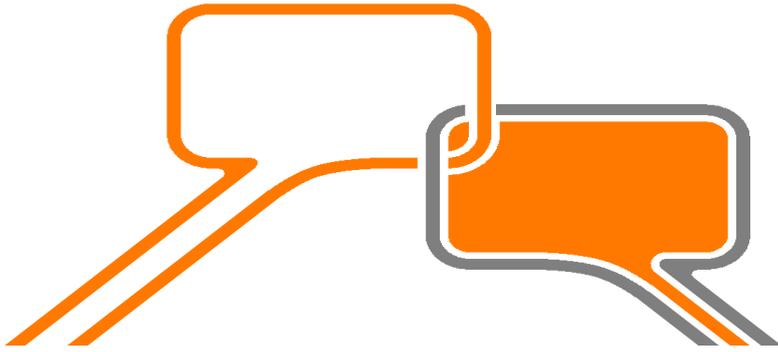# Committed to Europe

Cultivating competitive and responsible Artificial Intelligence in Europe

Summary

In 2016, a computer program powered by artificial intelligence (AI) played a match against, and defeated, the reigning world champion of board game Go. This historic victory sparked discussions about the power of AI, which continue to this day. Some argue AI is already everywhere and embrace the concept completely. . Others worry about the threat AI presents to humanity as we know it. Both positions are extreme. It is true that AI's capabilities are evolving, with techniques such as machine "self-learning" on the rise. But for the moment this remains limited in scope and scale; most machines are still incapable of complex tasks. Humans are unlikely to be replaced anytime soon.

AI is a buzzword. But what lies behind the term? To demystify the concept, this paper will examine what AI actually is, what it can and cannot do, and its potential impact on European societies and economies.

This latter point is particularly important, given the opportunities AI presents for European growth and global competitiveness. Europe must act now to stay abreast of such an important technological revolution. AI can bring benefits to all sectors of society, from industry and transport to health, from education to entertainment. But to achieve these benefits, we must establish what is needed for successful development and deployment of AI across the EU, including ways to tackle weaknesses and challenges. For maximum effect, there needs to be widespread acceptance of the technology.

Orange has been working on AI for over ten years, integrating it into an increasing number of areas, whether it be for network design and management, or to create innovative services for our customers. We are committed to engaging with EU policymakers and relevant stakeholders with a view to fostering competitive, responsible AI.

What is Artificial Intelligence?

What AI can do

AI can be broadly defined as the ability of a computer to perform operations that are analogous to human cognitive capabilities. These are numerous: perception, planning, reasoning, decision making, free will, memory, communication, etc. Current AI applications, properly designed and trained by appropriate data, or even achieving better than human performances on certain types of cognitive capabilities such as perception. These specialised AIs, so-called "Artificial Narrow Intelligence" (ANI), can replace human beings for these tasks, but AI technology is far from being capable of other more complex tasks, in particular those involving semantic or meaning. The possibility to develop an Artificial General Intelligence (AGI) that could be comparable to the cognitive capabilities of a human being is very unlikely in a near future. A survey of several hundred worldwide AI experts concluded that an AGI will probably not emerge for another 40-50 years.

AI extends or improves human expertise and cognition. The use of these systems can speed up innovation, agility and productivity. For AI technologies to be applied in practice however, human interaction is still needed, now and in the future. Humans input algorithmic definitions, define the underlying strategy

for usage of AI, and set the objective for a given task. In addition, human users of the AI technology, professional or general public, should always be involved in defining how AI interacts with them. One should be careful not to overpromise the current AI developments; we are a far cry from the 'intelligent, human-like' technologies depicted in science-fiction films. AI remains complementary to, not a replacement for, humans.

Why is it expanding now?

AI has existed, and been applied, since the 1950s. It is already present in our daily lives; from its application in search engines and digital assistants (Siri by Apple, Alexa by Amazon or Djingo by Orange), to its usage by digital content providers, music producers ("I'm AI" with Amper or "Hellow World" thanks to AI Flow Machines") or manufacturers of self-driving cars.

