PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 1 EARLY STAGE GRANT LASTING 24 MONTHS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENT OF MANAGEMENT, INFORMATION AND PRODUCTION ENGINEERING (SC 09/G1 – SYSTEMS AND CONTROL ENGINEERING - SSD ING-INF/04 – SYSTEMS AND CONTROL ENGINEERING) – CUP E11B20000010007 - TYPE B
PICA CODE: 20AR008

announced with decree of the Chancellor Rep. no. 81/2020 of 11.02.2020 and posted on the official registry of the University on 20.02.2020

RESEARCH PROJECT
"Ens-of-line defect classification using deep learning algorithms"

Research structure: Department of Management, information and production engineering
Duration of the grant: 24 months
Scientific Area: 09 – Industrial and information engineering
Academic recruitment field: 09/G1 – Systems and control engineering
Academic discipline: ING-INF/04 – Systems and control engineering
Scientific Director: Prof. Fabio Previdi

The WATCHMAN project aims to develop a hub of skills and experimentation on Computer Vision, through the development of Research and Development Goals developed in two application cases. The main goal is the creation of a new element of manufacturing processes (process innovation) with a high impact on product quality. It is the creation of a methodology with a modular approach for the design of highly reconfigurable Machine Vision systems, thanks to the introduction of the latest technological innovations in artificial intelligence, vision systems, collaborative robotics and data management. The purpose of the intervention is the creation of an extremely modular and easily reconfigurable system prototype, capable of solving heterogeneous artificial vision problems in manufacturing and beyond. In particular, modularity will allow the creation of interconnected but independent systems, and therefore usable together or alone on the basis of the needs of the end user. The reconfigurability will make the system easily adaptable to the solution of artificial vision problems in very different productive realities, covering the whole of the Lombard manufacturing sectors.
The research activity will mainly be focused on two workpackages.
VISION module
With the aim of creating a hub focused on artificial vision, this module must be able to provide the correct technological answers to the various vision problems that may arise. Thanks to the high modularity of the proposed approach, it will be possible to face problems in various production areas using the most modern image acquisition technologies.
INTELLIGENCE module
It is focused on the realization of classification algorithms based on deep convolutional neural networks, trying to overcome the limitations due to the huge amount of labeled images that they need to be trained. The transfer learning paradigm will be used, thanks to which a neural network can be reconfigured to perform even very different tasks with a limited number of training images. The ultimate goal will be to train and reconfigure networks, using fewer and fewer shot learning.