

55th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE
ACTIVITIES (D5)

Knowledge management in the digital transformation (2)

Author: Mrs. Marie Laure Gouzy
MEDES - IMPS, France, marie-laure.gouzy@medes.fr

Prof. Alain Luciani
University Paris Est Creteil, France, alain.luciani@aphp.fr
Mr. Eric Morand
Centre National d'Etudes Spatiales (CNES), France, eric.morand@cnes.fr
Mr. Orphée Faucoz
Centre National d'Etudes Spatiales (CNES), France, orphee.faucoz@cnes.fr
Dr. Sebastien Mulé
Université Paris Est Créteil (UPEC), France, sebastien.mule@aphp.fr
Mr. Arthur Tenenhaus
CentraleSupélec, France, arthur.tenenhaus@centralesupelec.fr
Mrs. Littisha Lawrance
Laboratoire d'Imagerie Biomédicale Multimodale Paris-Saclay, France, littishalawrance@gmail.com
Mr. Younes Belkouchi
DTIS, ONERA, Université Paris Saclay, France, Younes.BELKOUCHI@gustaveroussy.fr
Mr. Hugues Talbot
CentraleSupélec, France, hugues.talbot@centralesupelec.fr
Dr. Laure Boyer
France, laure.boyer@medes.fr
Prof. Nathalie Lassau
France, nathalie.lassau@gustaveroussy.fr

ARTIFICIAL INTELLIGENCE DATA AUGMENTATION FOR THE BENEFIT OF CITIZEN'S
HEALTH**Abstract**

The Centre National des Etudes Spatiales (CNES), willing to open up towards non-space ecosystems to foster inter-disciplinary innovation for the benefit of the economical, societal and environmental development has already promoted the existing collaboration with the French Society of Radiology (SFR). Relying on its "Connect, by CNES" initiative to "fuel disruptive innovation and drive economic development through the use of space solutions", CNES and the SFR have strengthened their partnership in the field of image processing and radiology in order to promote co-innovation, enable capacity building and ultimately solve challenges that are common to both entities. Indeed, SFR, which is a national scientific society binding all French radiologists is not only concerned by diagnostic and therapeutic imaging tools but also by techniques such as advanced imaging treatment algorithms, image texture analysis, and artificial intelligence which all aim at providing key prognostic tools, allowing more preventive, more predictive and more individualized practice of medicine. Through the elaboration of a common roadmap, common challenges have been evidenced, such as the need to rapidly process a large amount of data, to detect, extract and analyze weak signals and to translate the information into operational product for the user,

who is not always an expert.

The paper aims to highlight an initiative launched in October 2021 by SFR and CNES called Data Challenge which is a contest dedicated to Artificial Intelligence data augmentation for rare tumors. Today, there is no easy path to reach and generate enough data for rare diseases, there is no existing software able to detect those very rare anomalies. CNES had developed an expertise in generating data, especially through the general adversarial networks. The CNES-SFR collaborative working group naturally wondered if it would be possible to generate a large database from a very small rare disease dataset focusing on aggressive liver cancer. Beyond the technical results of the contest, the objective was also to federate different ecosystems around a common approach and having radiologists and industrialists, researchers, students from both space and radiology fields working together to answer to the objective of the contest.

Finally, the paper will propose to review both the organization of the challenge, protocols of evaluation of the quality of generated datasets and of course, the work of the winning team which will be selected at the very beginning of April, 2022.