What is new today is the combination of factors: the explosion of data availability and technologies management (Big Data); increased computing power and storage (Cloud computing); and advances in algorithmic and machine learning (including the deep learning techniques). Taken together, these open the door for AI to be deployed across all sectors of the economy, to support decision-making, allow for adaptive automation, and diminish the burdens of human workers on certain specific tasks. In short, we are entering the greatest technologically-driven societal revolution since the advent of personal computing almost four decades ago.
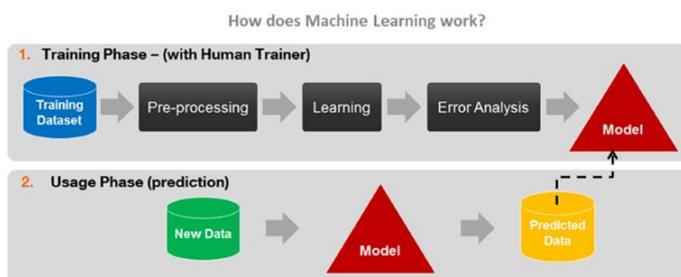
Why does AI matter for Europe?

AI is a game-changer – not just for the technology sector, but for societies and economies more broadly. By 2020, the market for AI technologies is estimated to be worth anywhere between $10 billion and $70 billion. Global technology giants such as Google, Baidu, Amazon, and Facebook are all investing considerable amounts in AI; and it is a focal point for start-ups too. There is also a geographical component to the race to compete. The U.S. and China are both developing specific strategies related to AI development and deployment, whilst in Europe, France has shared its own strategy and is considering launching an AI-focused research centre together with Germany.

Yet given the pace of change, and to prevent Europe from relying on AI developments imported from abroad, it is vital that the EU steps-up its level of investment and engagement. This will allow for optimum deployment of AI across European economies; improving productivity and competitiveness, increasing operational efficiency, and supporting re-industrialisation. AI can also help tackle challenges Europe faces in the areas of health and ageing, environmental protection, or security and defence. Current AI research in the area of cancer diagnosis, for instance, shows promising results; whilst AI-powered chat-bots can be used to support people suffering from Alzheimer's. Given that 90% of all car accidents are caused by human error, the prospect of applying AI to automate driving on Europe's roads holds great appeal. On cybersecurity, AI can be a key asset to fight against attacks and preserve sovereignty.

What is needed to make AI a success in Europe?

Promoting investment and innovation at the heart of EU policy

To capitalise on existing research and development assets, the EU must develop an industrial vision of the digital challenges and establish regulatory policy frameworks which will foster the development of Europe's digital economy.

The European Commission has acknowledged AI's importance within both the Digitising European Industry Strategy and the revised Industrial Policy Strategy – a move which we welcome. We also support the Digital

Single Market Strategy (DSM) and the proposed Electronic Communication Code's goal of supporting investment in new networks; realising the full potential of AI will only be possible via state-of-the-art connectivity and infrastructures, namely very high-speed broadband and high-quality fixed and mobile networks.

Similarly, impactful deployment of AI technologies will only be possible when privacy and security can be guaranteed, and citizens' trust ensured. The EU's General Data Protection Regulation protects privacy rights whilst still allowing for innovation. A similar approach should be taken within the proposed e-Privacy Regulation, currently under discussion. Yet in its current state, the text undermines EU companies' ability to innovate using metadata, critical for a successful AI. To ensure Europe can fully realise the DSM, it is vital to strike the right balance between adequately protecting personal data, without hampering innovation or the emergence of new business models.

Finally, policy makers should encourage EU industry to cooperate and co-innovate on AI; ensuring that the AI ecosystem will be interoperable in the future is also an essential challenge if we want the benefits of AI to be widely shared.

Addressing weaknesses and issues upfront

To ensure the smooth evolution of AI, it is vital to tackle challenges upfront. One issue is the introduction of bias into algorithmic itself or in the learning data. Various AI systems have been observed discriminating on the basis of gender or past behaviour, whilst others have 'mis-learnt' racist or sexist behaviour following inappropriate external input or delivered wrong answers, confusing for instance images of a turtle with a weapon[1]. Any supportive policy decided on AI should thus include work on AI robustness, reliability and accuracy. Another issue is AI's 'black box' problem – i.e. the fact that we don't really know how or why advanced algorithms make the decisions and choices they do. This makes for potentially unpredictable outcomes. It is therefore necessary to make algorithms more understandable and accountable.
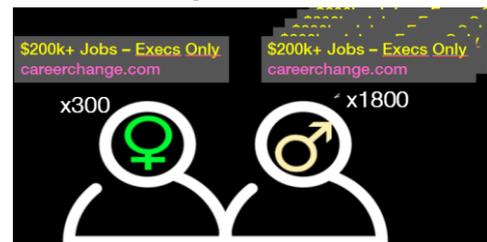
It is equally important to address broader issues which implicate AI; from debates around fake news and the use of algorithms to influence democratic processes, to concerns about military AI, or liability for road accidents involving self-driving cars. Yet, whatever the headlines of the day, it is important that any decisions which could impact the future deployment of AI be taken on the basis of fact, not fiction. Lack of regulation may open the door to unsafe developments but any regulatory measures should reflect technology as it stands now, and refrain from speculating too far about future expectations. Excessive regulation would risk hampering innovation and preventing Europe from taking full advantage of the socio-economic benefits AI can deliver.

