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SMART HOMES IN THE WORLD OF TECHNOLOGY

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ABSTRACT

For more than a decade, Smart Home technology has begun to bring the concept of networked devices and appliances into homes, the best definition of smart home technology is: the combination of technology and services through a network for a better quality of life.

The advent of smart technology has brought about a revolution in the world of architecture. Smart technology refers to the integration of digital and physical systems in a building, creating a responsive and intuitive living experience. Smart homes have become an increasingly popular trend in the world of architecture and technology. They are designed to provide homeowners with optimal comfort and convenience through the integration of modern technology into the home design. This technology includes automated systems for temperature and lighting, voice-controlled electronics, and remote-controlled access. Smart homes offer a range of benefits, including increased energy efficiency, enhanced security features

Architects must work closely with their clients to ensure that their preferred smart home features are seamlessly integrated into their homes, resulting in a harmonious and functional living space.

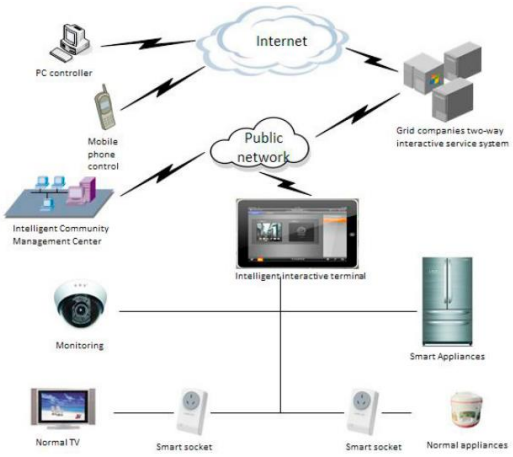
INTRODUCTION

Smart homes are changing the way we think about architecture and home design. With the integration of technology into the design process, architects and designers have a new toolkit at their disposal that allows them to create homes that are more efficient, secure, and environmentally friendly. These homes, commonly known as smart homes, are equipped with the latest in automation and connectivity technology, enabling homeowners to control every aspect of their living environment, including lighting, heating, security, and entertainment systems, from the comfort of their own smartphones.

In the past few years, with the rise of technology and smart gadgets, the concept of smart homes has taken the world of architecture by storm. Smart homes are designed to be energy-efficient, user-friendly, and equipped with the latest in smart technology devices. What sets them apart from standard homes is that they have the ability to connect and communicate with the world around them, utilizing the power of the internet of things (IoT) to control every aspect of the home environment. All the functions of a smart home can be easily controlled through a smartphone app or an integrated voice-assistant. Smart homes are also eco-friendly homes as the majority are designed to be energy-efficient; utilizing techniques like energy-saving appliances, solar panels, efficient lighting, and controlling heating and cooling through automated systems, hence reducing energy consumption and significantly reducing their carbon footprint. Smart homes are the

future of architecture, where technology meets innovative design, revolutionizing conventional housing and offering an advanced and comfortable living environment.

The aim is to introduce the concept of home automation, networking devices and equipment in more and more modern day houses to contribute in upgrading lifestyle, providing comfort and convenience, energy conservation, safety and security and helping physically challenged people.



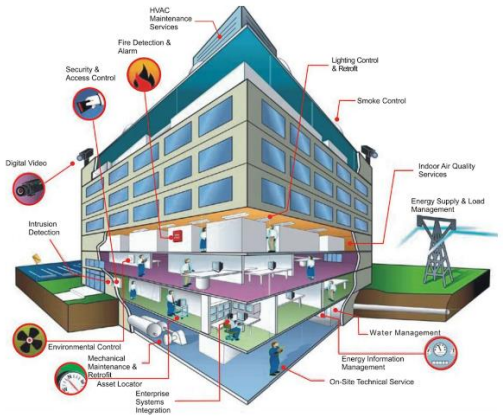
Smart home electricity service system structure

WHAT ARE SMART HOMES?

