



PhD Proposal 2017

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Collaboration with other partner during this PhD:	
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Title: Optimization and Modeling of Multi-source services in buildings and massive data processing (Big Data).
Scientific field: Optimization, Multi-source services, Big data
Key words: Ubiquitous, Internet of Things, Big Data, Smart building, Scheduling Optimization, multi-agent systems, modeling.

Background, Context:

We called a "**smart building**", the building where a set of techniques and technologies called home automation are applied enabling the automation and improvement of services within that structure. In our project, we define a building called "Smart", a building able to manage themselves, make decisions, predict events for better management of energy and ensure occupant comfort seamlessly and least intrusive. This complexity and distributed character design of computing architecture of an ubiquitous problem brings us back to adopt a multi-agent approach to the design of a service-oriented architecture while optimizing response time and the cost information

Research subject, work plan

The aging population, home care for the elderly, the working conditions, health, hospitals, transport, and education ... are among key issues to the development of a new territory. With the advent of new technologies (Internet of Things) and several complementary innovations (Smart Cities), we are now witnessing to the development of ways to make buildings and city of tomorrow the means allowing the home-support to the elderly, the best conditions working, for the health, for the hospitals, for the transport developments and the new services to residents and occupants.

This Thesis aims to facilitate the mobility of people by helping them to move in the best conditions in a secure and intelligent environment. The goal is the establishment of a real-time decision support system enabling all occupants of a hospital, for example to access dedicated services. This topic is focused on two main domains; Multi-agent approach in Smart building and massive data process (Big Data).

This PhD project will focus on the following five areas:

- The optimal setting up of components required for collecting the information. The objective in this section is to work on recovery algorithms for optimal placement of components required for the collection of information in a building.
- Analysis and processing of massive data (Big Data) in real time. Indeed, the analysis of heterogeneous and massive data in real time is an area in which research is still in its infancy. The objective is to minimize the measures taken intervals to analyze and manage more finely the use of services in a building or group of buildings with a real-time processing.
- This part will be devoted to a general state of the art on multi-agent systems and optimization methods and their contribution in information systems for buildings.
- The Study around a distributed optimization approach for the implementation of a multi-agent help information system for intra-urban mobility for modeling and optimization of multi-source services to of building occupants.
- Information visualization and implementation of decision support tools. Our ultimate goal is to propose to the administrator and building occupants' ergonomic tool for visualization of information and decision support. This administration must be as simplified as possible, making the building autonomous, able to manage the energy flows and anticipate events by knowing the habits of users.

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