

Industrial development is marked by a pronounced shift towards human-machine collaboration, a trend exemplified by the beginning of Industry 5.0. This evolving industrial paradigm prioritizes human-centered solutions, emphasizing resilience and sustainability. A vital part of this collaboration is the need for robots to possess more complex cognitive abilities, facilitating safe co-working environments with humans.

Technological advances have enabled diverse methods for monitoring human behavior. Analyzing these behavioral patterns enhances efficiency and collaboration.

This study introduces a setting where monitoring the operator and the robot is possible. It is achieved through a camera, an indoor positioning system, and wearable sensors. The collaboration can be represented by indicators (utilization of participants, level of stress based on physiological measurements of the person).

Targeted measurements were conducted, and the results underwent comprehensive analysis. The objective is to bridge the gap between human activities and collaborative robots and design their service to human needs. The developed methodology is presented in a complex demonstration game, and a design of experiments is shown.

Keywords: Collaborative robot, human-robot interaction, indoor positioning system, design of experiments