A smart home system gathers unique information from each of your smart gadgets or appliances through a wall-mounted unit or software that is accessible online, allowing you to manage all of your devices from a single location. Smart homes are residential buildings that have integrated technology systems that can control various aspects of the home. These systems can be controlled remotely through a smartphone or other device, or through voice commands using a virtual assistant like Amazon's Alexa or Google Assistant.

Smart Technology and Building Design

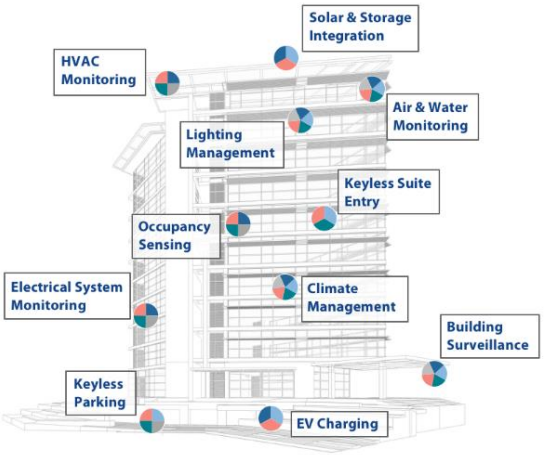
With the advent of smart technology, building designers now have access to a wide range of hardware and software solutions that enable them to create highly advanced and efficient buildings. For example, lighting systems can now be automated to adjust based on the amount of natural light present in a room, resulting in energy savings. Similarly, HVAC systems can use smart sensors to adjust the temperature and humidity of a building based on occupancy and other factors, resulting in enhanced comfort and energy efficiency. Building design, encompasses a range of factors like lighting, ventilation, space utilization, and insulation that promote comfort, health, safety, and productivity.



Smart building technology

Smart Technology and Building Automation

Building automation systems (BAS) are an essential part of smart technology in architecture. BAS systems provide centralized control over all aspects of a building's operation, including lighting, HVAC, security, and more. Smart technology and building automation refer to the use of intelligent devices and systems to automate different building functions, such as lighting, HVAC, security, and access control, it uses a network of sensors, controllers, and actuators to manage and optimize the performance of various building systems. Smart technology adds an intelligent layer to BAS by integrating advanced analytics, machine learning, and artificial intelligence to predict, adjust, and automate different building functions based on real-time data.



Smart building automations

Smart Technology and Building Maintenance

Smart technology has also revolutionized building maintenance. Building owners can now use smart sensors to detect temperature fluctuations, water leaks, and other potential issues, allowing them to address problems before they become serious. With the help of smart technology, building maintenance teams can

also manage issues remotely, using mobile devices to monitor and control building systems from anywhere in the world, with the potential to optimize maintenance schedules, reduce costs and improve building performance. Buildings require regular maintenance to ensure they operate optimally and remain habitable, and smart technology offers an intelligent solution that enables building managers to keep track of all necessary maintenance activities.

Smart applications of building maintenance

THE CRYSTAL, LONDON.

