

**PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 1 EARLY STAGE GRANT LASTING 12 MONTHS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENT OF MANAGEMENT, INFORMATION AND PRODUCTION ENGINEERING (SC 09/A3 - INDUSTRIAL DESIGN, MACHINE CONSTRUCTION AND METALLURGY - SSD ING-IND/15 - DESIGN METHODS FOR INDUSTRIAL ENGINEERING) TYPE B
PICA CODE: 20AR012**

announced with decree of the Chancellor Rep. no. 87/2020 of 11.02.2020 and posted on the official registry of the University on 20.02.2020

RESEARCH PROJECT

“Development of applications for neuro-cognitive rehabilitation processes by means of virtual reality technologies and motion capture systems”

Research structure: Department of Management, information and production engineering

Duration of the grant: 12 months

Scientific Area: 09 – Industrial and information engineering

Academic recruitment field: 09/A3 – Industrial design, machine construction and metallurgy

Academic discipline: ING-IND/15 – Design methods for industrial engineering

Scientific Director: Dr. Andrea Vitali

The research project concerns the development of applications for neuro-cognitive rehabilitation. Today cognitive rehabilitation processes are based on a series of traditional approaches that have shown in some cases an ineffective recovery of daily actions by the involved patients. The ineffective recovery is a consequence relative to a low ability of current rehabilitation processes to emulate real life situations in which the patient will be involved after being discharged from the rehabilitation center. Furthermore, there is an increasing need for innovative tools that allow an objective intra-operator and inter-operator measurement of the patient's condition during the rehabilitation process.

In this context, the proposed research activity will aim to develop innovative applications for the objective evaluation of rehabilitation processes in the neuro-cognitive field with particular attention to rehabilitation procedures necessary after serious brain injuries. The applications developed in this area will be based on virtual reality technologies and motion capture systems. These technologies allow creating interactive environments, which permit to simulate actions of daily life and therefore, better rehabilitation tasks more useful for the recovery of neuro-cognitive abilities.

The project is subdivided in three main phases. The first phase will concern the development of application prototypes. In this phase, the most appropriate hardware and software technologies will be identified for the creation of the final solutions. The chosen technologies will belong to consumers, free and Open-Source categories. The availability of these technologies are important to ensure the real introduction of the developed solutions as rehabilitation tools in the medical practice.

The second phase will concern the usability analysis of the developed prototypes in order to make them usable by both medical staff and patients. This phase will be carried out in collaboration with the rehabilitation unit of the Papà Giovanni XXIII Hospital in Bergamo and the Quarenghi Private Clinic in San Pellegrino (BG).

The third and final phase will concern the clinical experimentation of the solutions developed at the mentioned hospitals by involving patients.

Final results will be published on international scientific journals and international conference proceedings.