Project Proposal

Biomedical sensors frameworks and methodologies for Workplace Safety and Health enhancement

Project Description

Because of National and European laws, safety assessment and management are common tasks to be accomplished regularly: the number of accidents at work is increasing year by year.
The project aims at defining a methodology that analyses and characterises data from biomedical sensors for monitoring workplaces, in order to detect anomalies, prevent hazardous conditions, identify stress conditions [1], ensure compliance to safety-related laws and improve the quality of life of workers.

We propose a framework implementing a data integration methodology [2] for correlating many kinds of biomedical information sources in a unified model, in order to early detect [4] dangerous situations for workers, as well as environmental conditions that may run into problems for safety.

Starting from the integrated data, sensed from heterogeneous biomedical sources, we implement innovative techniques of machine learning and deep learning, by building ad hoc models or using and fine-tuning models from the state of the art in the literature [6,7,8].

We envisage the definition, training, implementation and validation of proper ML and DL algorithms able to interact with a heterogeneous set of biomedical sensors and information sources for quantitative verification of safety conditions in workplaces, thus enabling [3,5]:

(i) measurement of parameters related to the personal and environmental conditions of workers and workplaces
(ii) improvements of workers' safety and well-being conditions, by generating early warnings at the occurrence of possible risk conditions
(iii) monitoring of environmental hazards and provisioning of early warnings
(iv) monitoring of vital parameters and detection of stress conditions
(v) detection of obstacles and proximity to danger zones in order to reduce risk of accidents
(vi) automatic control of wearing of personal protective equipment

The final goal of the project is to implement a demonstrator to be tested and validated in different Public Administrations to prove that it can be effectively used for improving security of workplaces.

Expected background of the candidate preferably comprehend Artificial Intelligence, Machine/Deep Learning and Big Data Processing foundations.

Supervisor(s), Lab/Group details, other additional info. Flora Amato, DIETI Artificial Intelligence PICUS Group https://picuslab.dieti.unina.it/index.php/people. LaBadam Laboratory: room 1.13 (15-seat Laboratory with Server Room, currently under maintenance, scheduled for release in September 2022). "Misure e Collaudi" Laboratory, room S.03 (equipped with different special purpose sensors)

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