

Title	Home Automation Services Engineering for the Integration of Cobots in an Assistive Environment
Context	<p>Disabled people wish to take care of themselves without being a burden for their families. For now, the best solution is the presence of caregivers at home. But economic and demographic issues make this solution difficult to realize and put in danger disabled people' autonomy. This is also the case for injured people or handicapped teenagers, who aspire to leave home to do their lives</p> <p>Int his context of dependency, one solution is to equip the home with home automation, assistive robotics or human man interface devices... New technologies and digital services can also be used in a health and well-being context, constituting building blocks of the smart home, which must deliver these services in the safest, most comfortable, most ergonomic and ethical conditions for the people.</p> <p>The work done at Lab-STICC in this field (more precisely in the HAAL project) takes part in the development of research activities in a field that has become a national priority : live long and get old well. This is also about developing experimentation infrastructures, devices and services falling within these objectives and testing them in a real environment. The objective is to prepare the future generation of adaptable apartments, which would not only be adapted and to address technical and ethical topics of the future such as optic fiber, cyber-security and smart fabrics.</p>
Objectives	<p>Setting up adapted housing infrastructures seems to be a necessity for the disabled people. Such a housing can be equipped with technological devices from the general public such as home automation or robotic platforms. These solutions, with heterogeneous capabilities and functionalities must collaborate and interact with the humans to carry on adapted services.</p> <p>This thesis project addresses these challenges, both hardware and software.</p> <p>The first objective concerns the technological integration, which needs to think about architectural choices to support the principal constraints and characteristics of such system. In fact this system would be highly distributed with heterogeneous and evolutive components.</p> <p>Second objective lies in the adaptation capabilities of the services towards the hardware execution platform to the specificity and the needs of the user. The user's needs are necessarily evolutionary. These needs for daily services are part of the routine, but they include a part of desire and novelty. Moreover, humans can be collaborative, but they can also show resistance.</p> <p>In all cases, the system should be capable of drawing up a balance sheet upon the cooperation with the human in the accomplished task and adapt for next time.</p>
Novelty of the project	<p>The question of interoperability between home automation devices has already been carried on in several studies. It will be necessary to complete this work toward robotic platforms and assistive robots.</p> <p>We will focus mainly on the integration of cobots. Cobotics or collaborative robotics aims to produce robots that assists the human. This domain emerged in the industry to help operators in their tasks and to take into account human factors in the industrial process. Today cobotics tends to develop in the context of assistive technologies for</p>

	<p>disabled people. Finally, this thesis will study composition of services, reconfiguration and adaptation of computer systems in the context of ambient assisted living.</p>
<p>Expectations</p>	<p>Assistance to the frail raises public interest. For many years, Brittany region has contributed to innovative projects in this field. The VITAAL project aims to fight against isolation using new technologies and digital services in a context of health and well-being. The Maintien@Domicile chair is a joint scientific project from ENSIBS and IMT Atlantique. The two apartments in the ENSIBS in Lorient as well as the Experiment'HAAL living-lab at IMTA in Brest are the structural bricks of the chair and will be used as one interconnected living-lab in health and autonomy. M@D is a chair that aims to design and test systems to help disabled people (or in loss of autonomy) to live as long as possible at home. The HIT project that has been proposed in the TIGA call of PIA3 aims to enhance the life project of disabled people by bringing solutions in a systemic approach. The HIT project is supported by Kerpape rehabilitation center, iD2Santé, Brittany region and the M@D chair. This project (as well as 23 others) has been selected and funded in the context of the TIGA PIA3 AMI. The final project will be proposed in 2018.</p> <p>The benefits of this thesis are fully in line with this dynamic.</p>