

TALKING IMAGES VOICES FROM THE OPEN FRONTIER OF IMAGING

IMPACT OF AI IN DIAGNOSTIC IMAGING

Gianluca Dotti

We often ask ourselves this question in the future tense: **how will artificial intelligence impact the world of health and help the medical field?** However, it would probably make more sense to start asking this question in the past tense, or at least, in the present tense. Artificial intelligence is already transforming the whole medical field and there is a plenty of examples of projects underway, or even from the recent past, that realize it.

New digital technologies are affecting healthcare and its industry in every possible area of medicine and, as we will see in this episode of Talking Images, radiology and precision imaging are among the fields where the impact can be more decisive and promising.

With us: **Darya Majidi**, CEO of Daxo Group; **Paolo Soda**, full professor in computer science; **Marina Stocchi**, account manager Amazon Web Service and **Giovanni Valbusa**, digital innovation manager for Bracco.

This is Talking Images, a podcast series by Bracco Imaging.

My name is **Gianluca Dotti**, I am a science journalist, and we are starting a short but intense journey to explore opportunities, challenges, critical points and milestones of applying artificial intelligence, AI, to medicine, taking a cue from a specific virtuous project that is the AI for COVID Project by Bracco Imaging. But let's start from the beginning.

Darya Majidi

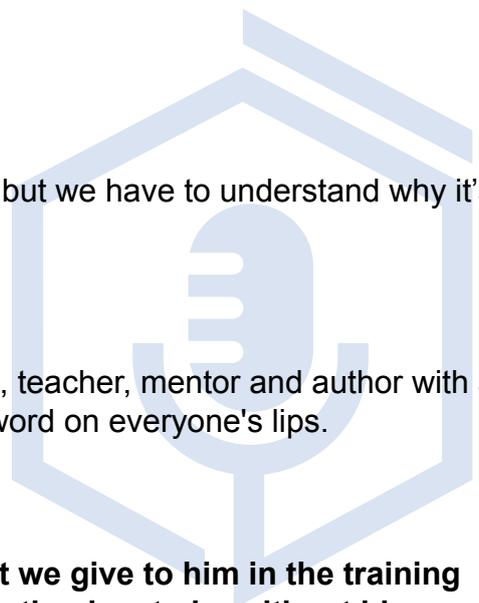
Artificial Intelligence is a branch of computer science, but we have to understand why it's different.

Gianluca Dotti

It's Darya Majidi speaking, CEO and owner of Daxo Group, teacher, mentor and author with a specialization in AI. Artificial intelligence is actually a buzzword on everyone's lips.

Darya Majidi

In AI, **it's the system itself that learns from the data that we give to him in the training phase.** This is so important because **the data we are selecting has to be without biases and without wrong information in it.**



We need not only computer scientists to work in this field, but we need psychologists, philosophers, we need really a new human involved for the different approaches in the human knowledge in the creation of this systems in order to be sure that we are creating something which is respectful of the rights of the people of their privacy, of the ethical issues.

Gianluca Dotti

A theme that is so huge also because, it's already an integral part of our daily life.

Darya Majidi

We're just using AI systems even maybe we're not aware of it, so every time we do research on Internet, every time we choose video on our streaming platform, every time we talk to our navigator, we're using already AI systems.

Gianluca Dotti

And among the areas where the impact will be felt the most, there is taking care of human health.

Paolo Soda

Artificial Intelligence has been boosting a lot of new research expertise and new application in the field of medicine

Gianluca Dotti

explains computer science and bio-inspired computing teacher Paolo Soda.

Paolo Soda

This is possible because **we are collecting a lot of digital data of patients even respecting their privacy. But the possibilities to explore this information open the chance to develop new systems that can support the technician while they're doing their job.**

Gianluca Dotti

The keystone is, at least apparently, really simple: big data enabled by digital transformation.

Darya Majidi

Let's say 100 years ago a doctor had a patient: the only information he had was its own experiences, its own studies. **Now with technologies, in a second you approach knowledge based, database, networks, community, so you can have second opinion,** so I think that is really useful. Specially in Artificial Intelligence, for example, supporting radiologists in their diagnosis process or in the therapy process.

***Gianluca Dotti***

On the whole, expectations towards artificial intelligence are numerous and well placed.

Darya Majidi

So I think that **these systems are going to be really good instruments and powerful tools for medical people and also patients are going to appreciate that**, if they talk with the doctors, in a second he can talk with the general practitioner, with the radiologists, with the other experts and together they can create a collaborative network and put the patients at the centre of this group of people working together.

