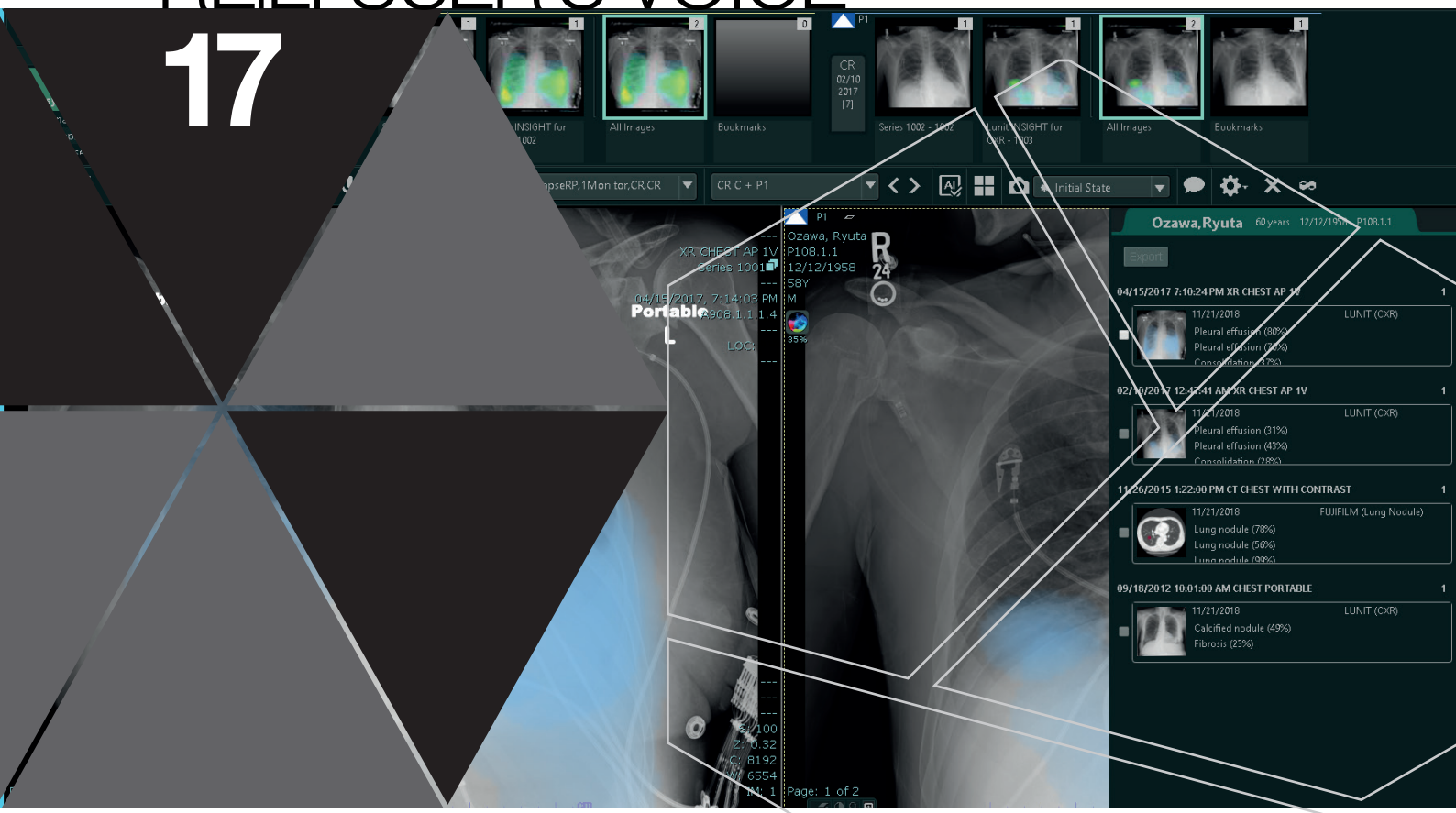
FUJIFILM
Value from Innovation

Fujifilm
TAKE
AWAY

REiLI USER'S VOICE
17



Artificial Intelligence

http://reili.fujifilm.com/en/

During the COVID-19 emergency Fujifilm has installed REiLI at the ASST of Vimercate, the first site in Europe to use Fujifilm artificial intelligence

Giovanni Delgrossi,
Head of the IT Department
of ASST Vimercate

Dr. Marcello Intotero,
Director of the Department of Radiology
and the Department of Diagnostic Services.

The Local Health Authority of Vimercate is part of the Regional Health and Social Security System. For many years now, it has collaborated with international scientific institutes, such as the Healthcare Information Management Systems Society (HIMSS), with the aim of creating solid, long-lasting IT solutions and architectures to help the specialists improve their work. The architecture, technology and organization of the ASST of Vimercate are all designed to put the patient at the centre of the logistical, diagnostic and therapeutic pathways. The ASST covers an area of 1,121 km2, serving 1,205,000 inhabitants; every year, in particular, Vimercate Hospital processes more than 460,000 X-ray examinations.

Its propensity for innovation and cutting-edge technology earned the hospital the EMRAM Stage 6 award, a synonym of "leadership in hospital IT" in 2014, ranking it among the 40 European hospitals on this level and the Italian hospitals classified as excellent in the special table for digitalization certified by HIMSS Europe. Its EMRAM Stage 6 certification was confirmed in 2017 and the ASST is currently planning improvements with a view to obtaining EMRAM Stage 7 certification.

