract domestic and foreign investments and encourage innovations in Vietnam.

Labor

- 1 Vietnam must **accelerate the transition of the labor force** from a physical, unskilled labor force to a more skilled one to ease the impacts of AI. This can be done by **improving the education system, investing in vocational training for workers, and creating new jobs**.
- 2 The government could direct the private sector to **promote the training and education of high-tech workers by providing more incentives for AI-driven companies and startups**. Such efforts would help to boost investment in AI development and application.

The road to proper regulation of AI is long and hard but Vietnam must be able to balance both opportunities and risks and move forward in a sustainable manner.



Closing remarks

As we reach the end of the Handbook, a journey through the intricacies of Artificial Intelligence (AI), it is only fitting to reflect on the profound insights gained and the vast landscape we have traversed together. The Handbook has gone over the definition, history, applications, challenges, and global regulatory frameworks that shape the realm of AI. As we conclude, let us take a moment to distill the essence of our exploration and cast our gaze toward the future.

At its core, AI represents the pinnacle of human innovation, a technological marvel that mimics and, in some cases, transcends human intelligence. Whether it be machine learning, natural language processing, or robotics, the overarching goal of AI is to augment human capabilities and solve complex problems.

The historical narrative of AI is a tale of resilience and breakthroughs. From the initial conceptualization of AI by visionaries like Alan Turing to the AI winter and subsequent resurgence, the journey of AI has been marked by a relentless pursuit of understanding and harnessing the power of intelligent machines. Each chapter in AI's history has contributed to the intricate tapestry of innovation we find ourselves immersed in today.

Yet, our exploration has not been without its challenges. Legal challenges, ethical dilemmas, biases in algorithms, job displacement, and autonomous vehicles are among the hurdles that demand our careful consideration. As we advance, it is imperative that we approach the development and deployment of AI with a keen awareness of these challenges, fostering responsible and ethical practices.

Turning our attention to the global stage, the varied regulatory landscapes governing AI encapsulate a spectrum of approaches. From the comprehensive frameworks of the European Union to the more flexible models in the United States, and the evolving policies in other regions of the world, our understanding of the regulatory framework underscores the need for a harmonized, yet adaptable, approach to AI governance.

As we stand at the precipice of an AI-infused future, it is essential to recognize the transformative potential that lies ahead. AI will continue to redefine industries, revolutionize healthcare, and reshape the way we live and work. However, this potential must be harnessed responsibly, with a commitment to transparency, accountability, and inclusivity.

To you, the reader, we extend our heartfelt gratitude for embarking on this journey with us. Your engagement and curiosity are catalysts for the dissemination of knowledge, fostering a collective understanding of AI's multifaceted landscape. May this Handbook serve as a beacon, illuminating the path forward as we collectively shape the future of AI.

In closing, let us carry forward the lessons gleaned from these pages as we navigate the ever-evolving landscape of AI. With responsibility as our compass, we embark on a future where AI enriches our lives, empowers humanity, and contributes to a world that is both innovative and just. The chapters of AI's story are far from over; they unfold with the promise of a future where our endeavors and advancements reflect the very best of our shared humanity.[104]

About us

At **PrivacyCompliance**, we believe what is good for society is good for business.

We were founded on the idea that people today want to buy from, work for, and invest in companies that demonstrate a positive impact on people and the planet. These societal shifts, spurred by new generations and amplified by modern technologies, redefine what good business looks like. We believe every company can thrive in this new era.

That's why we built **PrivacyCompliance**, the Vietnamese market-defining leader in privacy rights.

PrivacyCompliance stands out by our teams that seamlessly combine technology and legality to provide efficient, accurate, and cost-effective solutions that ensure smooth data flows and compliance with both local and international regulations. Our team comprises seasoned professionals, well-versed in cybersecurity, legal protocols, data protection, and risk management, who have undergone rigorous training across various regions such as Vietnam, the UK, the US, and the EU. Therefore, we possess unwavering assurance in our ability to cater to our customer's requirements and successfully resolve any concerns regarding privacy and data protection.

Contact

PrivacyCompliance., JSC

Email: info@privacycompliance.vn

Tel: +84 964 899 109

Website: privacycompliance.vn

Add: 9th floor, TH Tower, 3/98 Vu Trong Phung street, Thanh Xuan district, Hanoi

Authors

Mr. Nguyen
General Manager

Mr. Ngo Vi
Associate

Ms. Hoang
Consultant

Our services

Technology

Our suite of technological products provides comprehensive support for your organization's fundamental security and data privacy requirements.

Compliance

We offer a comprehensive range of services to ensure your organization's compliance with applicable laws in a timely and effective manner.

Risk Management

We provide evaluation and mitigation of data security threats, as well as assist you and your organization in earning reputable credentials.

Technology solutions

Data Privacy Management Platform

Our product suite assists your organization in all foundational aspects of security and privacy compliance. We systematically investigate your security posture and provide in-depth recommendations for improvement

Intelligent Data Discovery

Our Intelligent Data Discovery Framework allows your organization to assess and prioritize assets for protection, particularly data such as credit cards, bank account info, with close to zero false positives

Privacy-preserving Technologies

We help your organization with privacy-preserving data processing technologies and offer expertise in advanced cryptographic techniques to protect and preserve the security and privacy of your data

Privacy Compliance Virtual Assistant

Our advanced AI-based virtual assistant provides you with consultancy regarding the security and privacy aspects of your organization. It enables your organization to quickly comply with security & privacy standards and regulations

Compliance solutions

Privacy Review and Assessment

Conduct a review of the basis for the data processing to ensure the compliance of your data system with legal requirements

Policy Management

Upgrade and complement your privacy document arrangement with our drafting and review of Data Privacy Framework, Privacy Policy, Privacy Notice, Technical and Organizational Measures Application (TOMs)

Privacy Impact Assessments (PIAs)

Personal data protection impact assessment (DPIA) and oversea data transfer impact assessment (DTIA) are legal obligations that your organization must comply with, and we can help to facilitate your completion of such assessments

DPO Outsourcing Service

Our outsourced Data Protection Officer (DPO) helps you with managing personal data flow – a highly specialized task that requires a specialist with data protection expertise

Training and Awareness

Build your privacy-prioritized team with a profound understanding of data protection via courses designed by privacy & data governance experts

Risk management solutions

Enterprise Risk Management

Assess and manage the existing and potential risks to the confidentiality, integrity, and availability of your information assets to help you achieve an acceptable risk level among operations

Second-Party Audit

Second-party audit helps to assess and mitigate the information security risks posed by your suppliers and their compliance level – a confirmation of their suitability and compliance with your requirements set out in the contracts

Certification consultation

Provide you with the preparation, establishment, and continual improvement of your privacy information management system to meet the demands of the ISO standards for managing information security risks, which can generally boost your internal energy as well as external reputation

Certification training

The training courses on The Certified Information Systems Auditor (CISA), Certified Information Security Manager (CISM), and Certified in Cybersecurity (CC) would help you to prepare for the exams for these three credentials which are some of the most respected in the cybersecurity industry

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PrivacyCompliance., JSC

Email: info@privacycompliance.vn

Tel: +84 964 899 109

Website: privacycompliance.vn

Add: 9th floor, TH Tower, 3/98 Vu Trong Phung street, Thanh Xuan district, Hanoi
