AI: discovering the many faces of a faceless technology

A hands-on tool to help map AI, strengthen critical thinking and support anyone involved in negotiating the deployment of AI systems

Aída Ponce Del Castillo

Guide on artificial intelligence

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Aída Ponce Del Castillo, ETUI

1. Starting point: building capacity to negotiate AI

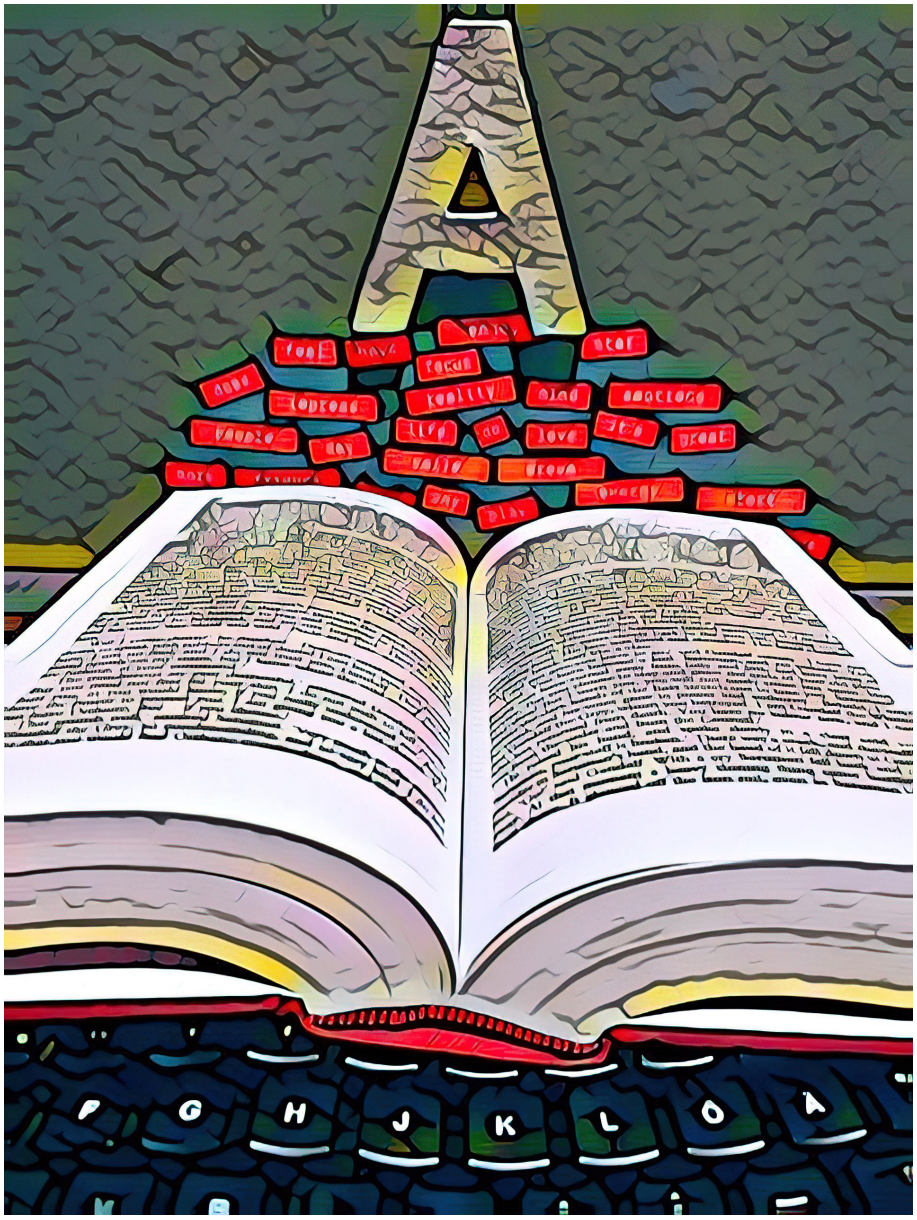
Artificial intelligence (AI) is at the core of the digital revolution we are currently undergoing. Conceived in research labs, it has now established itself in almost all sectors and has become an integral part of our economy and lives. Understanding artificial intelligence is a complex task, as it involves using concepts such as mind, intelligence, 'non-human intelligence', rationality, adaptivity and autonomy, and even the concept of what it means to be a human being. Today, every sector, company and even profession has its own understanding and definition of AI, a circumstance that creates confusion and renders the necessary discussion on AI difficult.

In autumn 2019, the ETUI held its first training course on AI. The course was attended by representatives of trade unions from across Europe, many of whom referred to this confusion and called for a clear definition of AI. The aim of this guide is twofold: first, it comes as a response to this need, enabling interested parties to engage in meaningful discussions on AI and its impact on workplaces and workers; and, second, it is designed as an accompaniment to the '**ETUI AI boardgame**', developed by the ETUI to help facilitate an understanding of AI concepts, improve problem-solving skills and encourage critical thinking about AI.

To address the domain knowledge of AI, this publication begins by looking at the origins of AI, offering a number of definitions formulated by the scientists who developed it. It then looks at how the EU institutions define AI in their policy approach. In addition, it clarifies the meaning of the many buzzwords surrounding AI, from 'conversational AI' to 'deep learning', in an effort to make future discussions on AI easier. It goes on to offer some specific examples of how AI is used in practice in many sectors of our economy.

The final part of the guide looks towards the future and the various challenges that AI systems pose to the work environment. It does this by presenting 'situations' used in the '**ETUI AI boardgame**'. Participants are asked to address these situations, taking on the roles of the various stakeholders involved (consumer, citizen, employee, employer, consumer, government authority, etc).

2. Defining AI: where it all began



Source: Teresa Berndtsson / Better Images of AI / Letter Word Text Taxonomy / CC-BY 4.0.

Definitions play an important role in helping us understand the object of knowledge. According to the Aristotelian tradition, a definition states the essence of a thing. By explaining what something is and what it is not, it can help avoid misunderstandings and provide clarity.

Over the years, artificial intelligence has been defined in many different ways. This section presents both a selection of 'scientific' definitions, provided by scientists credited with the founding of AI, and a number of 'regulatory' definitions, mostly provided by the EU Commission.

2.1 The scientific perspective of the 'founding fathers (and mothers)' of AI

Alan Turing (1912-1954), the Englishman noted for his major contributions to codebreaking during WWII, is considered to be one of the founding fathers of computer science and AI. Turing was interested in how computers could learn from experience and solve new problems by using 'guiding principles'.

Widely recognised as another of the fathers of AI, **John McCarthy** (1927-2011), Professor of Computer Science at Stanford University, was responsible for coining the term 'artificial intelligence' in the mid-1950s, defining AI as 'the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable' (McCarthy 2007).

Marvin Minsky (1927-2016), an American cognitive and computer scientist, was co-founder of the Computer Science and Artificial Intelligence Laboratory (CSAIL) at the Massachusetts Institute of Technology (MIT). He defined AI as 'the science of making machines do things that would require intelligence if done by men. It requires high-level mental processes such as perceptual learning, memory and critical thinking' (cited by Vilani 2018).