The ASST of Vimercate has collaborated with Fujifilm for many years, and has recently stipulated a collaboration agreement with a view to exploring new approaches to the treatment of patients with benefits both for the clinical services and to support healthcare operators.

The major emergency caused by the rapid spread of the COVID-19 virus, which has disrupted the hospital's operations, has also, however, given the opportunity to test REiLI in support of the radiologists in their daily work, by increasing the operational workflow and easing the burden of interpreting a large number of examinations.

At this difficult time, as a historical partner of Vimercate Hospital, Fujifilm decided to make its tools available to reduce the problems caused by the spread of COVID-19. Ever since the start of the emergency, Vimercate Hospital has operated to all effects as a COVID centre, dedicating its resources to the treatment of patients affected by the coronavirus.

At the start of the lockdown, Fujifilm undertook to plan a road map for installing REiLI, in collaboration with the IT department of the ASST of Vimercate and, in particular, with Giovanni Delgrossi, Head of the IT Department of ASST Vimercate, and Dr. Marcello Intotero, Director of the Department of Radiology and the Department of Diagnostic Services. In just two weeks Fujifilm managed to install a parallel PACS capable of housing the artificial intelligence platform REiLI, fed by the Lunit INSIGHT CXR algorithm, an artificial intelligence software that detects lung diseases, including pneumonia.

The installation of a dual software package enabled the daily workflow to continue uninterrupted, by activating REiLI on all the workstations at the disposal of the 17 radiologists and 24 technicians working at the facility. The system was implemented for emergency management on 28 March, and processed more than 600 examinations in its first five days of operation.

REiLI, Fujifilm's Artificial Intelligence platform, is integrated with the Lunit INSIGHT CXR module, already validated for the analysis and detection of the main types of lung disease (nodules, atelectasis, fibrosis, calcifications, cardiomegaly, etc.), and has recently been updated in order to provide support in identifying the parenchymal consolidation caused by COVID-19 (new version of Lunit INSIGHT CXR3).

The analysis of chest X-rays with artificial intelligence integrated in the Fujifilm RIS system enables users to identify severe cases of lung disease and optimize the management of patients affected by COVID-19.

During the rapid spread of the coronavirus, artificial intelligence has been found to be a useful supporting tool for managing the heavy workload, by offering the possibility of conducting examinations quickly and effectively to detect the presence of pulmonary parenchymal consolidation caused by the virus.
In this period of emergency, Artificial Intelligence is used to process every chest X-ray analysis (first-aid patients with respiratory symptoms, patients admitted to hospital with COVID-19 and before discharging a recovered patient).
The images to be reported come from the PACS installed at Vimercate Hospital, which sends them automatically to the parallel PACS integrated with REiLI. The artificial intelligence platform recognizes the type of examination and subjects it to analysis by the Lunit algorithm, which, in the case of pulmonary consolidation, assigns a score to it and returns the output to REiLI.
The innovative technology of REiLI, which collects and reorganizes the examinations, detects positive cases rapidly. The output generated is viewed by the radiologists directly on the reporting list of the RIS, so that they have an indication of the examinations to be reported. The RIS does not give an immediate view of the findings of the artificial intelligence software so as to avoid the risk of bias.
"The major emergency that we have had to face has disrupted the operation of the entire National Health System, as well as the daily work of our radiologists and technicians", declares Dr. Marcello Intotero, Director of the Department of Radiology and the Department of Diagnostic Services. "At the ASST of Vimercate we have studied every patient suspected of having covid19 by conducting chest X-rays in order to detect the presence of any alterations of the parenchyma suggestive of interstitial pneumonia; these examinations have been used to monitor the development of the disease during the hospital stay with a frequency that depends on the patient's clinical course. X-ray examinations have been a fundamental tool in this new diagnostic and therapeutic process for these patients, often particularly fragile and complicated from the clinical point of view.
The use of REiLI has enabled our radiologists to report on pathological examinations more quickly and efficiently even though, in purely numerical terms, the workload has not increased dramatically due to the reduction in the activities associated with other types of non-urgent examinations, which were discontinued to reduce the flow of patients coming to the hospital. The activities at our facility have been completely restructured to cater exclusively for covid patients; in this situation it became fundamentally important to process all the examinations more quickly to ensure maximum support for the clinicians. REiLI has made a major contribution to the work organization process in that all the examinations identified by artificial intelligence as covid suspects are processed by the radiologist in much less time than those that the system assesses as corresponding to a healthy lung. It has been extremely useful in determining the priority of the examinations and has proven to be an important aid in responding promptly to the emergency."

"At Vimercate Hospital we have registered and treated about 900 cases testing positive for coronavirus and over 80 chest X-rays of inpatients and first-aid patients a day have been analysed" – states Giovanni Delgrossi, Head of the IT Department of ASST of Vimercate – "If no priority is set for the examinations to be reported, it may take hours to identify a particular X-ray, which could require prompt, immediate action by the doctors. In an emergency like the current one, we need to react and act even more quickly. Artificial intelligence is particularly important in this setting. Fujifilm, which has always been a reliable and competent partner, has responded promptly yet again to our facility's needs, by taking immediate action to install a software package useful in supporting my work and that of my collaborators. As is happening in other hospitals around the world, artificial intelligence technologies are rapidly being implemented to tackle the pandemic caused by the coronavirus, and we, together with Fujifilm, have worked hard to make REiLI operational as early as possible. The information obtained from artificial intelligence provides important support for the work of radiologists as it enables them to identify the most severe cases rapidly. Assigning priorities to a work list through REiLI provides a second opinion to support our operators and benefit our patients."

REiLI