

## Application of Supervised Deep Learning-based Machine Learning to Manage Smart Homes

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**Abstract :** Renewable energy sources, domestic storage systems, controllable loads and machine learning technologies will be key components of future smart homes management systems. An energy management scheme that uses a Deep Learning (DL) approach to support the smart home management systems, which consist of a standalone photovoltaic system, storage unit, heating ventilation air-conditioning system and a set of conventional and smart appliances, is presented. The objective of the proposed scheme is to apply DL-based machine learning to predict various running parameters within a smart home's environment to achieve maximum comfort levels for occupants, reduced electricity bills, and less dependency on the public grid. The problem is using Reinforcement learning, where decisions are taken based on applying the Continuous-time Markov Decision Process. The main contribution of this research is the proposed framework that applies DL to enhance the system's supervised dataset to offer unlimited chances to effectively support smart home systems. A case study involving a set of conventional and smart appliances with dedicated processing units in an inhabited building can demonstrate the validity of the proposed framework. A visualization graph can show "before" and "after" results.

**Keywords :** smart homes systems, machine learning, deep learning, Markov Decision Process

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