Margaret Boden (born 1936), Research Professor of Cognitive Science at the University of Sussex, offers a surprisingly simple definition of AI: 'Artificial intelligence seeks to make computers do the sorts of things that minds can do.' She adds that, 'by "artificial intelligence", I therefore mean the use of computer programs and programming techniques to cast light on the principles of intelligence in general and human thought in particular. In other words, I use the expression as a generic term to cover all machine research that is somehow relevant to human knowledge and psychology, irrespective of the declared motivation of the particular programmer concerned' (Boden 1987: 5).

Stuart Russell (Professor of Computer Science, University of California) and **Peter Norvig** (Director of Research at Google Inc.) define AI in the following way: 'We call ourselves Homo sapiens — man the wise — because our intelligence is so important to us. For thousands of years, we have tried to understand how we think; that is, how a mere handful of matter can perceive,

understand, predict and manipulate a world far larger and more complicated than itself. The field of artificial intelligence, or AI, goes further still: it attempts not just to understand but also to build intelligent entities' (Sabharwal and Selman 2011).

'We define AI as the study of agents that receive percepts from the environment and perform actions. Each such agent implements a function that maps percept sequences to actions, and we cover different ways to represent these functions' (Russell and Norvig 2009).

Another way of defining AI is in relation to its nature. 'Weak AI' is the simulation of intelligence, referring to machines that can be made to act as if they were intelligent, like chatbots, recommendation engines or autonomous cars. 'Strong AI' is understood as machines that simulate 'intellectual capabilities', such as understanding, sensing and feeling (Sloman 1986).

Most definitions establish a connection with the human brain and intellectual functioning, but there is no precise, commonly agreed scientific definition of AI. The field is constantly evolving, and it is likely that future definitions will emerge that will be based on a multi-disciplinary view of the field (Stone et al. 2016). We may see definitions describing not what computers can achieve but rather what they cannot or should not do. What is your opinion?

2.2 Regulatory definitions: the EU's approach to AI and General AI

How EU bodies define AI is central to the discussion, influencing policies and legislative options, risk assessments, negotiations between social partners and future court rulings. Definitions in the regulatory context are essential in order to promote a harmonised understanding and ensure legal certainty. The OECD defines an AI system as 'a machine-based system that is capable of influencing the environment by producing an output (predictions, recommendations or decisions) for a given set of objectives. It uses machine and/or human-based data and inputs to (i) perceive real and/or virtual environments; (ii) abstract these perceptions into models through analysis in an automated manner (e.g., with machine learning), or manually; and (iii) use model inference to formulate options for outcomes. AI systems are designed to operate with varying levels of autonomy' (OECD 2019).

Over the years, the European Commission has proposed several regulatory instruments that are relevant to AI and demonstrate an evolution in its definition.

In 2018, the European Commission defined AI systems as follows: 'Artificial intelligence (AI) refers to systems that display intelligent behaviour by *analysing their environment and taking actions* – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in

hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications)' (European Commission 2018).

The High-Level Expert Group on Artificial Intelligence set up by the EU Commission in 2018 then proposed a reworked version of the above definition: 'Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, *given a complex goal*, act in the physical or digital dimension by *perceiving their environment* through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data *and deciding* the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions. As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization) and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber-physical systems).'

In 2021, the EU Commission proposed a regulation laying down harmonised rules on artificial intelligence: the AI Act. Article 3 of that regulation states that: '"artificial intelligence system" (AI system) means 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'.

Annex I lists three types of AI techniques and approaches referred to in the definition provided in Article 3:

'(a) Machine learning approaches, including supervised, unsupervised and reinforcement learning, using a wide variety of methods including deep learning;
(b) Logic- and knowledge-based approaches, including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems;
(c) Statistical approaches, Bayesian estimation, search and optimization methods.'

The definition given in the AI Act generated much discussion, prompting the Slovenian Presidency of the Council of the European Union (July–December 2021) to propose a new definition (Council of the European Union 2021). The redrafted recital 6 states that 'the definition should be based on the key functional characteristics of the software of artificial intelligence distinguishing it from more classic software systems and programming'. It goes on to clarify that 'for the purposes of this Regulation AI systems should be intended as

having the ability, on the basis of machine and/or human-based data and inputs, to infer the way to achieve a given set of human-defined objectives through learning, reasoning or modelling and to generate specific outputs in the form of content for generative AI systems (such as text, video or images), as well as predictions, recommendations or decisions, which influence the environment with which the system interacts, be it in a physical or digital dimension'. It therefore appears that the compromise definition proposed by the Slovenian Presidency seeks to differentiate AI systems more clearly from traditional software. The fully redrafted Article 3 reads as follows:

'artificial intelligence system' (AI system) means a system that:
(i) receives machine and/or human-based data and inputs;
(ii) infers how to achieve a given set of human-defined objectives using learning, reasoning or modelling implemented with the techniques and approaches listed in Annex I; and
(iii) generates outputs in the form of content (generative AI systems), predictions, recommendations or decisions, which influence the environments it interacts with.

The definition of AI system should be complemented by a list of specific techniques and approaches used for its development, which should be kept up-to-date in the light of market and technological developments through the adoption of delegated acts by the Commission to amend that list.

After multiple revisions, the Czech Presidency (July-December 2022) reached a common position on the AI Act in its final text on 5 November 2022. The 'general approach' puts forward a narrower definition of AI systems and adds a definition of general-purpose AI (Council of the European Union 2022b).

"Article 3 Definitions

For the purpose of this Regulation, the following definitions apply:

(1) 'artificial intelligence system' (AI system) means a system that is designed to operate with elements of autonomy and that, based on machine and/or human-provided data and inputs, infers how to achieve a given set of objectives using machine learning and/or logic- and knowledge based approaches, and produces system-generated outputs such as content (generative AI systems), predictions, recommendations or decisions, influencing the environments with which the AI system interacts;

(1a) 'life cycle of an AI system' means the duration of an AI system, from design through retirement. Without prejudice to the powers of the market surveillance authorities, such retirement may happen at any point in time during the post-market monitoring phase upon the decision of the provider and implies that the system may not be used further. An AI system lifecycle is also ended by a substantial modification to the AI system made by the provider or any other natural or legal person, in which case the substantially modified AI system shall be considered as a new AI system.

(1b) 'general purpose AI system' means an AI system that - irrespective of how it is placed on the market or put into service, including as open-source software - is intended by the provider to perform generally applicable functions such as image and speech recognition, audio and video generation, pattern detection, question answering, translation and others; a general-purpose AI system may be used in a plurality of contexts and be integrated in a plurality of other AI systems."

A new title in the AI Act, 'General-Purpose AI' (GPAI), focuses on AI systems that can be used for various purposes. They can be built into other systems to perform tasks in many different contexts. Although a highly debated term, the key aspect that differentiates GPAI from the other AI systems is that it is developed not for a specific purpose but applicable to a broad range of tasks. Some interpret this 'strong AI' as aimed at generating *human-like general-purpose* intelligence (Wang 2019). The new provisions further specify "that certain requirements for high-risk AI systems would also apply to general purpose AI systems in such cases" (Council of the European Union 2022a).

