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An update on Artificial Intelligence (AI)

January 15, 16, 18 and 19, 2018 saw the GE90 seminar devoted this year to Artificial Intelligence (AI). Throughout the 4 days, the students, whatever their specialty options, attending the conference organized by UTC-Costech Lab were able to address this theme with research scientists, a designer and a lawyer. Interactions spoke with the organizer of this highly stimulating event, Prof. Yann Moulier-Boutang, chair of economic studies, UTC.

02 Apr 2018

An update on Artificial Intelligence (AI)

What made you choose AI for this year's theme?

A seminar which counts as a credit course is organized every year. To gain the points, the attendee students must submit a dissertation and a work plan at the end of the semester. For first semester, 2018, the choice of AI seemed self-evident to us. It covers a set of issues that not only are of interest to students in the computer science and applications specialty, but also those who opt for urban system engineering, mechanical engineering, biomedical engineering and many other specialties. It is not a question of being “for” or “against” AI, but to make use of the positive potentialities offered by AI tools and to acquire and develop a critical attitude in doing so. Becoming familiar with AI technologies is as primordial for the public at large as for the future (and today's) engineers. It must be seen as a priority that France regains its self-reliance in the digital world, faced with the American and Chinese giants. If we consider population, France is the first contributor to the digital industrial sector in California! What we need is an Institute for Advanced Studies on the Digital Transition in order not to abandon training to the giants such as Google.

Are there several forms of AI?

Not only does AI open up marketing prospects inasmuch as the consumer profiles can be better targeted – via social networks, search engines – or service demand can be better channelled – Uber. In the future, a significant fraction of our science and security systems will rely on appropriate use of algorithms. The underlying societal challenges are very important – they run from diagnosis of certain complex illness – notably through fine analysis of X-ray images, to forecasting certain natural phenomena, and even the fight against threats of terrorist acts.

Progress in field like these call for algorithmic skills as well as deep statistical analyses, in many specialist areas. The aim will not always be to determine average behavioural patterns or the probability of events occurring, but more to pinpoint possible, rare, events with significant consequences: a patient dying, a terrorist or criminal attacks, natural catastrophes. As far as individuals' behaviour is concerned, social sciences and humanities provide the necessary complement needed to identify the most significant criteria.

Numerous fears have arisen with the new forms of autonomy conferred on machines. Are they justified?

There are considerably different visions as to the finalities of AI – will it replace Man or assist him for certain complex or repetitive tasks? Some people foresee the possibility of machines gaining a high level of intelligence such that they progressively acquire a conscience or feelings. This transhumanist vision opines that men's health and his mental faculties could be totally modified using computers. In France, Dr Laurent Alexandre supports the idea that our IQ factor can be improved by using computers. But there are, I repeat, many different visions. The ongoing digital revolution represents an opportunity for modern science, for our culture, for our safety and for the creation of more collaborative models that would prove very useful for democracy today and tomorrow.

Is the pervasive advent of AI modifying the working world and, in particular, will it impact professional engineers?

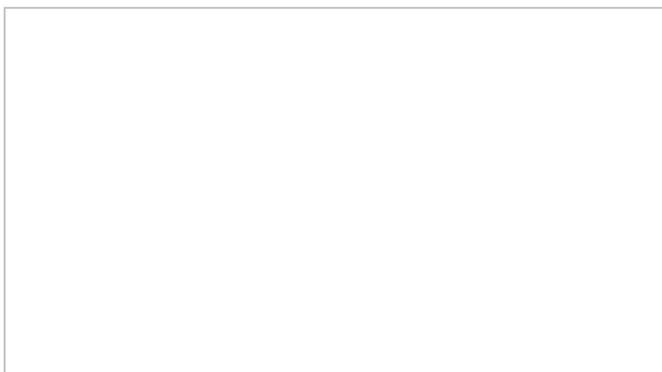
The entire economy is concerned by the ongoing AI revolution. Added value accrues increasingly to data producers than to industries and the service sectors. The example of aircraft engines is revealing. For a given engine on a commercial jet-liner, most of the costs relate to maintenance. Pratt and Whitney, a major US aircraft engine company signed an agreement with IBM to develop real-time engine part control systems, thereby preventing break-downs by using sensors. In this partnership, clearly it is "big blue" who controls the market. This logic can also apply outside the cutting edge technologies. Vinci Public Works is looking at the possibility to replace its worksite supervisors and foremen by digital processes. If this project come to be, some 20 000 jobs could be lost. For big data specialists, evolution is rapid. Thanks to the multitude of data available it is no longer possible just to collect. We must be able also to analyse and use the data. The next few years will see the recruiting of increasing numbers of data analysts. Working conditions will also be changed. Until recently many engineers, experts in data sciences, were employed directly by the major groups. The trend now is to see them create their own start-ups and offer their services.

Can UTC offer special skills in this field?

The pluridisciplinary features of UTC's laboratories are strong assets when it comes to AI studies. Work done at the UTC-Heudiasyc laboratory, for example, on self-drive vehicles relies on data received from a multitude of sensors. The concept of system resilience (or robustness) developed at Heudiasyc is a direct application of AI research. Likewise, work at UTC's LMAC (applied maths) Lab in the area of stochastic analysis has proven highly relevant for the creation of probabilistic models. AI also brings together and mobilizes our knowledge about Society and mankind in general. At the UTC Costech lab we have social science and humanities research specialists whose remit is to study several aspects of the ethical, societal and epistemological facets of these issues.

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