

Excellence and Trust in AI – Brochure

This brochure gives you a quick overview of the EU's main policy and investment activities in the area of Artificial intelligence.



What is AI?

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. Many AI approaches critically depend on the availability of data to achieve their results, or use learning methods to reach their peak performance or improve over time.

AI applications can be:

- Purely software-based
- AI embedded in hardware devices

Why is it important?

Enabled by computing power, availability of data and progress in algorithms, AI is progressively turning into one of the strategic technologies of the 21st century.

AI can contribute to a wide array of benefits across the entire spectrum of economic and social activities. It can help to solve complex problems and boost the green and digital transformation of businesses and societies.

The application of AI solutions was during the last years proven beneficial in sectors such as:

- healthcare e.g. enabling fast and effective diagnosis of COVID-19 or supporting surgeons to increase the safety of very precise operations
- agriculture e.g. helping farmers better monitor their crops or using robots for precision farming to drastically reduce use of pesticides
- education e.g. interaction with social robots for language learning
- energy e.g. cheaper and more sustainable production
- transport and logistics e.g. business process automation or safer and cleaner transport
- public services e.g. improving citizen-government interaction or waste recycling
- security e.g. anticipating cyber attacks
- occupational safety e.g. keeping workers away from dangerous, strenuous or dull tasks with the help of robots

However, some of the uses and applications of AI generate risks that may concern:

- consumers rights e.g. credit scoring
- safety e.g. self-driving cars
- human dignity e.g. social scoring
- democracy e.g. deep fakes
- human rights e.g. mass surveillance.

What is the EU doing on AI?

A successful development and uptake of AI technologies offers Europe the potential to accelerate its economic growth and global competitiveness. This can only be achieved if technology is developed and used in ways that earns people's trust. Therefore, an EU strategic framework based on fundamental values, will give citizens the confidence to accept AI-based solutions while encouraging businesses to develop them.

In its Strategy on Artificial Intelligence, the European Commission puts forward three strands that aim to:

1. boost public and private investments in AI
2. foster skills to make the most of AI and automation at work
3. ensure an appropriate ethical and legal framework

The three strands go hand in hand with a vision for a European ecosystem of excellence and trust, presented in January 2020 through the Commission's White Paper on AI (.pdf).

A vision on AI excellence and innovation, empowered by:

- a new public-private partnership in AI, Data and Robotics
- a vibrant and interconnected network of AI research excellence centres
- at least one digital innovation hub per Member State specialised in AI
- testing and experimentation facilities providing developers with the infrastructure to test AI technology before bringing it to the market
- a European AI-on-Demand Platform as a focal point for AI resources, including data repositories,

tools and algorithms and access to computing capacities

- the provision of more financing for development and use of AI, with the help of the European Investment Fund as well as the Recovery and Resilience Facility
- the use of AI to make public procurement processes more efficient

A vision on AI trust, enabled by:

- a new legislation that mitigates risks but does not limit innovation
- requirements that high-risk AI systems be transparent, traceable and under human control
- empowering authorities to check AI systems as they check cosmetics, cars or toys
- unbiased data sets
- the introduction of clear rules and limits on AI

Building on European values, strategic priorities and existing provisions, these options are complemented by:

- the sectorial product legislation (that already cover a large number of products where AI can be embedded)
- a Report on the safety and liability aspects of AI
- the European Data Strategy that aims at creating a single market for data

An ecosystem of excellence in AI

To build an ecosystem of excellence that can support the development and uptake of AI across the EU economy and public administration, there is a need to step up action at multiple levels.

Working with Member States – the Coordinated Plan on AI

December 2018, Member States joined forces with the European Commission in a Coordinated Plan on AI to maximize impact, encourage synergies and cooperation across EU. The Plan covers key AI action areas including:

- research, development and deployment
- investment
- AI uptake in industry
- skills and talent
- data
- international cooperation

The Plan also included a recommendation for the Member States to develop national AI strategies. A Review of the Coordinated Plan on AI will be presented in April 2021. It will give an update on the Plan's actions and introduce new joint ones.

AI for digital recovery and resilience

Digital technologies are also a means of recovery from the current COVID crisis. In the frame of its **Recovery and Resilience Facility** (RRF), the EU will make available €134 billion in loans and grants to foster the digital transition – including AI.

The RRF could be a game changer accelerating the development and uptake of trustworthy, secure and sustainable AI technologies in Europe.

In the context of AI, RRF funding can be used to reinforce investment into joint AI actions, identified in the Coordinated Plan on AI and support actions in Member States' national AI strategies. Such actions can include:

- the establishment of testing and experimentation facilities for AI applications
- the support of initiatives on AI and skills
- actions to accelerate the uptake of AI by industry
- projects to boost research excellence in AI

Investments in AI (2014-2019)

The Commission has long recognised and supported the potential of artificial intelligence and robotics in Europe. Starting from 2004, this support covered research and innovation in AI-related fields, evolving during the past decade to trigger a public-private partnership and initiate one of the world's biggest civilian research programmes in robotics.

- AI-Related Areas: €2.6 billion over the duration of Horizon 2020
- robotics: €700 million under Horizon 2020 + € 2.1 billion from private investment
- skills: € 27 billion in skills development + €2.3 billion especially in digital skills

The European Strategy on Artificial Intelligence has set a target to increase AI investment (public and private sectors combined) to at least EUR 20 billion per year, over the following decade.

