SMART HOME

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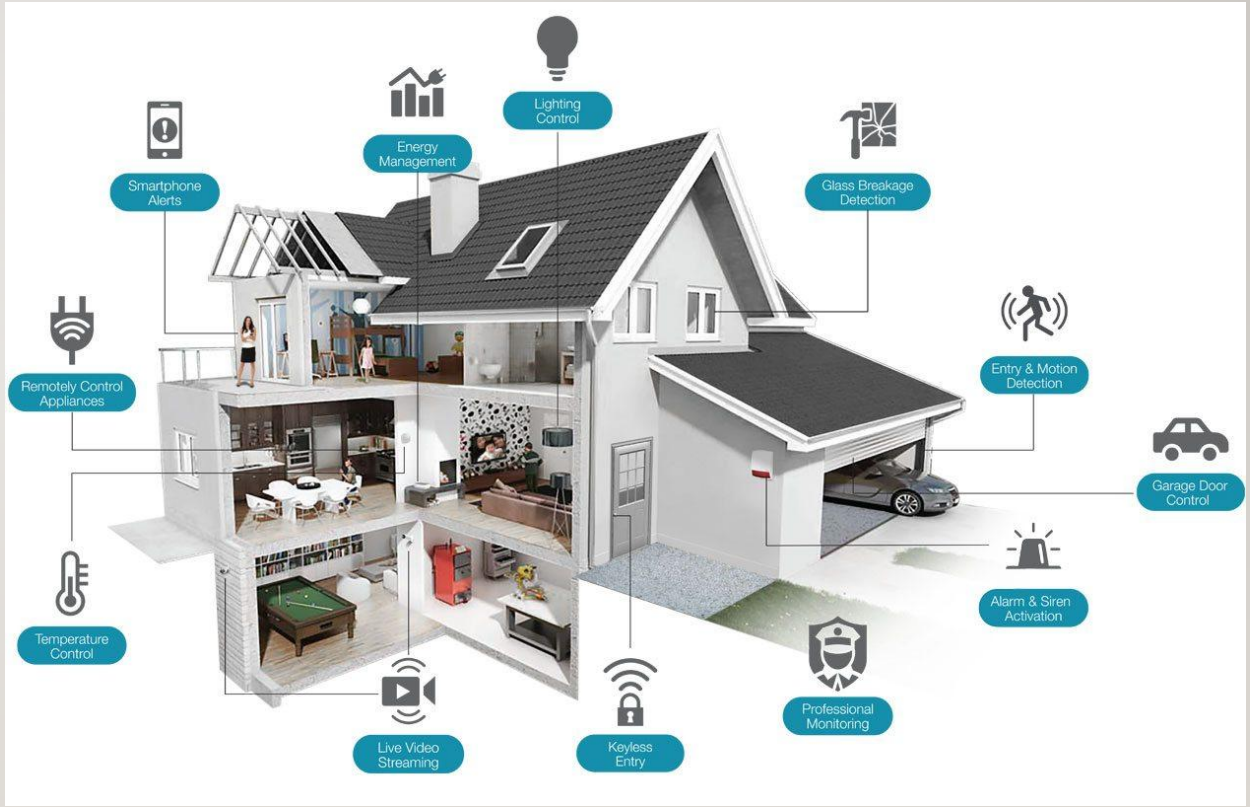
DEFINITION

SMART home technology use devices connected to the Internet of things (IoT) to automate and monitor in-home systems. It stands for Self-Monitoring Analysis and Reporting Technology. The technology was originally developed by IBM and was referred to as Predictive failure analysis. The first contemporary SMART home technology products became available to consumers between 1998 and the early 2000s. SMART home technology contributes to health and well-being enhancement by accommodating people with special needs, especially older people.

