A machine is cheaper than a human for the same task [1]

Luis Moniz Pereira [2]

Luís Moniz Pereira, 70, emeritus professor at the Faculty of Sciences and Technology of the New University of Lisbon, retired a decade ago to dedicate himself full time to Artificial Intelligence (AI), as researcher of its Laboratory of Computer Science and Information Technology. During this time, he consolidated ideas on how to introduce moral and ethical concepts into machines, in order to prevent the risks associated with their increasing autonomy, which already enables them, for example, to shoot without human order.

To what extent is Artificial Intelligence taking over our lives?

In fact, Artificial Intelligence has not yet arrived. Or just a small sample. Most of what today is, rather too spectacularly, called Artificial Intelligence is what, in Computer Science, the more rigorous scientists call Data Science. Essentially, it is a technology that recognizes patterns or images. The Google translator or Siri, who translate full sentences, do not understand anything about them at all. They simply resort to a huge database to find very similar phrases. This is nevertheless useful, but AI is much more than that – it stands for a larger whole that involves imagining, arguing, proving mathematical theorems, and very much of that is still missing in the day to day applications that nowadays enjoy so much fuss. So, AI is still going to take care of our lives, but in much more sophisticated ways.

Will machines think?

Of course. Let's say they are another tool that humans will have, as they once had the bow and arrow. The challenge is to put thought out of the brain, transposing to another hardware all our cognitive abilities, creativity included. Just as biologists thought of creating life in the lab, other scientists think of putting intelligence in another medium. It will not be in a test tube, for sure.

From this AI sample, as you call it, what most surprised you?

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[1] This is the interview of Luís Moniz Pereira for VISÃO, a Portuguese weekly magazine, by its journalist Rui Antunes, published in its issue of November 8, 2018, pages 12-14, and available online from here: http://visao.sapo.pt/atualidade/entrevistas-visao/2018-11-18-A-maquina-e-mais-barata-do-que-o-Homem-para-executar-as-mesmas-tarefas.-As-pessoas-vao-viver-num-limiar-de-sobrevivencia. I thank them the permission to utilize here my translation thereof into English.

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I was very surprised by Watson, the IBM machine that won Jeopardy, the general culture television contest. The game requires a lot of knowledge and some reasoning. It used a combination of technologies and knowledge developed by AI to make that possible. It is no longer just a little program for a very specific thing.

If it reasons, it is no longer just a machine that analyses patterns and images.

Precisely. Autonomous robots are another form of AI that surprised me. It is no longer the robot that always does the same thing, it begins to have autonomy. It's the drones, the driverless cars, the robots that go to the grocery store down the street and do the shopping. Man-machine symbiosis is going to be the future, and certainly machines will become more human. Autonomy forces them to live with us and, in order to be included in society, they will need social and moral rules. Even in the coexistence between them. Imagine a team of robots, possibly from different makers, doing security in a mall. They will have to coordinate in reaction to a robbery, a fire, an attack, whatever.

Does this scenario imply that there is no human overseeing?

The machines can be on Mars, on the seabed, on a mountain rescue mission or dealing with any tragedy, an earthquake, a tsunami... There will be more and more robots with large degree of initiative that can no longer be waiting for instructions from a human; besides, the machine on the ground has much more information than the human who is far away. This is what already happens with the autonomous drones that are able to identify faces and can have the autonomy to attack. They still do not use it, or are denied using it, but the technology exists and can begin to be used from one moment to the next, even because the enemy has it too.

Are the great powers in a race to have the best of this type of weaponry?

We have the example of the spoken about Google's project with the United States Department of Defense, which contributes with its image management know-how for the identification of faces. The drones can recognize people in the middle of a demonstration, which is also happening in China. This is not in a climate of war, but in China the authorities keep a type of record in which they put down the good and bad things about individual people, wherein they attribute positive or negative credit points that determine their speed of access to health, employment, a house, etc. They know who have contacted suspects, who ordered something or other on the internet, who was reading articles about making explosives, etc. – it's a kind of social control via AI tools.

You were one of the 56 scientists and academics who appealed in April to a boycott of a South Korean university research centre (KAST) due to its involvement in a project with industry to develop autonomous war robots. Is there an excessive risk of mistakes in algorithms or even the creation of algorithms with the worst of intentions?

There are still no computer techniques that certify the moral properties of machines. We are far behind in the creation of such security software, with international standards that also protect it, for example, from hacker's attacks. And while an atomic bomb requires very

complicated technology, drones are already within everyone's reach. Robots will appear that steal and kill, or drones that enter through a window with an explosive without anyone knowing who sent it. It is very difficult to be sure that machines do nothing wrong, and that's when we enter the field of machine morality.

