

# Developing a Natural Multimodal Human-Robot Interface

## Client

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## Description

As smart robots are transforming many industries and becoming an integrated part of our daily activities, humans and robots will inevitably interact more regularly. The purpose of this project focuses on the development of a multimodal human-robot interface that can intuitively convey the information collected by robots and reduce robot control complexity, thereby enabling natural human-robot collaboration in robot-assisted inspection applications, such as pipeline inspection, and search and rescue.

## Objectives

Students will be required to develop an intuitive interface in Ubuntu for an end-user to interact with a pipe crawler (under development) or a mobile robot, which can:

- Convey information acquired from the robot in real time,
- Integrate and switch between different control modalities (developed in the client's previous research) to enable multimodal robot operation,
- Record and replay user-defined sensory data for future analysis,
- Incorporate the above components in a visualization interface.



*Figure: Mobile robots to be used in this project.*

## Required and Desired Skills

- Experience of programming in Ubuntu (language is flexible) is required.
- Strong software engineering skills are required (the code *must* be maintainable and extendable).
- Familiarity with Robot Operating System (ROS) is preferred (but not required).

## Student Benefits

Students will have the opportunity to access modern robotics systems, collaborate with graduate students and faculty on cutting edge robotics applications, and develop work experience of system design that is highly relevant to graduate education and industry positions.

## Location

Students will mainly work in the Human-Centered Robotics Laboratory (HCRobotics Lab) in the Brown Building at CSM.