Assessing and anticipating AI's impact on jobs

The level to which AI will impact human employment and the labour market is still very uncertain: estimates range from 10% to 50% of jobs which could be destroyed as a result of AI-driven automation. Understandably, these types of figures generate anxiety. Citizens' perception is also mixed: in a recent Eurobarometer survey[2], 72% of respondents revealed they fear robots will steal people's jobs. But there are more optimists than pessimists. In the same survey, 84% of respondents said robots could do jobs that are too hard/dangerous for people, whilst 68% expressed a belief that robots are good for society. Orange's view is that it is important to think in terms of tasks and not jobs. Many jobs will be transformed (in terms of tasks), and the capacity to adapt to these changes, through education and training, will be key.

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[1] http://www.bbc.com/news/technology-41845878

[2] https://ec.europa.eu/digital-single-market/en/news/attitudes-towards-impact-digitisation-and-automation-daily-life

What is clear is that EU policy leaders and decision-makers must be prepared to address frictions as they arise. For instance, it is highly likely that the increased presence of AI technologies in the workplace will translate into greater demand for human workers with the skills and abilities to manage these. Yet currently, just 40% of EU citizens possess any level of digital skills. To address this gap, and make sure European citizens can thrive in future, the development of relevant skills amongst young people, as well the re-skilling of the existing workforce, must be addressed. The way AI will be used in hiring processes, profiling or people management will also require further assessment and accompanying measures.

AI can only succeed if embraced by all

Widespread public acceptance is necessary to fast-track the successful development and deployment of AI technologies. Understanding and awareness are critical. A survey[3] recently conducted by the French data protection authority (CNIL) showed that, whilst over 80% of the respondents have heard of algorithms, over 50% weren't sure what these were. This demonstrates the need to exchange with citizens in a clear, transparent, and approachable manner.

The Commission's follow-up paper[4] to the European Parliament resolution on civil laws on robotics[5] suggests establishing a Forum on Artificial Intelligence, something Orange strongly supports. We believe the societal and industrial perspectives have to be linked, which require a tight interaction between users, developers, citizens, industry and policy makers; the Digital Society Forum set up in France could be a relevant example. An EU forum could work on developing a responsible European AI ecosystem based on common ethical values, helping citizens gain hands-on experience of AI tools, disseminating software solutions and recommendations for responsible AI, based on benchmarks, or open sources, and working in the future towards a 'soft' certification scheme for responsible AI technology. Orange looks forward to playing an active part in the European debate ahead.

Orange and AI

Orange has been a major player in AI research and innovation for ten years, in main four fields:

- Customer relations; AI enables notably digital assistants to complete currently simple tasks via speech recognition and natural language;
- Content production; AI can support all stages of content production and broadcasting, from creation, to access optimisation;
- Network optimisation; AI optimises telecoms network usage by notably adapting inputs to manage congestion, respond to attacks, or implement new services;
- Operational processes; AI can be applied to internal processes such as accounting, HR, and deep learning training.

We have also initiated a blog to help raising citizens' awareness; https://hellofuture.orange.com/en/tag/artificial-intelligence/

€732 million invested in research and innovation

600 Researchers

140 PhDs / post-doc

Djingo Multimodal, Multiservice conversational agent, Cooperation with Deutsche Telekom

Orange world class research results on Predictive analysis, Automatic speech recognition, AI application for network management and security, etc

1st European operator on patents

Chatbots Sosh & Orange Customer relation / Orange Bank / For CRM / For information

200 New patents per year

6000 Patents portfolio

For more information: www.orange.com/committedtoeurope, or follow us on Twitter: @Orange_Brussels

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3 https://www.cnil.fr/fr/comment-permettre-lhomme-de-garder-la-main-rapport-sur-les-enjeux-ethiques-des-algorithmes-et-de
4 Follow up to the European Parliament resolution of 16 February 2017 on civil laws rules on robotics
5 http://www.europarl.europa.eu/news/en/press-room/20170210IPR61808/robots-and-artificial-intelligence-meps-call-for-eu-wide-liability-rules