This has been at the centre of your research. Why do you say we are far behind in introducing morality into machines?

We know little about our own morals, and our moral theories do not compaginate on many issues. We have many religions in the world and among its followers they each are very good, but to others they might not be seen so. This comes about because religion and morality evolved to create cohesion within a particular group, but humanity is now at a crossroads where it has not yet been able to see itself as a single group on a planetary scale, as it needs to.

If there is no universal morality, how can differences of opinion be minimized in order to impose some order on the growing autonomy of robots?

We cannot expect them to immediately have a full morality that applies to all cases. We can create a moral toolkit base, with a set of general rules, and the computer scientist will then configure programs according to the specific moral rules of each culture. And there must also be the possibility of a robot revising and updating its morals as situations unfold. But we are far from being able to produce such software, as well as being legally lagging. Imagine an accident between two driverless cars. Who is to blame? It's the car? Is it the state? The manufacturer? The owner? Law experts, as they don't know much about machines, are waiting to see what situations do happen.

At the level of introduction of moral concepts in machines, we speak of a future at what distance?

It will depend on the investment that is made, but it will be a good dozens of years, and that's why I say we are behind and late. The Future of Life Institute (FLI), which was brought together by big names in science and technology, such as Elon Musk and the late Stephen Hawking, is a private non-profit institution that has raised the issue of security in the AI race, by analogy with the arms race of nuclear weapons. In its 2018 call FLI chose ten projects to support, among 200 candidates, and the one I'm involved as co-PI was one of them. Its goal is precisely to create mechanisms leading AI companies to develop software that promotes machine safety.

What is the starting point for achieving such an objective?

There are several ways, for example with incentives or penalties, depending on the degree of collaboration with other companies in the industry. Each company wants to be first to market some AI product to make the most money fastest, neglecting security in the haste. But it will then fail to receive shared information from the competition if it does neglect security, for example. Or they will not have access to the common fund to which everyone contributed in the beginning. The project goes on to show that by defining certain rules of the game, with

different consequences, the further one company is willing to go in cooperating with others, the more rewards it will have, and vice-versa for penalties.

Do you align with the thesis that machines will rob us of jobs and create greater social inequality between the poor and the rich?

It's inevitable. The very historical trail of our species tells us that there are always ones that benefit more to the expense of others. And with the ongoing technological amplifications, the rich are getting richer and the poor getting poorer. I believe we will evolve into a society of castes, in the sense that we will have above all others the owners of the robots and software, then the administrators of the machines, then their executives, and last but not least the exploited ones. Those creating their wealth will exploit others with the coming tools. For lack of proper wealth distribution this will generate riots, and the robots and software will be used to protect the higher castes and dominate the population.

Like in science fiction movies?

We are already quite robotized in our lives of permanent consumption. Children, teens, and even adults are so accustomed to the smartphone that they have increased trouble in dealing face to face with one another. People are transformed into mere objects of consumption and will also become even more underpaid. Since software is going to become increasingly cognitive, machines and robots will replace humans, with the perversity that we will have been scoring between our own goal posts. There are hundreds of thousands of people making money by teaching machines. They're working to put themselves out of work.

Are we not going to turn the tables in our favour?

We shall move towards the "uberization" of all professions. An architect belonging to some "uber" of architects receives a call to request his services for three hours, to verify if a floor plan is in agreement with regulations. "Are you free?" "Yes, I am, I’m on my way." It shall be thus.

Do you look at the future with worry?

It is an ideological issue. Humanity creates instruments that allow us to enjoy the resources of Nature. You ask yourself: who benefits from this? Why should the president of a company be the great beneficiary, having created it with the many contributions from the surrounding society, starting with the universities? As society is increasingly globalized, it must perforce be the whole of it to benefit from the return wealth it produces. There has to be quite a much larger redistribution, but what we see is that the wealth gap is increasing not decreasing. Instead of being put at the service of all, AI will aggravate this problem in a very acute way. The machine is cheaper than a human to perform the same task. Increasingly, people will live on a survival threshold and consume things that do not interest them at all, just so as to abuse their life force. Most will survive as in those farms of chickens or pigs, where animals live pell-mell only to produce wealth for others.

It's a catastrophic scenario.

That's why nobody talks about it. It's completely taboo. I am 70 years old and this scenario will not affect me, but I believe it is not very far.

Is it for the 21st century?

It is certainly for the 21st century.