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How to deal with Covid-19 using Artificial Intelligence

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iNSTANTECHNOLOGIES

Democratizing Artificial Intelligence

CHALLENGE: **HACK THE VIRUS**

SOLUTION TO HELP DEAL WITH THE VIRUS:

1) Creation of predictive models for contagion forecast
2) Creation of a image recognition tool to identify ill people through X-ray and C.T scan

…in order to support both medical and governmental strategic, and analysis processes to deal with Covid-19.

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Democratizing Artificial Intelligence

SCIENCE & TECHNOLOGY PARK FOR MEDICINE
TECNOPOLO MARIO VERONESI MIRANDOLA

Instantechnologies is an innovative startup born from the 25 and more years experience of its founders in the field of semantic and AI.
Instantechnologies is part of Mirandola Technopole (the second most important biomedical district of the world).

Instantechnologies decided to provide its own competences, technologies and proprietary algorithms to help looking for solutions to deal with the virus, which is now ravaging in Italy, in Europe and all around the world.

Promotore

Ethics Expo - The international Ethics Expo was born in Mantua with the aim of promoting ethics in human relations and in the economy. Since 2014 he has created 60 international events including humanitarian expeditions, conferences and training initiatives centered on volunteering.

Public entities and local institutions support Ethics Expo projects aimed at social justice, the development of human capabilities and sustainable development.

www.ethicsexpo.com

Partner

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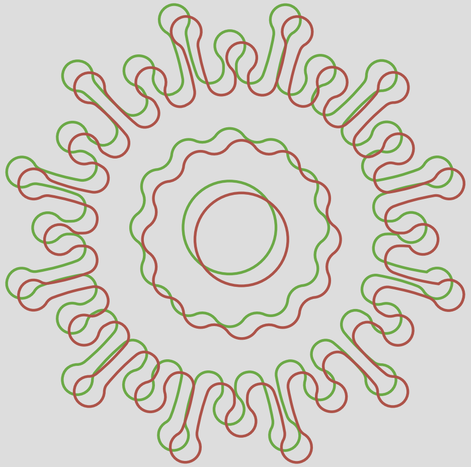
1) Creation of predictive models for contagions prediction



The aim of this first analysis is to estimate the contagion short and long impact in each Italian Province, to provide indications about the possible reception need in the future, the chance to plan medical personal and structures beside the possibility to work on further forms of prevention and restraint. Differently form who offers forecast analysis, IT developed an AI model that doesn't rely its prediction an historical data trends.

After a careful initial analysis the model has been elaborated taking under consideration data semantic meaning; this is a feature that distinguishes IT: profiling citizens' behavior, starting from the causes of diffusion more than the effects.

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1) Creation of predictive models for contagions prediction

To exemplify the functioning at the model, it has been considered the occurrence each citizens has to contract the virus and the possibility each citizen has to become vehicle of infection itself. People have been divided into asymptomatic and into needing of care, taking into consideration incubation time and possible number of contacts of each during the different times.

The model is dynamic, the social system external changes are taken under consideration (implementation of restrictions habits, activation of forms of protection, transport restrictions) from which changes in behavior derive.
The ecosystem considered is very different from the one considered from a traditional AI analysis, since it evaluates and expects social changes for which historical data are not available.

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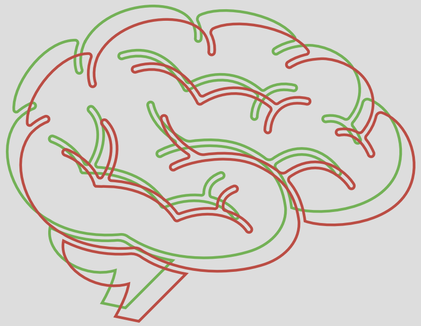
1) Creation of predictive models for contagions prediction



In early stages, automatic intelligent analysis offered a few dozen possible scenarios, which have drastically reduced in the following days thanks to the feedbacks received compared to real trends. After 5 days the system reached a level of maturity that allows today to provide estimates on the diversity of the progression of the infection in each area of Italy. The system keeps honing its forecasting ability every day, and the same model is currently being transposed to other nations.

As anticipated, the implemented system offers a point of view which we would preferentially like to target to national, regional and provincial emergency operators. Secondly, a simplified, limited, public exposition, supervised by competent authorities free of long-terms forecast, could became a useful indicator to inform people about progresses and developments in the short-term.