Title A1 general purpose AI systems

Article 4a
Compliance of general-purpose AI systems with this Regulation

2. Without prejudice to Articles 5, 52, 53 and 69 of this Regulation, general purpose AI systems shall only comply with the requirements and obligations set out in Article 4b.
3. Such requirements and obligations shall apply irrespective of whether the general-purpose AI system is placed on the market or put into service as a pre-trained model and whether further fine-tuning of the model is to be performed by the user of the general-purpose AI system.

The final text of the AI Act will be adopted once the Council and the European Parliament conclude their institutional negotiations or trilogue.

The decision to work on and agree on definitions of 'AI systems' and 'General Purpose AI' was useful and timely. However, definitions are not just theoretical concepts, but have practical implications and consequences in real life. In this case, the definitions fall short of what they should be. They do not establish clear limits for the use of AI systems. They do not help employers and those deploying AI systems to understand the risks associated with such systems. Moreover, the definitions are technology-focused. They thus fail to integrate the human dimension: concepts such as human intelligence, knowledge, psychology, language, reasoning or behaviour are largely absent. Beyond the definitions themselves, what matters is who is involved in defining such key concepts: social players, including trade unions, should remain vigilant and pay close attention to who is involved and stands to benefit in which way.

3. Mapping AI in the world of work

Source: Yasmin Dwiputri & Data Hazards Project / Better Images of AI / AI across industries / CC-BY 4.0.

3.1 Breaking down AI buzzwords: the terminology surrounding AI

To help make more sense of artificial intelligence, this publication looks at some of the key buzzwords that are frequently used in discussions about AI. While not all referring to 'technologies' per se, the terms below are likely to crop up in articles, documents or websites on AI. They can also refer to components of AI or be embedded in AI systems. If you have come across expressions such as 'machine learning', 'neural networks' or 'conversational AI' and wondered what they meant, the list below should help by offering a short and simple definition of the key terms used.

Affective computing	Is the study and development of systems that sense, recognise and interpret human affects and respond by performing specific, predefined tasks.
Algorithm	A set of instructions or steps that are followed to complete a specific task. There are different types, some are designed to solve very difficult problems, others have many steps.
Artificial general intelligence (AGI)	Is a type of artificial intelligence which, unlike narrow AI, can perform different kinds of tasks well, in a similar way to humans. In narrow AI (also called weak AI), the technology performs a very narrowly defined task, focusing on a limited set of cognitive abilities. This is the only type of AI that exists to date, but it can still be extremely powerful, e.g. weather forecasting, sales predictions, speech/image recognition or automated translation. Autonomous driving is also a type of narrow AI, or rather a combination of AI systems programmed to perform a single function.
Augmented intelligence (or intelligence augmentation)	Is a subset of AI aimed at complementing and extending human cognitive abilities and intelligence by pairing humans and machines.
Autonomous vehicles (or self-driving vehicles)	Are vehicles that can sense the environment and self-drive without human involvement. Six levels of driving automation have been identified, ranging from Level 0 (no automation) to Level 5 (full automation).
Chatbot	Is a computer program that simulates conversations with human beings and interacts with them through a chat interface.
Cognitive computing	Refers to the development of computer systems that combine machine learning, reasoning, speech and vision, and simulate human thought processes by using self-learning algorithms. These systems 'learn' by being exposed to and processing an increasing amount of data over time, in order to provide the human user with possible solutions to a given problem. https://www.predictiveanalyticstoday.com/what-is-cognitive-computing
Commercial UAVs (drones)	UAVs are unmanned aerial vehicles, able to fly remotely (controlled by a tablet or a controller) or autonomously. A UAS is an unmanned aircraft system. Such a system encompasses the UAV, the person on the ground controlling it and the system connecting the two.
Computer vision	Enables computers to see and process images in the same way humans do, and to produce a result based on image classification or object detection. This is primarily used to give vehicles the ability to detect objects or obstacles on the road and to take action, such as alerting the driver or stopping the vehicle.
Compute	The 3rd element of AI, together with algorithms and data. It includes the hardware and the power of the computing infrastructure.
Conversational user interfaces	Allow a user to tell a computer what to do, as opposed to the traditional graphical interface, which involves clicking buttons or navigating by using menus and entering text.

Deep learning and deep neural networks (DNNs)

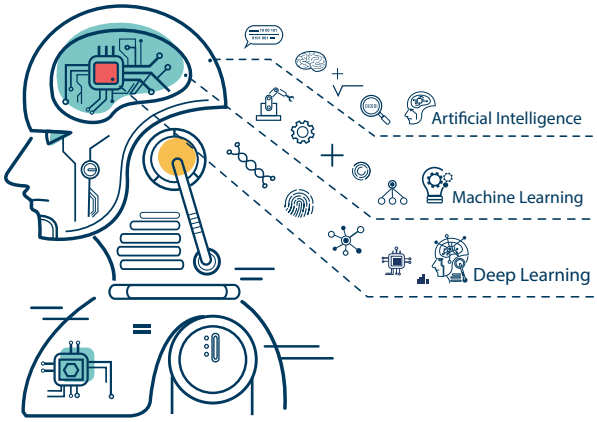
Widely considered as the most promising field of AI application, deep learning is a subset of machine-learning that teaches computers to learn by example. This essentially involves feeding a computer enormous amounts of data which it then uses to make decisions about other data.

As a practical example, imagine a computer system tasked to identify specific types of migratory birds passing through a country at a given time of year. A database would be connected to the system, containing data on all species of birds, in all their different colours, shapes and sizes, including variations (young birds, adult birds, males and females), the sounds they make, the shape of their wings in flight, their feeding patterns, and so on. Using its data capture tools (cameras, sensors, microphone, etc.), the system would compare the collected data with the data contained in the database it has assimilated or 'learned' from, identifying birds as they cross a given territory, just like a human ornithologist would.

This process is essentially machine learning. Deep learning uses 'neural networks', computer systems that mimic human thinking and simulate the way neurons work in a human brain. In our example, the system can improve its ability to recognise birds over time and learn from its mistakes, using the new data it collects to train itself.

The adjective 'deep' refers here to the number of hidden layers between the input and output layers. The input layer sees the reality, and each of its neurons reacts to a specific signal. One neuron will trigger itself when the bird is black. Another neuron will trigger itself when the bird is smaller than 20 cm. Thousands of such neurons can make up the input layer. The output layer is what the computer does after assimilating and analysing the data, for instance deciding that this particular bird is a swallow.

The 'thinking' happens in the layers between the input and output layer. These layers contain millions of neurons that use the triggering of an input neuron to trigger the appropriate neurons in the output layer. Training the model requires the use of an image for which the desired output is already known. During training, each connection between one neuron and another is weakened or strengthened, depending on the closeness of the output to the expected output. If they are close and the system 'sees' a type of swallow, the connections are changed only minimally. If the system fails to see a swallow and sees an seagull, the connections between neurons are changed more radically. By repeating this process millions of times, the model learns to become more accurate and, eventually, to perform without human supervision.



Source: Adobe Stock, Buffaloboy.

