



EDITORIAL

ESPECIAL EDITION - DATA SCIENCE, ARTIFICIAL INTELLIGENCE AND HEALTH

We need you

Hardly anyone will disagree that we need better health policies. In fact, we need better public policies across all sectors. The question is whether the lack of quality of Public Policies is merely the result of the actions by the governments we choose, or a consequence of our limited involvement, since we can help the government making better decisions, but we rarely do so. Interestingly enough, the scientific community was not absent in the actions against the COVID-19 pandemic, and the sense of volunteerism and participation was significant. We have witnessed, not only in Portugal, but also in other places, researchers asking (in the case of Portugal, begging) for access to data that would allow them to study, analyse and, simply put, contribute to improve knowledge about a virus that was, and still is, unknown.

We also observed researchers redeploying their laboratory equipment, particularly 3D printers, to produce Personal Protective Equipment and non-invasive ventilators. The Faculty of Engineering of the University of Porto (FEUP), for instance, collaborated with several hospitals, and there was even a collection of acetates, useful in the design of improvised visors. Several researchers, from different research centres, have also worked on projects focused on the development of mechanical ventilators, thus trying to meet the needs resulting from the huge increase in demand, as well as to address their significantly high cost.

Hospitals and other healthcare facilities have accelerated the use of telemedicine, which was still limited and sporadic, in order to reduce the impact of the pandemic on clinical activity (which still managed to be significantly high). This required the requalification of technological infrastructures and the training of healthcare professionals, which always represent a cost, but will lead to long-term benefits, eventually becoming a way of reducing the disparities and inequities that still exist in the access to healthcare in Portugal, particularly in remote regions.

INESC TEC was also quite active during this pandemic, contributing with solutions in the healthcare sector. This incursion into healthcare is not new, by the way. This field intersects with several INESC TEC's research centres, in multiple scientific areas and in several projects, involving a considerable number of researchers who contributed to the creation of some companies as shown in the diagram on pages 16 and 17. In this special issue of the first edition of the magazine INESC TEC Science and Society, we highlight some relevant activities by INESC TEC researchers, who resorted to technology to innovate in healthcare.

The opening piece is an opinion article about the duty of the scientific community towards society, which translates into its collaboration in the discussion of Public Policies.

Several articles involve the use of advanced methods of Artificial Intelligence (AI), so we frame them with an article that presents some of the recent advances in AI, while revisiting Alan Turing and the origins of AI. Moreover - and misquoting José Régio -, since we must know where we are heading to, we invite you to read the article that explains the importance of explainable Artificial Intelligence.

The use of AI was also part of a project of recognised practical relevance to address COVID-19, developed at INESC TEC. This work is described in an article that seeks to help detect the presence of lung lesions caused by the virus in X-ray images. To do this, it uses AI algorithms that will help the clinical teams to grade the cases.

Concerning another initiative described in an article included in this edition - which has been generating a lot of media coverage -, INESC TEC researchers have joined together to develop a contact tracing application, which allows to identify outbreaks of infection and intervene more quickly, in order to stop or limit contagion. Despite the potential objections to this type of applications, namely with regard to privacy, the truth is that STAYAWAY COVID is working and contributing to stop the spreading of COVID-19.

And since there is life beyond COVID-19, it is important to highlight what has also been done by our researchers in other clinical contexts. This is what you can find in an article describing the MINE4HEALTH project, developed in partnership with The Portuguese Oncology Institute of Porto. This initiative will enable the collection of extremely valuable clinical information from clinical journals, placing it at the

service of science and clinical practice, while assisting doctors in making cancer decisions.

Another article describes how Artificial Intelligence could help screening for diabetic retinopathy, allowing the automatic detection of the presence or staging of this pathology, which can lead to blindness if it is not detected and treated in earlier stages. Another INESC TEC project, also described in this magazine, uses AI to support the diagnosis of gastric cancer through the analysis of endoscopic images using Artificial Intelligence. This tool can be a valuable resource to oncologists, by helping them making faster and, hopefully, more accurate diagnoses.

We also highlight the design of a disinfection robot, which allows disinfecting healthcare units, particularly hospitals, through ultraviolet rays. You may think its influence is quite limited, but it is important to bear in mind that infections in hospital environments are one of the leading causes of death among inpatients, especially those who have undergone surgery. You can read more about this in an article describing this disinfection robot.

Finally, and as Hegel once said, what we learn from History is that we learn nothing

from History, we include an article about the sanitary siege during the bubonic plague epidemic that occurred in Porto, in 1899. Some of the similarities between what happened more than a century ago and what we are witnessing now, during the pandemic that is deeply affecting us, are striking. We should reflect on this.

All of these contributions were made possible by three fundamental vectors: sheer will, technology and health policies. In this case, sheer will and technology preceded the policies, which followed the important breakthroughs. There were changes in the legislation that were changed to allow the use of contact tracing; Infarmed moderated some criteria, in order to launch some of the innovative solutions that were being proposed; and the Public Administration hastened certain ponderous formalities, in order to promote a timely reply.

The urgent nature of the situation made all of this possible; but, and above all, the pressure from the academic community and society was crucial. Consciously or unconsciously, we were agents who promoted health policies and advocated for change. If we can do it during times of crisis, why shouldn't we be able to do it in times of normality? It is our duty towards society.

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