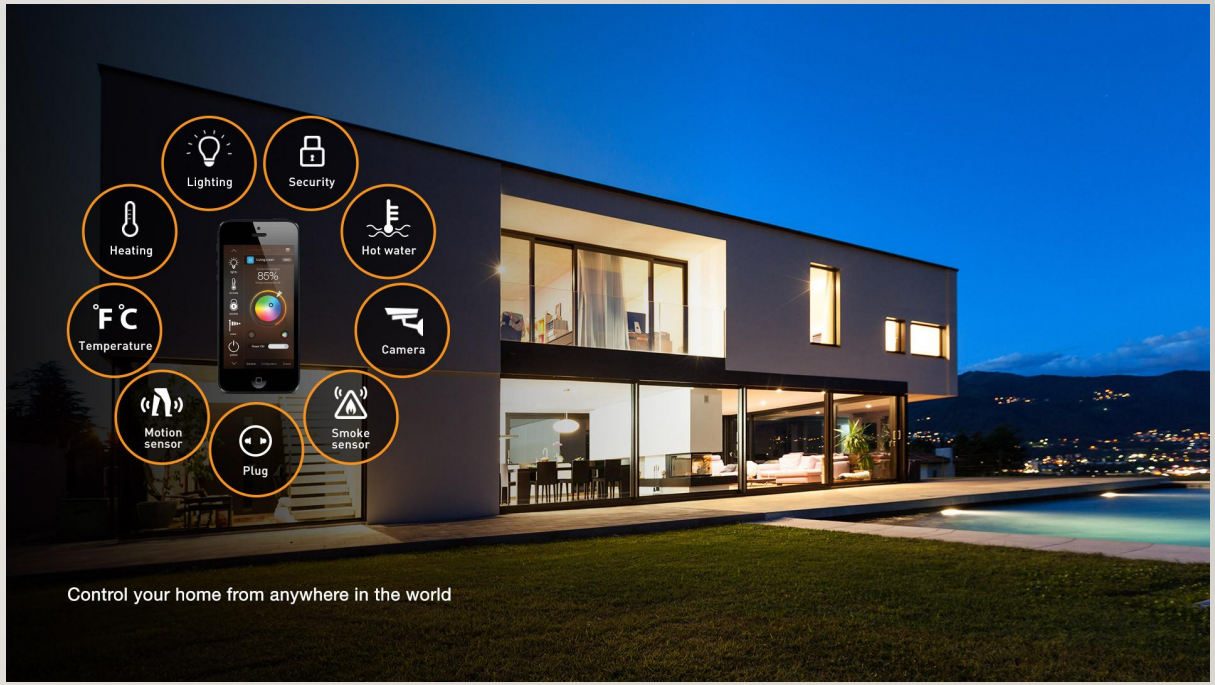


INTRODUCTION

Smart homes constitute a branch of ubiquitous computing that involves incorporating smartness into dwellings for comfort, healthcare, safety, security, and energy conservation. Remote monitoring systems are common components of smart homes, which use telecommunication and web technologies to provide remote home control and support patients remotely from specialized assistance centers.

INTRODUCTION

Smart homes offer a better quality of life by introducing automated appliance control and assistive services. They optimize user comfort by using context awareness and predefined constraints based on the conditions of the home environment. A user can control home appliances and devices remotely, which enables him or her to execute tasks before arriving home. Ambient intelligence systems, which monitor smart homes, sometimes optimize the household's electricity usage. Smart homes enhance traditional security and safety mechanisms by using intelligent monitoring and access control.



ALGORITHMS AND METHODS USED IN SMART HOMES

Category	Algorithms and methods	Purposes
Artificial Neural Network	Artificial Neural Network	• Prediction of the future states of home environment • Create and evaluate behavioral model • Detect and recognize activities of daily life
Multiagent System	Distributed intelligent system	Health monitoring from remote location
	Multiagent system	Simulation of agent interactions and task interactions
Statistical methods	Hidden Markov model	• To create and evaluate behavioral model • To determine location of the inhabitants
	Statistical predictive algorithm	• To predict activities of daily life (ADL) • To model circadian activity rhythms (CARs)
Fuzzy logic	Fuzzy logic	• Recognize routines and also deviations from routines • Control lighting system

SMART HOME UTILITIES AND SERVICES

Services	Function
Comfort	• Lighting, temperature and heating control • Arrange home environment according to the resident's desire • Home appliance control • Identification of introduction, presentation, aperitif and game • TV program selection, cooking recipe display and forgotten property service
Remote access, monitoring and control	• Appliance monitoring and control via mobile devices and computers from distance location, through web browser from remote location • Controlling and monitoring home appliance from remote location
Automate home appliances control	• Voice-operated appliance control • Intelligent appliance monitoring and control
Data repository	• Web based repository of bio-signal data
Energy optimization	• Reducing energy wastage
Healthcare	• Graphical representation of wellness • Respiratory and sleeping disorder assessment • Activity tracking and alarm generation • Sleeping stage recognition • Fall, immobility and reaction incapacity identification • Lighting control

FUTURE CHALLENGES

Future homes will be able to offer almost all required services, e.g., communication, medical, energy, utility, entertainment, and security. People spend a significant amount of time in their houses, which attracts potential investors to promote the integration of all possible services into traditional homes.

Recently, a new research area regarding the intelligent control of electricity usage has emerged. This new branch of study is called smart grid research. A smart grid is an intelligent electricity network that provides bidirectional communication between electricity suppliers and consumers. A supplier may implicitly control home appliances to ensure uninterrupted electricity supply. Smart meters are an integral part of a smart grid; they enable intelligent energy control. The integration of smart homes, smart grids and smart meters will become essential part in providing for consumers.

ISSUE

There is also the issue that smart homes may violate user privacy. Because the flow of information is sometimes unprotected over the internet and telemedicine systems, there is a possibility of exposing user private information to others. To protect user privacy, concerned authorities in the USA have already prepared an e-Health Code of Ethics, which sets four guiding principles under eight main headings: candor, honesty, quality, informed consent, privacy, professionalism, responsible partnering, and accountability. Other countries are also requiring the approval of an ethical committee and placing emphasis on obtaining the written and oral consent of the user.

3 BEST SMART HOME GADGETS (INDEPENDENT VER.)

Philips Hue Starter Kit

Ring Video Doorbell 2

Nest Thermostat

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THANKS FOR ATTENTION!