Data mining	A field of data science that uses techniques to analyse large a complex datasets to discover useful information, patterns and trends
Digital ethics	Studies the ways technology shapes our political, social and moral existence and its impact on societies and the environment in which we live.
Edge AI	Refers to systems that run AI locally on 'edge devices' or in local IoT devices, such as servers close to the source of the data. There is no dependency on the cloud or on Internet availability.
Explainable AI (XAI)	Is about ensuring the transparency of AI systems, how they work and operate, so that humans can understand how an AI system reached a particular decision.
Generative AI	A type of AI trained on large amounts of data sets and which uses Large Language Models (LLM) to generate text, image, music or other outputs, in response to a question or prompt. ChatGPT is a tool driven by Generative AI (GPT means Generative Pretrained Transformer).
Graph or network analytics	Is a form of data analysis based on building a graphical expression of the complex relationships between data points or nodes.

Source: Grandjean M. (2014) La connaissance est un réseau, Les cahiers du numérique, 10 (3): 37-54. DOI:10.3166/LCN.10.3.37-54

Gesture control devices	Are computer systems controlled via the recognition of body movements rather than any direct physical contact.
GPU accelerated computing	Involves using a GPU (graphics processing unit) together with a CPU (computer processing unit) to accelerate processing-intensive tasks and applications. This allows superior and faster performance for software applications (techopedia.com).

Human augmentation	Is a field of research that uses medicine (chemicals), technology (orthotics, implants) and AI (access to visual or other information) to improve the human body and its sensing, action or cognitive abilities.
Insight engines	Are search engines with an embedded layer of artificial intelligence. The engine can not only find information but also make it available to the user in the right context.
Internet of Things	A network of interconnected things, objects or physical devices that communicate with each other and collect, store and transmit data over the Internet without the help of humans.
Intelligent virtual assistants (IVAs)	Are computer programs designed to assist humans by performing tasks and interfacing with them in an organic manner.
Machine learning (ML)	Is a field of computer science and a segment of AI that seeks to teach computers to handle and adapt to new situations, through self-training, observation and experience, without having been explicitly programmed. Practically speaking, it is based on two components: a massive volume of training data fed to a machine and a 'feedback loop' that informs decisions and allows the machine to learn and determine whether the decisions it is taking are correct. Useful link: https://deepai.org/machine-learning-glossary-and-terms/machine-learning
Metaverse environments	An embodied internet where individuals have immersive experiences beyond two-dimensional screens. It includes virtual and augmented reality technology, artificial intelligence and the use of blockchain-based assets in digital payments.
Natural language processing (NLP)	Is how computers can understand and interpret human language. It includes NLU (natural language understanding, or the ability of a machine to comprehend) and NLG (natural language generation, the ability of a machine to translate data into words).
Non-Fungible Tokens	Non-fungible tokens (NFT) are unique, indivisible and irreplaceable pieces of digital content (containing information), recorded and verified in smart contracts or blockchains to certify authenticity and ownership. (Cointelegraph). They can be used to represent both tangible and intangible items (Kramer et al. 2022). They are a solution for transferring ownership and property into digital form and can be bought or sold online.
Personal analytics	Is the application of analytics to individuals, in order to understand how they operate and detect meaningful decision patterns. Predictive analysis applied to humans is possible because of tools such as social media, big data and cloud computing. These are used to collect, store and analyse individuals' data harvested from different sources.
Regulatory sandbox	Concrete frameworks which, by providing a structured context for experimentation, enable where appropriate in a real-world environment the testing of innovative technologies, products, services or approaches – at the moment especially in the context of digitalisation – for a limited time and in a limited part of a sector or area under regulatory supervision ensuring that appropriate safeguards are in place (Council of the European Union 2020).
Reinforcement learning	Is a type of machine learning which trains algorithms by giving them a reward when they perform correctly and a penalty when they do not.

Robotic process automation (RPA)	Allows company employees to define instructions that a robot will then execute. The tasks are usually simple and repetitive and relate to transaction processing or data manipulation. RPA speeds up these processes, increases productivity and prevents people from having to perform boring and repetitive tasks.
Smart robotics	Robotics and artificial intelligence are two very different things. Robotics deals with physical robots, understood as programmed machines that can perform actions autonomously or semi-autonomously and interact with their environment through sensors. Robots are usually not 'intelligent' and can be programmed, for example, to take an object and move it to another position. The robot will perform that task, and only that task, until it is told to stop. Some robots, however, are artificially intelligent robots, i.e. they are controlled by AI programs and are thus able to go beyond their limited ability to carry out repetitive movements. Such robots may use a navigating algorithm to move around a factory or find a way to return to base when they run out of fuel.
Smart dust	'Smart dust' devices are tiny wireless microelectromechanical sensors (MEMS). As small as a grain of sand, they contain nanoscale (defined as 1 to 100 nm) sensors, circuits, wireless technology and a power supply, and have the ability to sense and detect light, noise and vibrations. They can be used to collect data to feed AI systems.
Speech recognition	Is the ability of an electronic machine to understand spoken words. Most embedded systems use a vocabulary of 10,000 words, as opposed to the 30,000 words used by an English speaker (without counting the added complexity of regional or local accents and dialects). Increased computer power and distributed computing are increasingly used to bridge that gap and ensure greater accuracy.
Synthetic data	Is artificial data or data generated by an AI algorithm instead of collected or measured in the real world.

Question: any other buzzwords used in your sector that we should define?

3.2 Practical uses of AI in various sectors of the economy – the visible expressions of an invisible technology

One of the features of AI is that it is an immaterial and invisible technology. It is normally embedded in systems, some of which combine multiple layers of technologies, data, computing power and infrastructure. Such a system is used in mobile apps, which require a mobile device and microprocessors, GPS, a camera, virtual assistants or facial recognition powered by AI, as well as an Internet connection, a mobile application and a user to interact with it.

Below are examples of applications or systems that operate with AI in different sectors. Some were identified during conversations held with trade union federations between 2019 and 2022, while others were featured in reports and on company websites (Klenert et al. 2020; McKinsey 2007). After each sector,

a list of resources is provided where more information can be obtained. These examples can be used when playing the '**ETUI AI Boardgame**'.

This list can be used for "Technology Horizon Scanning", a useful tool for trade unions to uncover trends, analyse which ones could shape the future of organisations and sectors, and derive possible implications and required actions in terms of further research or negotiations at company or sectoral level. We encourage you to add examples to this list, based on your knowledge of your industry, and to share the results with trade union officials working in your sector, but also in other sectors. Innovation is at the heart of AI, and a new application may be developed in one industry today that will have a huge impact in another industry tomorrow.

Agriculture and farming

- Drones
- Agriculture robots or 'agribots' for crop and soil monitoring, seeding, planting, thinning
- Weed control ('See & Spray' robot by Blue River Technology)
- Automatic harvesting (autonomous strawberry picking machine by Belgian R&D company Octinion)
- Sensor systems alerting farmers to potential crop infection
- Machine learning algorithms to study evaporation, soil moisture and temperature
- Livestock weight predicting systems
- Livestock health monitoring

(For more information, please refer to the following resources: www.bosch.com, www.bluerivertechnology.com, www.fanuc.eu and www.octinion.com.)

