

**EARLY-CAREER
RESEARCHERS IN MEDICAL
APPLICATIONS @ CERN –
SHORT TALKS**

Report of Contributions

Contribution ID: 1

Type: **not specified**

Overview of Digital Technologies for Medical Applications at CERN

Wednesday 9 November 2022 16:30 (5 minutes)

Presenter: RAIMONDO, Alessandro (CERN)

Contribution ID: 2

Type: **not specified**

CAFEIN project: A deep learning approach for diagnosis' support

Wednesday 9 November 2022 16:35 (15 minutes)

A novel AI-based tool to assist clinicians, patients and caregivers in the analysis, diagnosis and prognosis of brain abnormalities based on the integration of clinical and imaging data. CAFEIN follows the 'life-cycle' of a radiology department and implements machine and deep learning tools using raw magnetic resonance images, X-ray images and patient data in order to improve clinical workflow's efficiency and performance. The tool focuses on strokes, brain tumors, multiply sclerosis and small vascular diseases while targets on detection, segmentation and classification tasks.

Medical applications developed over the CAFEIN:

- a. Brain MRI anomaly screening
- b. Multi-pathology detection and classification

Presenter: STATHOPOULOS, Ioannis (National and Kapodistrian University of Athens (GR))

Contribution ID: 3

Type: **not specified**

MARCHESE project –Remote Monitoring of Health Parameters

Wednesday 9 November 2022 16:55 (15 minutes)

Intelligent robotic systems are becoming essential for space applications, medical applications, industries, nuclear plants, and for harsh environments in general, such as the CERN particles accelerator complex and experiments. Nowadays, mechatronic systems use mature technologies that allow their robust and safe use, even in collaboration with human workers. Specific for complex and hazardous environment, vital signals monitoring is expected to support people in their daily activities in the near future, following continuous strides in developing health technologies. As the industry 4.0 revolution grows, robotic systems are increasingly deployed to support health monitoring, like for example in search and rescue scenarios for disaster areas. This presentation introduces contactless human health monitoring methods explored using photoplethysmography methods and machine learning techniques. Experiments conducted on several people demonstrate that cardiac activity can be monitored from camera views to obtain non-invasive and reliable vital parameter measurements. This system could address several medical applications in the future to meet the required health and safety needs, also besides the CERN context.

Presenter: CITTADINI, Roberto (Universita Campus Bio-Medico (IT))