# Robotics and Artificial Intelligence: What is in store?

## 5 January 2017

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**Robotics and Artificial Intelligence have already entered our daily lives**, as video games competitors, mass-producers in factories, or automated vehicles. Even though the potential of such technologies is widely acknowledged, some – notably scientist Stephen Hawking – warn of their potential pitfalls and possible threat to humanity if uncontrolled. Therefore, **how can the European Union fully reap the benefits of these new technologies?**

Several complementary fields have caught the eye of researchers and tech companies: (i) **Robotics**, the science to make machines move, (ii) **Artificial Intelligence** or the building of intelligent machines capable of reasoning and interacting with the world, and (iii) its engineering approach, **Machine Learning**, which instructs a computer program on how to learn.

The use of these three technologies has proven beneficial in a number of fields. **Robots replace and complement humans in tasks that are repetitive, dangerous or dirty**, such as processing and analysing data or sorting nuclear waste, to allow humans to focus on more creative tasks and reduce avoidable human errors. **Artificial Intelligence has also the potential to improve healthcare** through the use of apps offering personalised care and advice, as well as continuous monitoring to patients who would otherwise only see their doctors a few times a year. Over the next years, the use of Robotics, Artificial Intelligence and Machine Learning should **stimulate research and innovation**, **boosting productivity**.

The **Partnership on Artificial Intelligence** gathering Amazon, DeepMind/Google, Facebook, IBM, and Microsoft seeks to provide for best practices on using Artificial Intelligence technologies and advancing the understanding of the public.

**Regulation has a role to play to ensure the adequate development of Robotics and Artificial Intelligence** and address the challenges ahead:

- *Ethical issues*. European Data Protection Authorities (DPAs) have voiced concerns regarding **the profiling and monitoring of individuals** by automated machines and their societal implications. Artificial Intelligence has the ability to create digital profiles using the information individuals disclose when using the Internet and predict their behaviour based on the information collected, leading to stigmatisation, social exclusion, and disproportionate monitoring of one's activities. DPAs have also questioned the **transparency of automated decisions**. Machines have to be programmed to take decisions, and undesirable patterns can be introduced – consciously or unconsciously – during this process, which may produce wrong or even dangerous decisions.

- *Legal issues* raised by **the civil and criminal liability of a robot** in the case of accidents, **the supervision of automated decisions** taken by autonomous machines when collecting personal data, and **data protection legislation**.
- *Employment issues* as **robots may replace human jobs across the economy**. Even though it is generally believed that Robotics and Artificial Intelligence may replace low-wage or low-skilled jobs such as logistics, office work, or customer services, these technologies can also impact high-skilled jobs, e.g., by achieving more efficient data analytics. The development of Robotics and Artificial Intelligence should nonetheless create new jobs in areas relating to technology. The European Commission has presented in 2016 several propositions to counter such job losses and address the growing demand for digital skills on the European labour market, notably its New Skills Agenda for Europe.

Efficient regulation will require **striking the right balance between guaranteeing privacy and safety, and avoiding overregulation that would stifle innovation**.

In the absence of specific European legislation on Robotics and Artificial Intelligence, **the European Parliament has set up a Working Group to pave the way for drafting rules**. Member of the European Parliament Michał Boni (EPP, Poland) called to put a focus on the fields of employment and cybersecurity, advocating for cooperation between robots and humans.

**The European Parliament is addressing its recommendations to the European Commission in an own-initiative Report on Civil Rules on Robotics.** Published on 31 May 2016, the draft version of the Report supports the adoption of a common European definition of smart autonomous robots, as well as short-term verification mechanisms of Robotics outcomes to understand the real risks and opportunities associated with its dissemination. The document further advocates for the creation of an ethical framework for Artificial Intelligence and Machine Learning design, as well as a registration system for advanced robots. The Draft Report also addresses the issue of the civil liability of robot production and robot use. The final report should be adopted on 13 February 2017.

**The European Commission is set to publish in the coming months a Communication on liability for autonomous systems**, which should advocate for a cautious legislative approach to avoid excessive legislation. Nevertheless, the Institution actively promotes research, innovation, and job in these fields, dedicated on average €200-240 million a year in funding.

It remains to be seen whether the European Union will produce legislation balancing innovation and economic growth with respect for fundamental rights, consumer trust and labour market forces **to make the most of Robotics, Artificial Intelligence and Machine Learning**.