Transport and automotive sectors

Transport sector

- Autonomous vehicles and trucks (Einride)
- Navigation systems, including Google's AI-powered traffic prediction apps (Google Maps, Waze)
- Driving analysis and real-time alerts to warn of dangers (CarVi)
- Scoring systems to rate drivers' skills (CarVi)
- Ridesharing apps like Uber and Lyft
- AI autopilot systems on commercial flights (Boeing)
- Facial recognition technology scanning drivers' or operators' faces for fatigue or impairment (Caterpillar, Subaru's 'DriverFocus')
- Drone delivery (Zipline)

Automotive sector

- Digital testbeds based on virtual replicas of the real world (AAI)
- Manufacturing co-bots
- Wearable industrial robots or exoskeletons for assembly line workers: Hyundai's chairless and vest exoskeletons (H-CEX and H-VEX), GM's force-multiplying glove (RoboGlove), Ford's upper body EksoVest

- Supervisory control systems
- Predictive maintenance in factories
- Predictive machine failure through machine learning (DataRPM)
- Autopilot system (Tesla)

(For more information, please refer to the following resources: getcarvi.com, www.progress.com/datarpm, www.boeing.com, uber.com, google.com, automotive-ai.com, hyundai.news, eksobionics.com, caterpillar.com and tesla.com.)

Banking and financial services

- Digital personal assistants and chatbots
- Data analytics
- Automated investment banking (Goldman Sachs US cash equities desk down to two traders from 600)
- AI-powered biometrics (NatWest Bank) allowing customers to open accounts remotely with a selfie
- Identity verification system (Socure), using predictive data science on online, offline and social data (e-mail addresses, phone numbers, IP addresses, etc)
- Algorithms that assess borrowers with little or no credit history (ZestFinance's 'Automated Machine Learning' platform)
- Robo-advisory platforms that help customers with recommendations
- Algorithmic high-frequency trading
- Contract Intelligence (COiN) chatbots (JPMorgan), able to analyse legal documents and extract key information
- Natural language processing (Alphasense) used to analyse keyword searches within news reports to discover trends in financial markets
- Mobile cheque deposits (MitekSystems), via the use of AI and machine learning to decipher and convert handwriting on cheques into text via OCR
- Full-service digital banking
- Anti-money laundering, using intelligent segmentation, an advanced alert system and advanced transaction monitoring

(For more information, please refer to the following resources: www.gbm.hsbc.com, www.jpmorgan.com, www.db.com, www.groupbnp.com, www.santander.com, ayasdi.com, socure.com, jpmorganchase.com, zestfinance.com, alpha-sense.com and miteksystems.com.)

Construction

AI is used in construction for the purpose of planning and design, safety, autonomous equipment, monitoring and maintenance.

- 3D Building Information Modelling (BIM) systems to plan, design, construct and manage buildings
- Use of connected data and machine learning to predict and prioritise high-risk issues or project subcontractor risk (Autodesk)
- Autonomous machinery (excavators, truck loaders, etc)
- Intelligent systems for mapping asphalt compaction ('Compact Assist' by Volvo Construction Equipment)
- Industrial photo and video management platform (Smartvid.io) that identifies risks and suggests safety measures

- AI-enhanced safety systems mapping in 3D an entire construction site with real-time tracking of interactions between people, machinery and objects (Komatsu and Nvidia)
- AI-enhanced software to improve construction productivity (Doxel), using robots and drones equipped with cameras and LiDAR sensors to monitor and scan building sites
- AI platforms detecting construction errors by comparing visual data from everyday site scans with small-scale design models
- Automated removal of asbestos
- Forecasting of raw material price evolution and automatic purchasing

(For more information, please refer to the following resources: buildingsp.com, www.doxel.ai, www.builtrobotics.com, www.rolandberger.com, www.robotnik.eu, smartvid.io, komatsu.eu and nvidia.com.)

Education

- Adaptive learning
- Automated exam grading tools
- Machine-learning based hyper-personalisation
- Machine learning tools to personalise learning and identify at-risk students
- Plagiarism checkers
- Essay-grading AI tools, using one human reader and one robo-reader ('e-Rater')

EdTech

EdTech, or education technology, is the deployment of technology in a classroom to create more engaging, inclusive and individualized learning experiences (Frankenfield 2022).

- Emotion and attention detection is a visual analytics system used to analyse classroom videos to detect students' emotions and engagement. It combines emotion recognition algorithms with visualizations
- Software using cognitive science and AI technologies to personalise tutoring and give real-time feedback for post-secondary education students ('Mika' by Carnegie Learning)
- Intelligent tutoring systems (chatbots)
- Virtual teachers, with smart virtual environments (Will, an artificially intelligent digital avatar developed by Vector and Soul Machines, in New Zealand)
- 3D gaming and computer animation
- Metaverse environments for education
- Virtual classrooms
- Robotic systems for students with disabilities

(For more information, please refer to the following resources: carnegielearning.com, microsoft.com/en-us/cortana, gradecam.com, eliasrobot.com, claned.com, century.tech and ets.org. https://www.theglobeandmail.com/world/article-in-china-classroom-cameras-scan-student-faces-for-emotion-stoking/; https://www.soulmachines.com/2018/08/meet-will-vectors-new-renewable-energy-educator-in-schools/)

E-commerce and retail

- Real-time pricing and incentives platforms
- Stock and inventory management and optimisation
- Machine learning incentive tool (Granify) for online retailers to identify shoppers who are just window shopping and encourage them to buy before they leave
- AI-based mailbots/chatbots and customer service operations
- Predictive analytics platform (Reflektion) that shows online customers what they want to see (in the hope that they buy it)
- Data analysis for targeted advertising campaigns
- In-store visual monitoring
- Robots with AI and machine vision that monitor shops and identify stocking issues
- AI-powered conversational commerce platform (Addstructure)
- Review of purchasing patterns
- AI-powered sales assistants
- AI-automated warehouse operations and delivery process (JD)

(For more information, please refer to the following resources: www.amazon.com, www.dpd.com, www.syte.ai, www.ibm.com/watson, www.blueyonder.agency, jd.com, granify.com, reflektion.com and addstructure.com.)

Healthcare

- Use of AI to diagnose efficiently and reduce errors
- AI-based symptom and cure checkers that use algorithms to diagnose and treat illness (Buoy Health)
- Robotic systems to assist doctors and surgeons
- AI-powered radiology assistants (Zebra Medical Vision) that help radiologists by analysing scans
- Machine vision and machine learning for disease diagnosis and predictive patient outcomes
- Exoskeletons for healthcare staff
- Software to standardise workflows of nurses and other staff
- Virtual medical assistants for processing data on patient interactions
- Deep learning algorithms to simplify and enhance the accuracy of certain medical procedures
- Remote consultation services
- Development of new medicines and ‘drug re-innovation’ programs, using AI to find new applications for existing drugs (BioXcel Therapeutics)
- Automating healthcare’s most repetitive tasks, freeing up administrators to work on higher-level ones
- The Cleveland Clinic teamed up with IBM to infuse its IT capabilities with artificial intelligence
- Personalised healthcare plans (IBM and Cleveland Clinic)

(For more information, please refer to the following resources: siemens-healthineers.com, health.google, ibm.com/watson-health, babylonhealth.com, arterys.com/cardio-ai, europe.medtronic.com, stryker.com and robovision.be.)