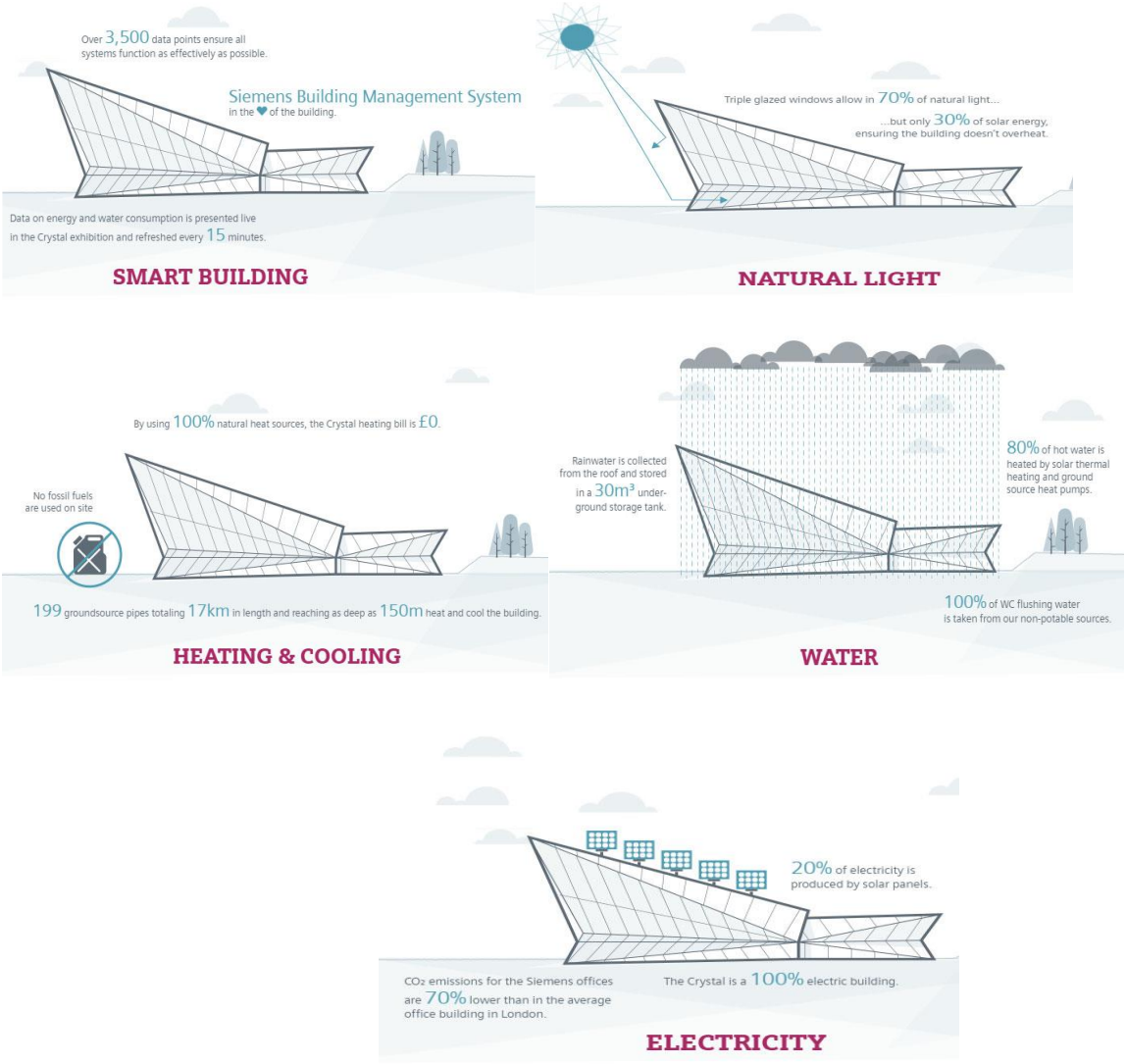
The crystal, London.

Operated by BUILDING AUTOMATION SYSTEM, the Crystal is a sustainable conference centre in London's Royal Victoria Dock.

FEATURES

- A building automation system efficiently controls all electrical and mechanical systems in the building, including its heating, cooling, and ventilation systems, lighting, and solar thermal hot water system.
- Solar panels on its roof generate approximately twenty percent of the building's power.
- Over three thousand five hundred data points are used to monitor and manage water and energy usage, meaning its carbon emissions are seventy percent lower than comparable office buildings in the UK.
- The water is recycled, and then it is water is heated by a combination of solar thermal water heating from the roof and ground source heat pumps.

- Lighting is sixty five percent fluorescent and thirty percent LED, managed by an advanced control system that automatically adjusts every individual lamp to provide comfortable brightness levels without wasting electricity.



