

# Development of perception skills for building coherent explanations during robotic manipulation

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## Abstract

In the context of the CHIST-ERA project COHERENT, we are investigating how a robotic system composed of different layers of intelligent systems can generate coherent explanations about the robot's intentions behind an action or the reasons for failure. Such explanations provided not only at the end of a task but during the manipulation can ensure a more trustworthy relationship during robotic assistive tasks.

In this framework, the student will work with methods to provide explainability at the perception level to algorithms used to recognize the different scene states during a task, emphasizing on the uncertainty quantification of the recognized parameters/states. This will contribute to the explainability of the overall system. The student will collaborate closely with the COHERENT team that is already working at the decision-making and action execution levels, with the objective of studying how to represent the knowledge learned at the different levels in a way that can be used to synthesize explanations. The project has a duration of 9 months that will allow the student to learn new techniques and to train and evaluate the solution in realistic scenarios. Collaboration with international partners and scientific publications is expected.

**Keywords**— Computer vision, deep learning, explainability, knowledge representation