Journalism

- Machine-learning tools to gather, produce and distribute news
- Content selection and distribution (AP)
- Social media power alerts to analyse social media feeds with natural-language processing (SAM by AP)
- Cross-referencing data, news aggregation and content extraction (The Juicer)
- Automatic analysis of media streams across many languages (SUMMA)
- Image recognition technology
- Automating context-building into a story or generating a story from raw data
- AI story-writing tool (Bertie)
- Algorithms to build interactive data visualisation (Reuters)
- Predictive analytics of stories
- Chatbot media interfaces (The Guardian)
- Use of AI to moderate reader comments, encourage constructive discussion and eliminate harassment and abuse (New York Times)

(For more information, please refer to the following resources: ap.org/discover/artificial-intelligence, bbcnewslabs.co.uk, summa-project.eu, bertie.forbes.com and newswhip.com.)

Logistics

- Automated warehousing (Amazon)
- Robotic 'hive-grid-machine' (UK grocery company Ocado) to fulfil orders
- Autonomous ships with remote control (Rolls Royce and Intel)
- Last-mile delivery
- Historical reporting on operational performance and the ability to detect trends and target inefficiencies in logistics
- AI-enabled freight platforms connecting carriers and shippers on a single platform
- Smart roads sending information to data centres and connecting road surfaces with vehicles
- 'Smart pavement slabs' connecting to truckers' cell phones for instant traffic news and hazard warnings

(For more information, please refer to the following resources: ocado.queue-it.net, dhl.com, rolls-royce.com, integratedroadways.com, transmetrics.eu, etrucknow.com and home.kuehne-nagel.com.)

Manufacturing

- Quality checks for complex products, using machine vision based on high-resolution cameras (landing.ai)
- Product design and planning
- 'Generative design' (Airbus and Autodesk), where a program generates a number of outputs to meet specified criteria, allowing for the creation of thousands of design options and reducing testing times
- Integration of sites and communication streamlining through cloud-based machine learning (Azure's Cognitive Services)
- Post-production support (KONE) to monitor how its lifts are used

- Machine learning for predictive maintenance
- Co-bots
- Digital twins, or virtual representation of a product and its attributes (NASA).

(For more information, please refer to the following resources: landing.ai, nasa.gov, kone.fi and airbus.com.)

Metaverses

Amazon
Apple
Decentraland
Google
Nvidia Omniverse Platform
Horizon World by Meta
Microsoft
Sandbox metaverse combining blockchain, DeFi, and NFT technology in its 3D world.

(For more information: https://www.oculus.com/horizon-worlds/; https://blogs.microsoft.com/blog/2022/10/11/microsoft-and-meta-partner-to-deliver-immersive-experiences-for-the-future-of-work-and-play/; https://www.reuters.com/technology/whos-building-metaverse-2021-11-01/)

Recruitment and human resources

- Automated talent rankings and reports for recruiters
- Digital customised interviews
- Candidate suggestion and matching
- 'Talent pools' optimised for successful hire (LinkedIn Recruiter)
- Automated timesheets
- CV-screening machine-learning tools
- Video and game-based assessments of candidates' skills and potential

(For more information, please refer to the following resources: seedlinktech.com, business.linkedin.com/talent-solutions, hirevue.com and www.allyo.com.)

4. Encouraging forward-looking critical thinking about AI

Source: Anton Grabolle / Better Images of AI / Human-AI collaboration / CC-BY 4.0.

The purpose behind this guide is twofold: to help trade union activists understand what is AI by providing practical and accurate information (definitions, concepts, buzzwords, examples of AI applications), but also to encourage them to think about some key questions: In what way will AI change the world of work? What are the potential risks in the workplace and how can they be assessed? How can AI be leveraged to help protect workers? How can workers get better access to an invisible and relatively inaccessible technology? What are the avenues for social dialogue?

4.1 Playing the scenario-based AI boardgame with scenarios

This guide accompanies the '**ETUI AI boardgame**', a game developed using foresight principles. It uses horizon-scanning, long-term thinking, roleplay and scenarios to identify concerns for the different players and come up with plausible solutions. The aim of the game is to acquire as many AI technologies as possible, while solving the many challenges encountered.

Players are assigned different roles (see below) in the form of figures. They throw a dice to move their figures across the board, buying or gaining AI technology on the way (a bit like Monopoly). They may land on a field marked 'AI issue' where they have to pick a card and briefly discuss the 'issue' on it. Another field is marked 'AI challenge'. Here again, players pick a 'Challenge' card in which a scenario is described (see below). They discuss the challenge, taking the standpoint or interest of the role that they are representing, and aiming to find a solution accommodating every role and taking account of all implications, e.g., legal, environmental, privacy, human rights, etc.

4.1.1 The roles

Each player is assigned a specific role in society. They act the role with plausible arguments and narratives. Which roles are involved depends on the context of the scenario, whether public, private, sectoral or other. Depending on the context, roles can vary. Here are some examples:

- AI system developer
- Entrepreneurs / start-ups/ EdTech companies
- Government
- Employer
- Workers
- Trade unions
- Parents
- Consumer associations
- NGOs for vulnerable groups
- Environmental NGO's
- Human right's activists
- Civil society organisations

One way to provide greater depth to the way the game is played is to change the roles of the players once the first challenge has been solved.

When one player lands on the 'Challenge' field, all players are asked to discuss a certain scenario and find a plausible and collective solution. To facilitate the discussion, we recommend following the structure below:

1. **Frame the issue:** Consider the possibilities or constraints associated with AI as a technology. What is the evidence?

2. **Identify critical issues:** What are the different issues at stake? Which factors influence the situation? What is the worst-case scenario behind the situation? What could happen if nothing is done?
3. **Identify the various stakeholders' views:** Identify the views (and values) of the various stakeholders involved. Identify whose voice is being heard, or not being heard, and who has a critical view of their own assumptions.
4. **Identify what social partners can do:** Are there collective agreements in place?
5. **Develop plausible solutions:** Develop potential and shared solutions. Think about the impact – both positive and negative – of the choices involved. What are the trade-offs?

Thinking about the different ways of handling the scenarios can bring about a 'wow effect', providing players with ideas that can be used in real life when negotiating the introduction of AI technologies at the workplace.

4.1.2 The scenarios

The scenarios help readers and players to develop their ability to think critically about the future, particularly in terms of AI.

Scenario 1. Sit&Store makes top quality, made-to-measure wooden furniture. Ranked as the most sustainable wood company last year, it is currently bidding for a major contract with complex requirements, a tight deadline and limited budget. The winner will be chosen not just on price but equally on worker well-being and sustainable manufacturing processes (both ecological and social). The company is planning to invest in AI technology to demonstrate its technological and organisational capability.

Question:
What type of AI system could be implemented while at the same time safeguarding the jobs and well-being of workers?