Gianluca Dotti

But all this does not mean that the points of attention are completely missing. Some resistances still remain on the field, some justified and others less, of which it is essential to take care.

Paolo Soda

One of the biggest challenges of the use of AI in medicine is that physicians are reluctant to trust and adopt something that they do not fully understand and the regarded is a "black box". So that **the clinical adoption of these tools has been slow because of a lack of trust.**

Gianluca Dotti

This means working on transparency, also aware that machine errors are generally much less tolerated in public perception than human mistakes.

Paolo Soda

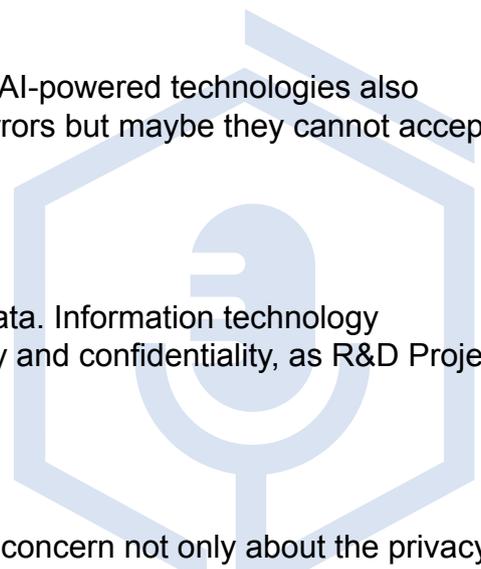
Besides clinician's doubt, patients lacking confidence with AI-powered technologies also hamper development because, they may accept human errors but maybe they cannot accept machine error.

Gianluca Dotti

And still there is the theme of managing personal health data. Information technology and digitalization enter the context even in terms of privacy and confidentiality, as R&D Project Manager at Bracco Giovanni Valbusa explains.

Giovanni Valbusa

Medical use of AI requires patients' data, and this raises concern not only about the privacy of data but also about the ownership of data, so who owns the data, this is a problem. First, **we need a networking, we need to work together, we need data integration among**



hospital because a single hospital is not sufficient at the regional level, but not only, also at the national level and continental level.

Gianluca Dotti

Giovanni Valbusa is also the creator of the Imaging Archive for the aforementioned AI For Covid project.

Giovanni Valbusa

We started the project when we were forced to stay at home during the first lockdown, it was a reaction to the disease and also to the hard situation we and our friend's radiologist were facing.

We created the AlforCovid Imaging Archive, it's a shared collection of images and clinical data.

Gianluca Dotti

After all, we well know that the nourishment for algorithms and artificial intelligence is data.

Giovanni Valbusa

The AlforCovid Imaging Archive **contains so far more than a thousand positive cases of patients that had radiographic examination cared out upon a hospitalization.** Each x ray images is associated with clinical information about the patient collected at the same time. This data was collected as part of the AI for Covid project: AI for Covid **is a no profit multicentric research project.** It was **promoted by Bracco Imaging in partnership with the hospital Centro Diagnostico Italiano. The initiative involved major hospitals and both public and private research institutes in Italy.**

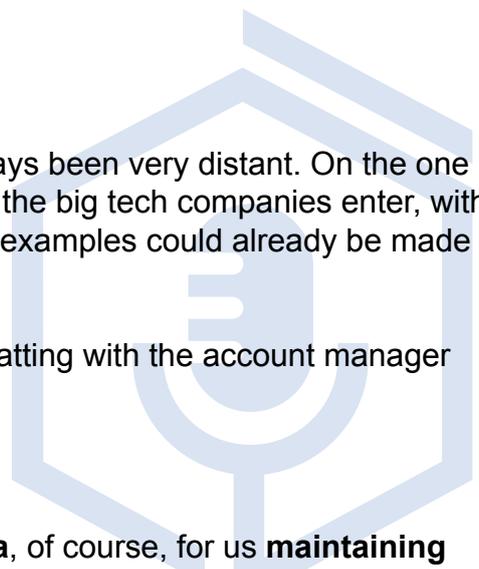
Gianluca Dotti

This indicates a mixture of areas that historically have always been very distant. On the one hand healthcare becomes high tech, and on the other one the big tech companies enter, with their skills, in the world of personal care. A very long list of examples could already be made out of this.

