

Assistive robots dependability in domestic environment: the ASIBOT kitchen test bed

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Historically the kind of technologies used in homes has been in the form of electrical appliances such as washing machines, ovens, etc. Later was introduced the classic "Home Automation" concept, which involves improvements like computer-controlled devices such as lights, alarms, different sensors, etc. and the Ambient Intelligent paradigm is contributing to integrate and disallocate all the devices working together to present a ubiquitous computing environment that provide IT services. The classic devices have always been static, this means they are installed in the house and stay there during all their useful life doing always the same task. New mobile robotics devices are conquering homes, like vacuum dry units which use the free floor space to clean it while moving. This is the first step in the introduction of advanced technologies in home environments. The main concept is to introduce dynamic and mobile items in homes, it means robots, to serve not only information or environmental control, but also "household chores" that requires dextrous manipulation and advances sensing and reasoning. This is a huge objective and implies a big improvement step of basic robotics technologies, almost related with anytime availability, safety and user satisfaction. From a point of view of dependability the most complex part of a house would be the kitchen, attending to the number of static-fixed task devices (white appliances). This is the first working scenario, to test the acceptance of new modular types of robotic aids for handicapped. The ASIBOT based domestic aided Kitchen, is the adaptation of a handicapped adapted kitchen for the operation of the portable climbing robot ASIBOT. Its ability to travel around the house between fixed or mobile stations has been deeply tested, and clinical trial has been discovered its usefulness to assist motion impaired to perform by themselves a wide variety of tasks: eating, cooking, washing, transportation, etc. But previously programmed based behaviour is not enough to meet the user's expectations and deeply usability improvements are detected. The light-weight robot ASIBOT2, aims to be a domestic robot assistant without on board intelligence, but safe and reliable with its mechatronic design and force-torque sensing, cameras at the tips, and control along the entire robot structure. Our target is to develop and test new light weight domestic climbing robot specifically designed and programmed for human-robot interaction in domestic environments, "dependability proved". This paper present the first simulation results of integration of ASIBOT2 in the kitchen environment and also presents the experimental results of ASIBOT1 in similar home environments like bathroom.

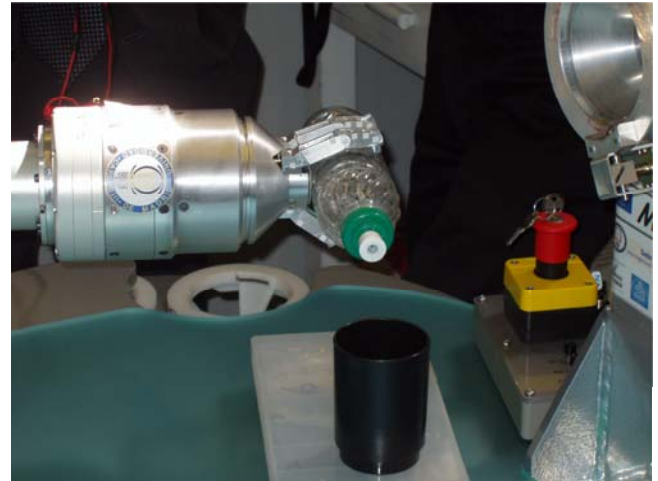


Fig. 1. Asibot hand.

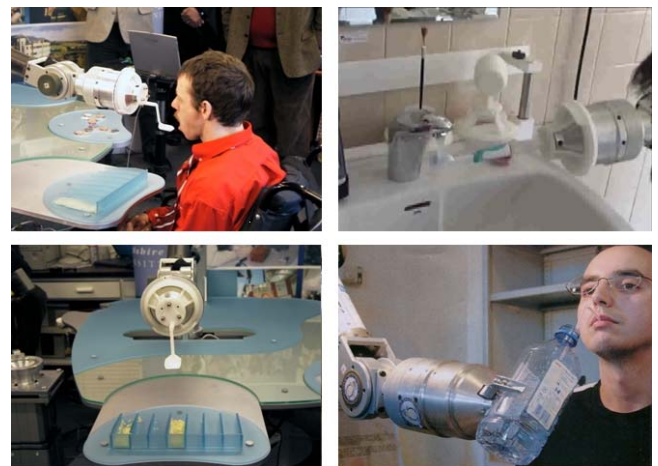


Fig. 2. Asibot applications.



Fig. 3 User trial.

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