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Sommario/riassunto	For human-robot-interaction, this work proposes a method for monitoring the complex, dynamic environment of the robot. The robot motion is controlled based on the concept of nonlinear model predictive control. The controller considers the detected obstacles and intended or unintended contacts of the robot with its environment so that undesired collisions are avoided and an adequate reaction to contacts is achieved. The proposed approaches are analyzed on a mobile manipulator.