Scenario 2. The software industry has a large number of non-unionised workers, and, although a diverse crowd, many of them face similar challenges regarding their rights and social protections. One such challenge lies in striving to maintain or increase physical and mental health at work.

Questions:
What are the possibilities for collective action?
How could AI systems contribute to a solution enhancing workers' rights, whether directly or indirectly?
What are the possibilities for a trade union to start organising them?

Scenario 3. A survey conducted at a meeting of EU Youth Organisations in Brussels shows that many young people entering the labour market are no longer interested in joining a union. While feeling the need for representation, protection and activism, they want a more direct, faster, more flexible, less politicised or ideological solution. They are interested in developing a platform to facilitate their communication and activism.

Question:
What do they need to take into account in designing and developing the platform so that it respects their rights? What type of AI solutions can the platform use to provide an alternative model of protection, representation and activism?

Scenario 4. In an attempt to improve urban and sustainable mobility (public transport), the city of Argus has decided to install video cameras and sensors in public areas to measure the mobility of private vehicles, buses and trams, scooters and bikes, as well as pedestrians. This measure may also help reduce working time and increase the work-life balance for everyone working in transport systems.

Questions:
How can the city choose and implement an AI system with decision-making algorithms without falling into a 'Big Brother' or 'surveillance' trap?
With regard to the deployment of this new technology, what are the issues to be negotiated with trade unions representing public services and transport?

Scenario 5. A factory is committed to enhancing workers' health and well-being. All workers are set to receive a smartwatch as a bonus. Equipped with advanced bio-sensing technologies, the watch collects all the data the body produces (metabolic and nervous responses, heart rate, sleeping time, etc.), as well as the location of the workers within the factory. In combination with other technologies, this data can be used to send an instant warning when a worker has an elevated heart-rate or abnormal vital sign. It will be helpful especially when workers are working in unsecured areas.

Questions:
How can the factory deploy this new technology without trading data protection and privacy for personalised health?

Scenario 6. In the face of the global climate and energy crisis, EU heads of states have decided to implement the Green Deal 4.0. An AI system is to be developed to calculate the percentage by which energy consumption needs to be reduced in each country. Consumers are likely to be asked to reduce their consumption, while businesses may need to reduce manufacturing rates and will receive incentives for doing so. Blockchain will be used to redistribute energy differently.

Question:
How can AI solutions guarantee fair access to and distribution of quality energy for all?

Scenario 7. Due to the high level of automation in 'Brussels Valley', the city has decided to implement an AI system supporting worker creativity and well-being at work. This will give them more freedom in their ability to express themselves and interact, not only at work and with the automated systems but also as individuals in society.

Questions:
How can AI systems be used to enhance people's creativity for the benefit of society, without reducing their autonomy or exploiting their creativity merely for the benefit of any one organisation in the Valley?
How can 'Brussels Valley' ensure that people's interaction with the technology (robots, automated system, etc.) occurs in a meaningfully manner?

Scenario 8. With the rise of digitalisation and automation in the shipbuilding and shipbreaking industries, worker safety is paramount. The shipyard manager will be able to monitor all workers' smart PPE equipment. The system can send alerts when the smart PPE is faulty, no longer effective, or when it is used improperly or for the wrong purposes. Workers will receive a vibration notification and can be flagged by the manager. If they are in a hazardous situation, the system can even deny access to certain areas where appropriate.

Questions:
How can such a system be introduced without trading safety for privacy and data protection?
How can the Labour Inspectorate investigate an accident related to the use of this AI system?

Scenarios related to the education sector

Scenario 1 Adaptive learning technologies for learning processes

A public primary school uses an Intelligent Tutoring System for history classes. The system uses AI to direct children to resources or study materials specifically adapted to their learning needs. It works by collecting real-time data about children's performance to predict their knowledge levels. Based on this, it adapts the learning path and provides constant feedback to each child. In addition, the system provides real-time information on children's progress to the teacher dashboard, predicting how it will evolve.

Questions:
- How can the school use the adaptive learning technology to improve learning while empowering teachers and avoiding inequalities as well as negative mental health impacts?
- Is the learning path designed by the Intelligent Tutoring System consistent with the national curriculum and 'Quality Framework'? How reliable are the predictions?

Scenario 2 Marking essays using automated tools

'Technoland University' wants to introduce AI systems to support the assessment of written student assignments. An EdTech provider is offering an AI-based system to support various assessment aspects (using large natural language models) including:
- automatic checks of student assignments;
- identifying errors;
- assigning grades.

Over time, the system can train large artificial neural networks with historical cases that contain various types of student mistakes to provide even more accurate marking. The system can:
- detect plagiarism and copyright infringements in students' written work;
- generate sample essays.

Questions:
- How can the university introduce the system in a way reducing teachers' workload without replacing their assessment role?
- What resources do students have at their disposal to object to an assessment or ask for a review when the assessment is influenced by the AI system?

Scenario 3 Education management information system

A private secondary school uses an AI-based management system that supports educational activities. The system collects student data on enrolment to:
- predict and better organise student enrolment numbers in the coming year;
- assist with forward planning such as allocating teachers and students to classes with a view to improving gender parity and increasing student diversity;
- assist with budgeting.

The school is also considering using past grades to develop standardised targets to predict student success and student drop-outs.

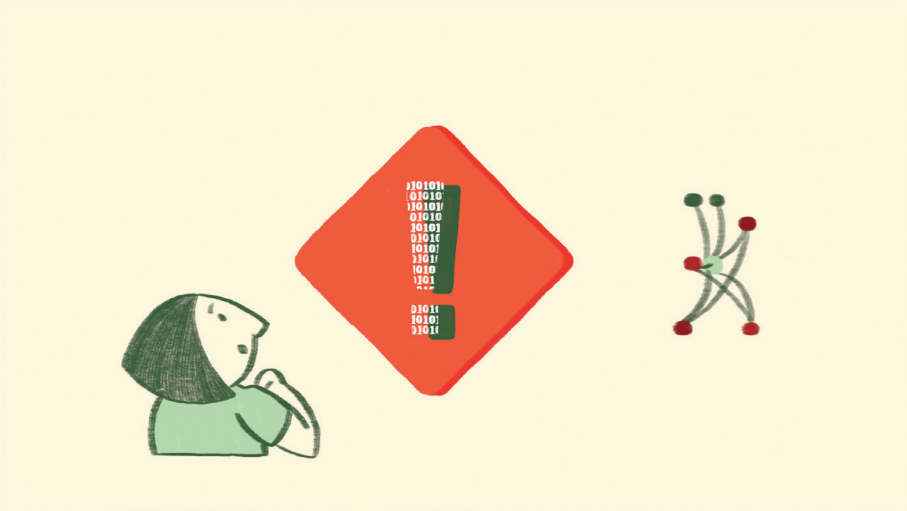
Questions:
- How can we ensure that the AI system benefits the school's organisational efficiency and students by enhancing diversity and equality, without focusing solely on profit for the school as a business?
- What needs to be done to ensure that the role of administrative staff is meaningfully covered in the AI system?