Strengthening investment (2021-2027)

The EU will invest at least €7 billion in AI through the Horizon Europe and Digital Europe programmes, in order to:

- foster collaboration in tackling scientific and technological challenges
- boost development and deployment of AI
- make AI available to small and medium-sized businesses and public services across all Member States

These funds will enable research in areas such as safe and secure AI, explainable, unbiased AI, next generation AI (e.g. hybrid AI, unsupervised machine learning), data efficiency and advanced human-machine interactions.

The **Digital Europe Programme** complements Horizon Europe with €2.1 billion to:

- invest in and open up the use of AI by businesses and public administrations
- facilitate the access and the storage of large sets of data and algorithms
- strengthen and support existing AI testing and experimentation facilities in areas such as health and mobility in Member States and encourage their cooperation.

The testing and experimentation facilities will receive €110 million for four sectors – agri-food, healthcare, manufacturing and smart communities – and €85 million for the technology-specific focus on edge AI under the Digital Europe Programme. These testing and experimentation facilities will:

- provide developers with a technology infrastructure with specific expertise and experience for testing AI technology before bringing it to the market;
- be easy to use, work under real conditions, closely involve end-users and be used by developers

across the private and public sector, especially SMEs;

- offer infrastructural, technical and scientific support in testing AI systems for their robustness, reliability, non-discriminatory performance and safety of AI technologies, thereby helping the implementation of the upcoming EU legislation on high-risk AI and the fostering trustworthy AI in Europe;
- provide support and infrastructural environment for testing and experimentation for the AI regulatory sandboxing schemes established by national competent authorities

An additional €580 million will be invested in digital skills. Part of the €1.3 billion dedicated to digital technologies, will finance **Digital Innovation Hubs on AI** in:

- designing and delivering short-term training and courses for entrepreneurs, small business leaders and the workforce
- designing and delivering of long-term trainings and master courses for students, IT professionals and the workforce
- delivering on-the-job trainings and traineeships for students, young entrepreneurs and graduates
- building up and strengthening the network of European Digital Innovation Hubs (aiming to have one Hub in every region)

Working with public and private partners to ensure excellence in AI

The Commission is promoting a Public-Private Partnership in AI, Data and Robotics to take all investment to the next level. It will foster cross-pollination of research within these three communities as well as between industry and users. This will contribute to the overall resilience of the robotics ecosystem.

Two important initiatives launched under Horizon 2020 that support the building of the European AI community and make Europe a powerhouse for AI:

- AI on demand platform

The programme aims to create a European AI ecosystem, bringing together the knowledge, algorithms, tools and resources available and making it a compelling solution for users. The “AI4EU” platform is expected to become a single access point to all algorithms, tools, resources (including data and computing) to develop AI-based services, products and solutions, knowledge and tools available for all.

By the end of the year, the platform will have >10.000 registered users (developers, researchers, students and industry) and over 70 AI resources, made available by >140 partners with a funding amount of €50 million.

- Networks of European AI research excellence centers

A €50 million programme to structure collaboration between the AI research community and foster excellence, aims to make Europe “the place to be” for AI scientists. It also promotes cooperation between academia and industry, focusing on science and technology challenges.

The programme is expected to mobilise the best researchers and academia into networks. These networks should allow to create a critical mass on key AI topics and foster exchange between

projects, and relevant initiatives.

An ecosystem of trust in AI

In order to ensure an appropriate ethical and legal framework, based on the Union's values and in line with the Charter of Fundamental Rights, the European Commission established a High-Level Expert group on AI (AI HLEG). The AI HLEG defined "Trustworthy AI" as AI that respects all applicable laws, regulations, is ethical and robust, and complies with the following **seven key requirements for trustworthy AI**:

1. Human agency and oversight
2. Robustness and safety
3. Privacy and data governance
4. Transparency
5. Diversity, non-discrimination and fairness
6. Societal and environmental well-being
7. Accountability

Working with stakeholders in building Trustworthy AI

Assessment List for Trustworthy Artificial Intelligence (ALTAI) for self-assessment

In the AI HLEG's Ethics Guidelines for Trustworthy AI, the 7 Key Requirements are complemented by an "assessment list" to support their practical implementation. Following a consultation of 500 stakeholders and a piloting process with 350 developers and deployers of AI, the list has been translated into an online self-assessment prototype - ALTAI. This tool aims to support AI developers and deployers in developing Trustworthy AI.

The overall work of the AI HLEG has been central to the development of the Commission's approach to Artificial Intelligence. The concept of Trustworthiness and the seven key requirements are guiding the upcoming legislative steps in AI.

European AI Alliance

The forum was created as a channel for exchanging views with European and international stakeholders in the policy field of AI. It initially fed the work of the AI HLEG and evolved into the main portal of document exchange and communication of initiatives that shaped the current approach on European excellence and trust in AI. The main initiatives hosted by the AI Alliance are:

- Consultation on the draft Ethics Guidelines for Trustworthy AI
- Forum discussions with the AI HLEG on the impact of AI in specific socio-economic fields
- First European AI Alliance Assembly
- Piloting of the Assessment List for Trustworthy AI
- Public Consultation launched along with the White Paper on AI
- Second European AI Alliance Assembly

EU Member States and the International Community

Technologies, data and algorithms know no borders. The Commission aspires to bring AI ethics to the global stage strengthening cooperation with like-minded partners and playing an active role in international discussions and initiatives.

What is next?

Based on the consultations and member-state discussions following its White Paper on AI, in April 2021 the Commission is expected to present:

1. An updated version of the Coordinated Plan with the Member States
2. A proposal for a regulatory framework that will mitigate risks associated with certain uses of AI and create a sound and future-proof legal framework for trustworthy AI

Related topics

Artificial intelligence

Investing in network and technologies

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