Features

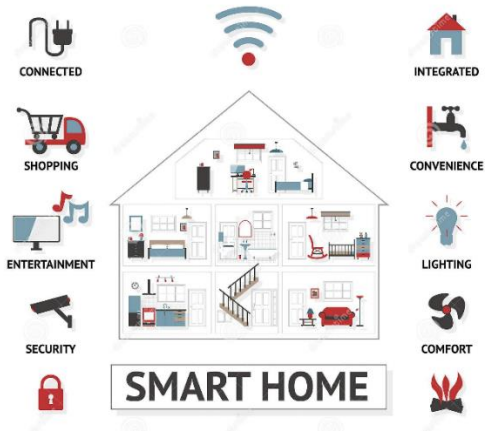
Inferences:

Area - 6,300 sq. m.

- Solar panels 3,500 data points to control water and energy usage.
- Reduced carbon emission by 70%.

SMART HOMES FOR COMFORT AND CONVENIENCE

Smart homes have revolutionized the concept of convenience and comfort in the home environment. Smart devices and technologies have created smart homes where residents can control and monitor all aspects of their home with ease, improving their daily lives' quality.

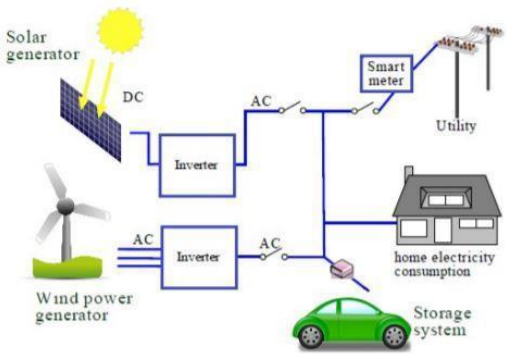


Applications that makes smart homes convenient

- **Automation:** Smart homes offer the option for residents to automate different home functions such as lighting, temperature, and entertainment systems, among others. Residents can customize their automated settings to their preferences to create a comfortable atmosphere without the need to manually modify settings. For instance, smart thermostats can be programmed to adjust the temperature based on residents' routines, creating a comfortable environment when they get back home.
- **Voice control:** Smart devices like Amazon Echo, Google Home, and Siri offer voice control features that allow residents to control various home systems, including lighting, music, door locks, and temperature, itemizing convenience. With voice control, residents can operate their homes through spoken commands, eliminating the need to use different remote controls or smartphone apps.
- **Remote control:** Smart home systems can be remotely controlled through mobile devices, providing residents with access to their home systems wherever they are, delivering unparalleled convenience. Residents can use their phones to adjust lighting and temperature settings, configure home entertainment systems, and manage home security settings.

ENERGY EFFICIENCY

Smart technologies can also optimize energy consumption, reducing utility bills and waste by controlling home heating, lighting, cooling, and plug loads all leading to better energy management and reducing the overall carbon foot print.



use of natural resources in smart homes

- **Lighting Control:** Smart lighting systems come with occupancy sensors that detect presence in a room, and adjust the lighting accordingly. When a room is not in use, the system can switch off the lights, reducing energy consumption. Additionally, lighting levels can be adjusted based on the natural light available, further reducing energy consumption.
- **HVAC System Control:** Smart HVAC systems can use indoor and outdoor sensors to adjust the temperature and humidity of a building based on occupancy and weather conditions. This allows for efficient heating and cooling operations, reducing energy consumption and increasing energy efficiency.
- **Building Automation Systems (BAS):** BAS systems provide centralized control over all aspects of a building's operations, including lighting, HVAC, and security. With real-time data on building performance, BAS systems can detect anomalies and make adjustments that optimize energy use, reducing costs and increasing efficiency.
- **Renewable Energy Integration:** Smart technology can integrate renewable energy sources, such as solar panels and wind turbines, into a building's operations. This allows buildings to generate their energy, reducing reliance on traditional energy sources and increasing energy efficiency.

SMART HOME FOR PHYSICALLY CHALLENGED INDIVIDUALS.

Smart homes offer several benefits for physically challenged individuals, providing them with greater independence, safety, and accessibility within their living space. With smart home technology, individuals who have difficulties with mobility, vision, or dexterity can control their home environment more easily with voice commands, sensors, and automation.