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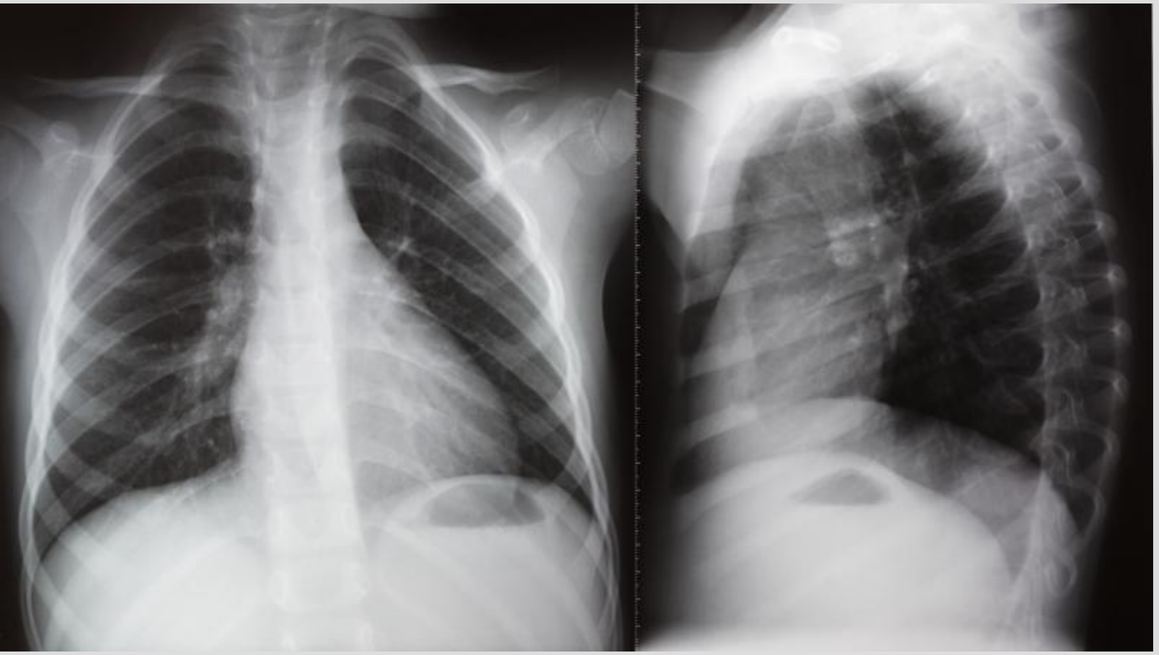
2) Creation of a image recognition tool to identify ill people through X-Ray and C.T- scan

Case Study



Esempio indicativo caso di studio

Incidence of Subclinical CT Changes High in COVID-19 Cases

FRIDAY, March 20, 2020

…

The researchers found that 73 percent of the cases were asymptomatic, and 54 percent of these cases had lung opacities on CT. The remaining 27 percent of cases were symptomatic, and 80 percent of these cases had abnormal CT findings. Lung opacities and airway abnormalities on CT were seen more frequently in symptomatic versus asymptomatic cases (lung opacity: 80 versus 54 percent; airway abnormalities: 50 versus 18 percent). More ground-glass opacity (GGO) was seen over consolidation (80 percent) among asymptomatic cases, while symptomatic cases more often showed consolidation over GGO (38 percent). In symptomatic versus asymptomatic cases, the CT severity score was higher, particularly in the lower lobes (symptomatic versus asymptomatic cases: right lower lobe, 2 ± 1 versus 1 ± 1; left lower lobe, 2 ± 1 versus 1 ± 1; total score, 7 ± 4 versus 4 ± 2).

"Asymptomatic cases showed more GGO over consolidation and milder extension of lung parenchymal opacities," the authors write.

https://www.drugs.com/news/incidence-subclinical-ct-changes-covid-19-cases-89088.html?utm_source=ddc&utm_medium=rss&utm_campaign=Incidence+of+Subclinical+CT+Changes+High+in+COVID-19+Cases

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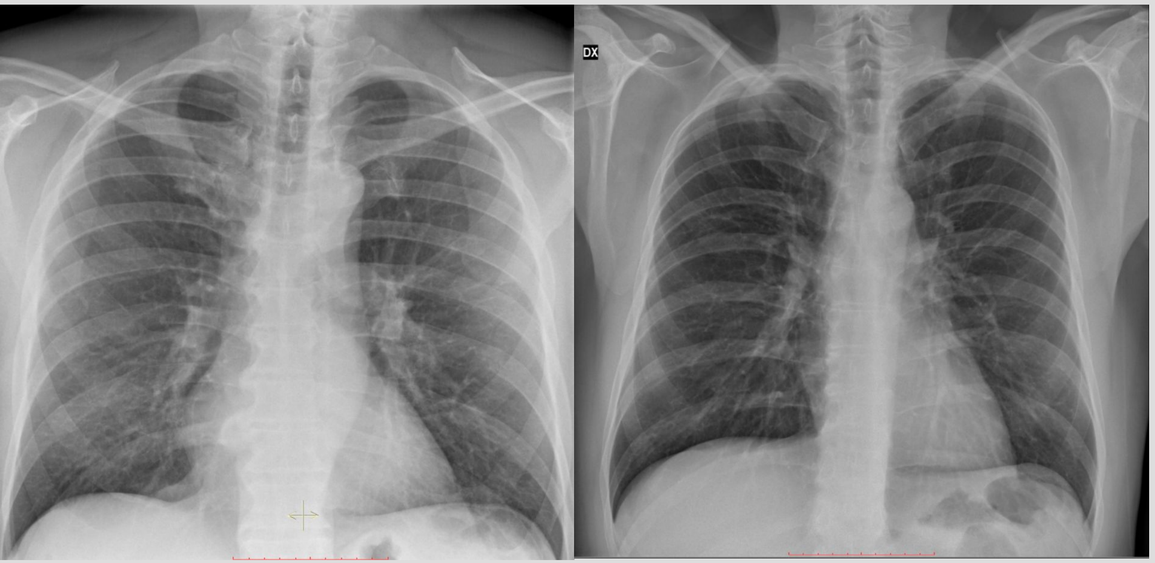
2. Sviluppo tool intelligente per identificare patologie da image recognition di RX e TC