Scenario 4 Using facial recognition system for security and safety in education

Following several cases of violence and bullying in the school, a private education institution introduced cameras with AI-based facial recognition. Cameras are allowed under this specific jurisdiction. The software is able to detect aggressive behaviour and notify the school head. Data is stored in the school's private cloud and deleted after three years. Yesterday, the local tech newspaper reported that hackers had hacked into the school cloud system and were threatening to disclose the data, including the faces of teachers and students, if the school did not pay a ransom of 200,000 EURO.

Questions:
- How can this situation be solved to protect the rights of teachers and students?
- What are the legal safeguards available at national and European level?

5. Using collective bargaining



Source: Yasmin Dwiputri & Data Hazards Project / Better Images of AI / Managing Data Hazards / CC-BY 4.0.

The ETUI AI boardgame has four main objectives:

1. to familiarise players with key AI-related terminology;
2. to learn about the various sectors and AI applications already in use;
3. to address issues such as privacy, data protection, explainability, data accuracy, algorithmic decision-making systems, algorithmic management, surveillance, etc;
4. to serve as a tool to strengthen social dialogue, in particular by building the capacity and improving the understanding that workers – and possibly other stakeholders – have of a highly technical topic.

When emerging technologies become part of the daily life of workers, they should be a topic for social dialogue. Some interesting examples of collective agreements exist. At EU level, the Autonomous Social Partners Framework Agreement on Digitalisation was adopted in 2020. At sectoral and company level, the following initiatives stand out:

- France: Accord relatif à l'impact du numérique sur les conditions de travail et l'emploi dans les entreprises de l'économie sociale et solidaire. Signed in 2021;

- Finland: Collective agreements and conditions of employment in the insurance sector. Signed in 2022;
- Germany: IBM Group Works Agreement on the Introduction and Use of Artificial Intelligence Systems, negotiated by the Group Works Council of IBM Central Holding GmbH. Signed in 2020;
- Germany: H&M collective agreement on digitalisation covering all 14,300 German employees, negotiated by the ver.di union, the H&M Central Works Council and H&M Deutschland's management. Signed in 2022;
- Spain: Agreement between Takeaway Express Spain, the "Federación de Servicios, Movilidad y Consumo de UGT" and the "Federaciones de Servicios y de Servicios a la Ciudadanía de CCOO". Signed in 2021.

AI can be an opportunity for social dialogue and collective bargaining. With the accelerated deployment of AI permeating every industry and company both vertically and horizontally, and the *platformisation* of business models, it is imperative that social partners seize the opportunity to negotiate AI.

Subjects for negotiations on AI and other emerging technologies

Technological change opens up many uncertainties and, in many cases, *black box* situations. Some of the objectives of negotiating technology are to achieve legal implementation and change, plan for technological change, prevent high-risk situations and provide appropriate worker involvement. The following are possible bargaining topics related to emerging technologies and AI:

a. Innovation and technology:

- Preservation of worker autonomy.
- Identification of the type of technology to be implemented and how it will transform the organisation, including the transformation into a platform-like model.
- Identification of technologies not to be introduced or to be phased-out.
- Methods and approaches to deploy new technologies or technological change in a step-by-step manner.
- Framework for technology assessments for risk assessment, risk management and risk mitigation, including prevention policies related to the deployment of new technologies.
- Framework for addressing possible uncertainties.
- Description of the role of workers' representatives.
- Introduction of AI systems or other systems to manage workers, organise work, working conditions, etc.
- Framework of use of generative AI.
- Framework for reporting incidents.
- Updating agreements related to monitoring tools and the prevention of surveillance.

b. Further implementation of legal requirements set by the AI Act or national legislation:

- Implementation of the legal requirements set forth in the AI Act, Platform Work Directive, Digital Services Act.
- Measures further specifying the implementation of EU harmonised standards.
- Measures specifying the uses of regulatory sandboxes.
- The process for upgrading or modifying an implemented technology.
- Methods for using external independent algorithmic auditing services.
- Measures and mechanisms to protect fundamental human rights.

c. Data privacy and protection:

- Practical implementation of the General Data Protection Regulation or national legal obligations and rights in the context of employment.
- Measures to implement recommendations from European or national Data Protection Authorities.
- Provisions to develop data protection impact assessments when processing workers' personal data.
- Data infrastructure provisions helping to deploy data-driven technologies safely, including cyber-security measures and monitoring provisions.
- Verify that 'informed consent' is not used as a legal basis to process workers' personal data.

d. Education, training and skills:

- Development of knowledge and specific skills to use AI systems or other emerging technologies.
- Schemes to identify the skills needed to cope with technological change.
- Identification of skills that would be replaced.
- Programmes to match skill development with the deployment of new technologies.

e. New committees composed of workers and management:

- Committee on the guidance and oversight of the digital transformation
- Committee to address the anticipation of future changes.
- Committee to address possible impacts on fundamental rights.

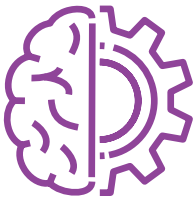
5.1 Building AI literacy

Gaining such abilities contributes to building '**AI literacy**', understood as the capacity to critically engage with AI. Acquiring technical skills and using them at work, although necessary, is not enough and mostly serves the interests of an employer. Becoming 'AI literate' means being able to understand the role of AI, its impact on one's work and occupation, and to anticipate how it will transform one's career and role. The passive use of AI systems does not benefit workers themselves. A certain distance needs to be established for them to see AI's overall influence. Trade unions need to develop this new skill, helping them to navigate volatile and fast-moving technological developments.

Moreover, there is scope here for a new role for workers' representatives to flag IT-related risks and interactions, to assess the uncertain impact of largely invisible technologies and to find new ways of effectively integrating tacit knowledge into workflows and processes.

In practical terms, 'AI literacy' can help in raising relevant questions related to the uncertainties and impacts related to both data protection and the deployment of new technologies, and in providing input to stakeholder consultations at EU or national level. Equally, AI literacy can serve as a tool to oversee implementation of collective agreements or in the proper use of new technologies and AI at company level.

Discussions on AI should not be left to academics, technology experts or IT developers. Trade unions and other social stakeholders need to be involved in order to develop a better understanding of science and technology in general and AI in particular, to influence the decisions made by those working in the field, and to become co-creators. This guide, together with ETUI training courses and the work of the ETUI Foresight Unit, is intended as a contribution to this effort. It also seeks to stimulate workers' foresight and critical thinking around AI and encourage them to become critical thinkers about the subject.



6. Concluding remarks

The panorama of artificial intelligence is ever-changing. New ideas are born every day, with investors pouring millions into their development. While not every idea will be turned into an actionable technology, there is no denying that some will and that our life, both at work and outside it, will be influenced by these technological developments. While the ETUI monitors the sector and continues to build up its AI capacities, this work can always be developed further. Please share with us any knowledge or information you may have about new AI tools, systems or applications that you come across in your sector. By disseminating this knowledge across the European trade union movement, the ETUI will be able to improve every worker's understanding of AI. Please feel free to share with us any other ideas or thoughts you may have about this important topic.

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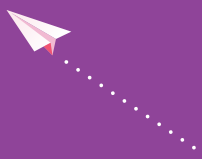

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