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**Robotic perception and control for a  
demolition task in unstructured  
environments**

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## *Abstract*

The construction industry is a capital-intensive sector that has steadily turned towards mechanized and automated solutions in the last few decades. However, due to some specificities of this field, it is still technologically behind other sectors, like manufacturing: there is room for improvements, that could lead to economical, technical, and also social benefits. In this work we focus on demolition robotics: taking the task of demolishing a wall as a case study (related to the needs of an industrial partner of the PERCRO laboratory), we propose a mockup for studying perceptual and control aspects on a scaled-down representative scenario. The thesis deals with several aspects of the demolition task, ranging from perception, to planning, to human-robot interaction (HRI). In addition to a conceptual framework, we propose some new approaches to scene segmentation and situational awareness in unstructured environments, as well as an intuitive on-site HRI paradigm.

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**PERCRO** Perceptual  
Robotics Laboratory



Scuola Superiore  
Sant'Anna



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