ĐẠI HỌC QUỐC GIA THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC BÁCH KHOA
KHOA KHOA HỌC - KỸ THUẬT MÁY TÍNH

Đồ án đa ngành

Smart House IoT
Hệ thống IoT nhà thông minh

GVHD: GV. Nguyễn Thanh Bình
Nhóm: CES
SVTH: Trịnh Duy Hưng - 1913652
Nguyễn Phương Nam -1914237
Vũ Nhật Nam - 1911660
Nguyễn Phước Toàn - 1915551
Quang Chấn Vĩ - 1915961
Nhóm trưởng: Quang Chấn Vĩ

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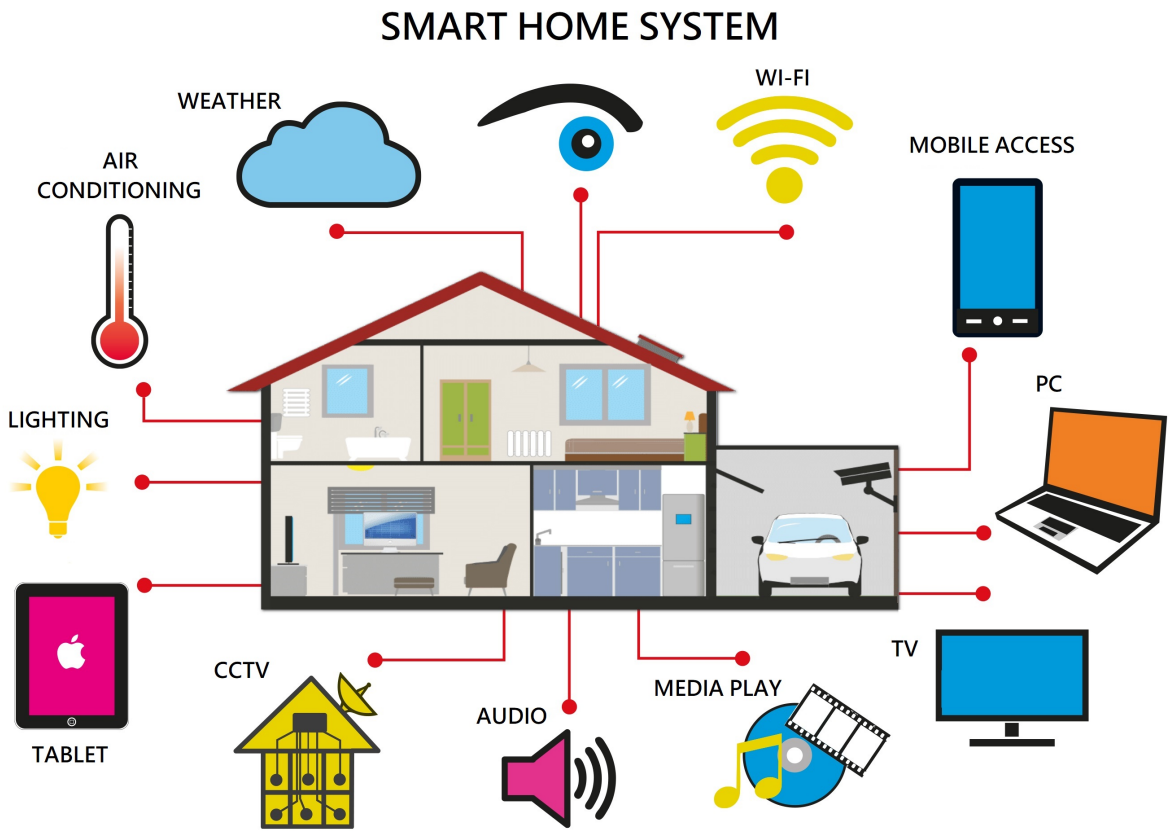
Mục lục

Introduction to project

The Internet of Things (IoT) is a new revolution of the Internet that has emerged as a new paradigm of connecting objects through the Internet. The IoT is not only a network of computers, but it is a network of physical objects. Connected any devices of different types and sizes, such as lights, smartphones, AC, home systems and devices. All the connected objects communicate and share information based on protocols, make them connect together by system services. IoT enhances connectivity anytime, anyplace with anyone using any devices. Smart House systems are considered one of the most typical applications in IoT, where it is possible to control home devices to achieve a better usage in terms of cost and convenience. Smart House system is the use of devices in the house that connect via a Internet. A system consists of a number of subsystems for controlling various aspects of a house, such as a security sub-system, a lighting control sub-system, and an entertainment subsystem which allows handy access to all devices within a home either locally or remotely via the internet



1 Requirement elicitation

1.1 Requirements overview

1.1.1 Context of project

Nowadays, when life is getting better and better, people's requirements also ask for the better convenience and support. Along with that is the continuous expansion of the internet network across the world to make the monitoring and control system through the internet become very important

From those actual requirements and conditions, the idea of a smart home was formed, where all human activities are supported and helped flexibly, in addition, the house can also be self-controlled management in the most intelligent way. So, what is a smart home?
The intelligence of a house is shown in 4 aspects as follows:

Automation. The house is equipped with a system of sensors such as: temperature sensor, humidity sensor, gas sensor, fire alarm sensor, obstacle sensor, light sensor ... with the ability to automatically operate according to environmental conditions. Smart homes help us monitor our electricity and water consumption better than the way we do usually.