Chest X-Ray

Development of an intelligent tool to identify diseases from X-ray and C.T - scan image recognition

The system developed in collaboration with the Health Physic Department of Mantua Hospital, allows medical staff to send via web X-ray and C.T- scan images in a simple way. The system, in a few seconds, assesses the presence of suspicious elements and the potential development of diseases.

Starting from the analysis of CT- scan of the lungs, AI system is able to process the image and give and answer in a few seconds. This tool has been now developed in order to find lungs abnormalities in patients experiencing early Covid- 19 symptoms before these symptoms degenerate into respiratory problems or pneumonia. Timing in identifying the pathology and time needed to elaborate the analysis, are fundamental factors in the identification of the disease and in hospital course.

This tool allows hospitals to be more efficient in diagnosis, reducing the number of patients that need to be admitted into Intensive Care Unit.

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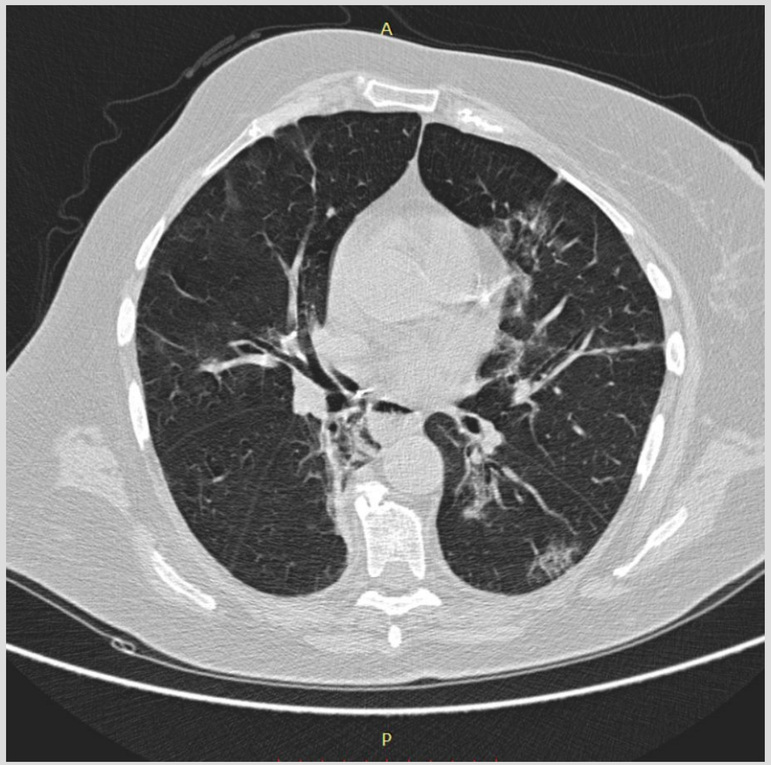
2.Elementi distintivi e vantaggi competitivi rispetto ad altre applicazioni



CT-scan of a Covid-19 positive patient

Distinctive elements and competitive advantages over other applications

Instantechnologies developed a semantic AI tool that is able to reduce the time for training the system by a factor 1000/10000. As a matter of fact, semantic AI doesn't consider the image as "sets of points" , instead, it considers and understands single visual elements that compose it, giving a meaning to what it sees.

System training is done by transferring the concept that gives meaning to each visual element; this makes it recognizable regardless of the point of view or variants represented.

This unique methodology, which we have developed in the last decade in a proprietary way, allows to reach in a faster way results; it requires less infrastructure; a lower computing power; it reduces costs and it is faster in giving the required results.

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“An ally is a power capable of carrying a man beyond the boundaries of himself”

CARLOS CASTAÑEDA

Covid-19
Hack the Virus

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