Voice control and remote monitoring

- **Increased independence:** Smart home devices and technology can help handicapped people gain more independence, minimize the need for assistance and professional care, and increase their quality of life.
- **Voice control:** Smart home devices can be controlled by voice, which can be very helpful for people who may have difficulty using conventional physical switches, such as people with limited hand mobility or those with visual impairments.
- **Automated home security:** Smart home security systems provide enhanced security features like automatic locking doors and windows, surveillance cameras, and smart alarms, making it easier for people with disabilities to feel more secure.
- **Temperature and lighting control:** Smart home devices can automatically adjust temperature and lighting levels as per the user's needs, providing an optimal environment for those with motor disabilities, visual impairments, or conditions like Multiple Sclerosis and Parkinson's Disease, which may require specific temperature and lighting settings.
- **Remote monitoring and alerts:** Smart home devices can provide remote monitoring and alerts for caregivers, family, or healthcare workers, enabling them to provide timely help or support, in case of emergencies or accidents.

SAEFTY AND SECURITY.

First, smart homes can be equipped with sensors and cameras that detect any unusual activity. These sensors can be connected to a homeowner's smartphone, allowing them to monitor their home's security remotely. If an intruder is detected, the homeowner can receive an alert and take appropriate action. Additionally, the homeowner can set up a combination of sensors and alarms to provide meaningful notifications when an event is triggered.

Second, smart homes can provide an extra layer of security when it comes to doors and windows. With smart locks and smart security cameras, homeowners can remotely lock and unlock their doors and windows, check who is at the door before opening it, and receive real-time alerts when someone enters their home.

Third, smart homes can detect fire, flood, and other hazardous conditions. If the sensors detect any of these conditions, the homeowner can be notified immediately, allowing them to take the necessary precautions.

Applications contributing in safety and security

COST EFFECTIVE

Smart homes use energy-efficient devices such as smart thermostats, LED lights, and smart power outlets. These devices can help reduce energy consumption, lower electricity bills and save money. Automation helps to reduce waste by turning off lights, appliances, and heating systems when you're not at home. This can reduce the overall utility bill of your home. With smart home automation, you can remotely monitor your home appliances and systems and adjust settings to keep energy usage in check resulting in saving energy and money on your utility bills. Smart security systems can provide more comprehensive protection than traditional security systems, such as using motion sensors to detect intruders and alert you when you're not at home. They also allow you to monitor who is coming and going from your home, improving overall safety. Smart home technology can be used to detect potential maintenance issues before they escalate into costly repairs. For example, a sensor can detect a water leak before it causes significant damage to your home.

CONCLUSION

With the integration of technology into home design, architects and designers can create homes that are more efficient, secure, and environmentally friendly. From automated lighting and heating systems to intelligent appliances and security systems, smart homes are redefining what it means to live in a modern, connected world.

One of the key benefits of smart homes is the ability to remotely monitor and control various systems in the home. This includes temperature, lighting, security, and even the operation of appliances. Through the use of smartphone apps and cloud-based platforms, homeowners can have complete control over their home, no matter where they are in the world including the integration of artificial intelligence, voice-controlled systems, and augmented reality. Smart homes will continue to push the boundaries of what is possible in home design and architecture, offering homeowners a more seamless, intuitive, and enjoyable living experience. The ability to automate, control, and monitor every aspect of a residence results in less energy usage, improved productivity, higher cost-effectiveness, and overall wellbeing, aligning the concept of convenience and functionality in favour of a stress-free living. Smart technology can integrate renewable energy sources, such as solar panels and wind turbines, into a building's operations. This allows buildings to generate their energy, reducing reliance on traditional energy sources and increasing energy efficiency. Smart technology in architecture can increase energy efficiency by providing building operators with the tools and data they need to make informed decisions about energy use. By optimizing lighting, HVAC, and other building systems, and integrating renewable energy sources, buildings can reduce energy consumption, reduce costs and increase sustainability.

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