INTERUNIVERSITY PH.D. PROGRAM BETWEEN

POLITECNICO DI BARI AND UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

IN INDUSTRY 4.0

Designing AI-based Technology Transfer Processes for the Healthcare 4.0 challenge

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Description of the research topic

The process of Technology Transfer (TT) is fundamental because it leads to absorption and dissemination of technologies, equipment, resources and products, and knowledge, in addition to encompassing approaches to transfer barriers, mechanisms and models at the various stages of technological and industrial supply chains.
In the particular complex and multidisciplinary context of the Industry 4.0 challenge, technology transfer plays a key role.
Industry 4.0 and its main enabling information and communication technologies are completely changing both services and production worlds. This is especially true for the health domain, where the Internet of Things, Cloud and Fog Computing, and Big Data technologies are revolutionizing eHealth and its whole ecosystem, moving it towards Healthcare 4.0 (HC4.0).
HC4.0 needs technology transfer and requires approaches that are no longer standardized but adaptive to specific requirements. Therefore, it is necessary to define new methodologies and systems which allow the design of highly customized TT processes that are optimized with respect to the requirements and constraints of the companies and the contexts in which they operate.
The objective of this research is to develop a new methodology supporting the design of TT processes for companies involved in HC4.0 challenge. The methodology - that exploits the potential of the "digital twins" concept - aims to formalize and optimize, through a specific framework, the process of technology transfer through Big Data and AI methods.
AI methods and tools will be used for feature processing and genetic algorithms for multi-objective optimization will be considered in order to underpin the design of an advanced decision support systems and, in general, an adaptive TT environment – based on the concept of the "digital twins" - for supporting the design of the most suitable processes for technology transfer in HC4.0.
The approach will allow to integrate TT in the value chain, according to a closed-loop strategy in which the TT processes can be dynamically designed on the basis of specific optimality criteria. The specific challenge is the P4 Medicine, i.e. predictive, preventive, personalized and participatory, by means of the radical change in medicine enabled by these I4.0 new technologies.