So, we got to know Amazon Web Service more closely, chatting with the account manager Marina Stocchi.

Marina Stocchi

AWS accelerates the utilization of scientific health data, of course, for us **maintaining customer trust is an ongoing commitment.** AWS security enables the highly regulated biopharma industry to confidently increase the phase of innovation unlock the potential of scientific data and develop a more stream life approach to therapeutic development.



***Gianluca Dotti***

At a cultural and setting level, **this new approach also changes the very way of understanding data in the clinical and hospital setting**, and it is a “corollary revolution” of the more general AI disruption, but by no means negligible.

Giovanni Valbusa

This is a sort of change for the information technologies people in the hospital because in the past they were just used to implement all those functionalities that were useful for making the hospital run, so archiving data administrative things and so far.

So it means that **information technologies can have new purposes now because of the AI**, and it also includes and implies that there are new jobs in the hospitals that were not there before and this need of course also new skills and investments.

Marina Stocchi

We have built a new technological regulatory and operational framework that has become a point of reference for future projects. I think about for instance an hospital: you can plan the resources needed to face the pandemic outbreaks, you're able to have a proper triage when you have to check-in patients and you're able to provide them the right proper cares, and you're able to provides also personalized approach for every single patient, because you're able to predict the prognosis and the projector of the disease for each single patient.

Gianluca Dotti

And, as Stocchi points out: **it is a revolution based on multidisciplinary and on the ability to make professionals with very different skills work together.** It is evident event in AI for Covid.

Marina Stocchi

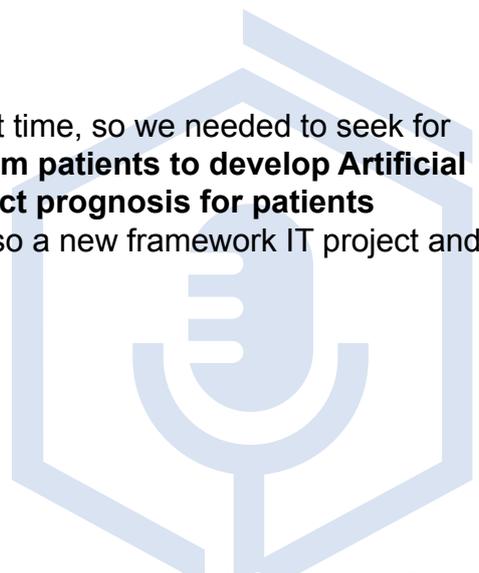
We were different excellences working together for the first time, so we needed to seek for a common language. **The key points is to using data from patients to develop Artificial Intelligence and Machine Learning model able to predict prognosis for patients themselves**, so this is for develop a new approach and also a new framework IT project and project based on health data.

Gianluca Dotti

And at the same time, Majidi points out

Darya Majidi

I think that **the pandemia has showed us that technologies are support that we as human can and must discovered more**, the value, the human values using technologies.



Gianluca Dotti

And every single project, beyond the achievement of their initial goals, will be useful for the future.

Giovanni Valbusa

We believed that **AI for Covid will help not only in relation to Covid disease, it will be also inspirational to boost research on Covid and beyond.** And we want like that its example will convince radiologists that they can find value in giving a second life to patients' data through AI.

Gianluca Dotti

A “second life” to data in a world that, thanks to technology, is giving a new and “second meaning” to the work in the medical field and to the healthcare in its complex.

Darya Majidi

People are involved in this sector because AI is really reshaping our planet, our world, and we have to be aware of its power and involved Diversity & Inclusion in order to be sure that we're giving all the information.

Gianluca Dotti

This sets the goals of today, and also those of tomorrow.

Giovanni Valbusa

It's known that AI is quite obscure today, I mean, the modern AI is a black box, in most of the cases: so, the research is going forward in the direction on unexplainable AI, it means that we cannot understand how it works. So, **we really want that AI gain's ability to communicate back to us, to show how it works, how it reasons, how it makes use of data:** and this of course will be beneficially, not only at academic level, but also because this really increase the trust that we can have in these tools.

Gianluca Dotti

Transformation that has already begun and seems unstoppable, and from which doctors and other professionals must make out the most, for the sake of patients.

Thank you for joining us!

And thanks to Darya Majidi, Paolo Soda, Marina Stocchi and Giovanni Valbusa.

This was “Talking images” a podcast series by Bracco Imaging.

From Gianluca Dotti, a warm greeting to you all.

