

# Human factors and motion planning in cooperative tasks with a collaborative industrial robot

Record number : OPR-531

## Overview

### RESEARCH DIRECTION

Wael Suleiman, Professeur - Department of  
Electrical and Computer Engineering

### INFORMATION

[wael.suleiman@usherbrooke.ca](mailto:wael.suleiman@usherbrooke.ca)

### ADMINISTRATIVE UNIT(S)

Faculté de génie  
Département de génie électrique et de  
génie informatique  
Institut interdisciplinaire d'innovation  
technologique (3IT)

### LEVEL(S)

2e cycle  
3e cycle

### LOCATION(S)

Campus principal  
3IT - Institut interdisciplinaire d'innovation  
technologique

## Project Description

Several factors need to be considered during an interaction between a human and a collaborative industrial robot. Among all the security constraints associated with the use of robots in a human environment, the psychological effects should not be neglected. In this thesis, we plan to investigate the comfort and awareness factors that affect the performance of a human collaborating or working near a collaborative robot in an industrial environment. We also plan to study how to model the comfort (physical and behavioral) criteria associated with human-industrial robot collaborative tasks. To build this model, we envision to explore several approaches (e.g., deterministic, stochastic, temporal logic theory, deep learning), and study how to combine these approaches with the spatio-temporal information from the robot's local sensors. Once the factors are identified, we plan to integrate them into a motion planning algorithm. The factors will be transformed into objective functions to be maximized or minimized during the motion. Validation tests on the robots Baxter and Sawyer will be conducted to validate the developed approaches, and the results to be published in top-tier robotics conferences and journals.

## Discipline(s) by sector

Sciences naturelles et génie

Génie électrique et génie électronique

## Funding offered

Yes

The last update was on 13 March 2024. The University reserves the right to modify its projects without notice.