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# Intelligent Residential Buildings and the Behaviour of the Occupants

State of the Art

 Springer

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# Preface

Over the last years, intelligent buildings and the behaviour of the occupants have been the scope of many studies. The number of studies of these areas is growing, as they appear to be the next step to optimize the energy efficiency of the buildings.

The concept of intelligent building is associated with the creation of a management system that takes into account the requirements of its occupants in terms of thermal comfort and the activities of their daily life, maintaining a good indoor air quality and minimizing the energy consumption. Thus, there is a need to study and combine these issues to obtain the new generation of buildings. In commercial or office buildings, these systems are already in an intermediate stage of implementation. However, in the residential sector, it still does not have a significant implementation.

In mild climate regions, where the interactions of the occupants with the building mechanisms are the primary way to meet their comfort and ventilation requirements, the importance of occupant behaviour studies and its incorporation in the algorithms of the intelligent buildings become even more important.

The main benefit of the book is that it contains a state of the art of two areas that have to be treated together in order to emerge a new concept of buildings, that are more efficient, more comfortable and healthier.

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# Abbreviations

ADL	Activities of daily living
AIIB	Asian Institute of Intelligent Buildings
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
BAS	Building automation system
BMS	Building management system
BP	Building performance
BRI	Building-related illness
CEN	European Committee for Standardization
CIBSE	Chartered Institution of Building Services Engineers
CIE	International Commission of Lighting (France)
CMV	Centralized mechanical ventilation
DGEG	General Direction of Geology and Energy
DNAS	Bibliographic Framework of the Behaviour of Buildings Occupants—Drivers, Needs, Actions and Systems
DSF	Double skin façade
E	Energy
EMS	Energy management systems
EPBD	European Directive on Energy Performance of Buildings
EU	European Union
HMM	Hidden Markov models
HVAC	Heating, ventilation and air conditioning
IAQ	Indoor air quality
IB	Intelligent buildings
IBG	Intelligent Building Group
IBI	Intelligent Building Institute
ICT	Information and communication technologies
INE	National Institute of Statistics (Portugal)
ISO	International Organization for Standardization



JIBI	Japanese Intelligent Buildings
KDD	Knowledge Discovery in Databases
MCMC	Markov chain Monte Carlo
NDIR	Non-dispersive infrared
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PIR	Passive infrared
QEM	Quality Environment Modules
SBS	Sick building syndrome
WHO	World Health Organization