Satisfaction. The owner of the house can control it at will or according to pre-programmed scenarios.

Security. Security monitoring system, fire alarm, gas leak alarm will automatically report the status of the house via the internet.

Control remotely. Devices such as light bulbs, air conditioners, televisions, refrigerators, ... are also connected to Internet. Users only need an internet-connected device to be able to monitor data from sensors and control devices in the home at will.

1.1.2 Smart house models currently in used

Currently North America is taking the lead in Smart home marketplace. With the era of 4 people family typed house, the smart house is provided with some functionalities: Gas alert, Breaching alert, automatic door, security camera, entertainment system,....

1.1.3 Smart house solutions

In VietNam, having a lot of manufacturers and architects who joins this market, leading are BKAV and Lumi Smarthome. With smart houses have functionalities like other countries, and have some own factor to be more comfortable in VietNam. Currently they have some advantages over other some manufacturers and architects in VietNam

1.1.4 Scope of project

1.1.5 Design Selection

Smart home is a broad topic and has many problems. Depending on the intended use of the owner to design, an important part in the smart home system is the control and monitoring system.
Previously, the smart home was only in the imagination as well as in the movies. Thanks to the continuous development of science and technology, smart home solutions are getting richer and more convenient for users. From the beginning, smart home only has remote control devices within the house to serve some human needs. Next is the automation of devices in the house with the ability to automatically adjust to the environment as well as the user
Then, with the development and spread of the internet, people came up with a solution to connect and control home appliances through the internet and add conveniences such as a safety system, computing power, etc. The energy used, ... helps the owner to control the device at a distance, not just inside the house

anymore.
Security is also a top priority, because along with an internet connection, the possibility of being hacked into the system to gain control also increases. Owners can use their own password to log into the system as well as the house through forms such as Passcode, fingerprint security, iris security... Accompanied by the ability to warn of intruders to help family Host can discover anywhere with Wifi/GPRS connection.
And recently, the trend of controlling devices by voice has also been added to the smart home building solution, making it easier to use for everyone in the house. In the future, thanks to new technological devices combined with artificial intelligence, the house can distinguish each member's voice and remember the habits of each family member.
Currently, in Vietnam, the solution to build smart homes with control and monitoring systems via the internet is still the most popular and developed because it is suitable with existing technological capabilities and economic conditions.

1.2 Detail Requirements

1.2.1 Functional Requirements

1. Simplicity Connectivity
    - IoT application can connect to a wide variety of devices - wired and wireless devices with easy instruction to connect the devices to the system and display and on the screen
2. Observing lights activities, status
    - The sensors will collect data about lights and send to server, which will send to app, web so that user can see which light is ON/OFF, managing the lighting system in house
3. Observing changes to temperature and moister
    - The sensors will collect data about the temperature and moister of the house and send to server, which will send to app, web. The user will base on the that information displayed on screen will make change to AC, open/close windows
4. Warning alert
    - The sensors will notify the user with alert message if the temperature/ moister or some conditions exceed the safe level of the house
    -
5. Weekly report

1.2.2 Non-Functional Requirements

1. IoT aspects
    - Run 24/7 with minimal scheduled downtime and preferably no unscheduled downtime.
    - Can extend the time of sending data to save energy.
    - One device can be connected to many controller – device (but just one is on control mode to avoid conflicting data).
    - Can accommodate for 50 connects at the same time.
    - Automatically use power saving mode or disconnect if necessary
2. Mobile aspects
    - The database system has 500MB of capacity.
    - Persistently log data for analyzing purposes over at least 30 days.
    - One controller – device can be connected to many devices.

- Having friendly interface and easy to use.

3. Both aspects
   - All functions can be done by pressing no more than three times.
   - The response time when control does not over 1.5 seconds.
   - The controllable – limit is 5 meters.

2 Use case

2.1 Monitor home condition

Use case name	Monitor home condition
Actor	User
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.2 Control lights

Use case name	Control lights
Actor	User
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.3 Control doors

Use case name	Control doors
Actor	User
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.4 Control temperature

Use case name	Control temperature
Actor	User
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.5 Control sound

Use case name	Control sound
Actor	User
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.6 Control gas

Use case name	Control gas
Actor	User
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.7 Request report

Use case name	Request report
Actor	User
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.8 Request services

Use case name	Request services
Actor	Server
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	

2.9 Read sensor

Use case name	Read sensor
Actor	Sensor
Description	
Preconditions	
Normal flow	
Exceptions	
Alternative flows	