

PERVASIVE BASED HOME AUTOMATION AND SECURITY WITH IoT

K. BHARATH¹, PAITHANKAR SUMIT¹, M KARTHICK RAJA²

¹UG Students, Department of Computer Science and Engineering, Sriram Engineering College, INDIA.
kilaribharath007@gmail.com, sumitpaithankar2@gmail.com

²Assistant professor, Department of Computer Science and Engineering, Sriram Engineering College, INDIA.
krajamuthiah@gmail.com

ABSTRACT

Ubiquitous or pervasive computing is a concept computer science which means appearance everywhere and anytime. According to this concept a user can interact with the computers, which exist in different forms like laptops tablets and terminals in everyday objects such as a fridge, Mobile, Watches and TV. On the other hand, the Internet of Things is a marketing buzzword for this physical computing In this prototype, objects and devices that are commonly used every day are considered to be the smart computing devices which are capable of communication with user and other similar devices through network. So combining these two technologies can be used to create a smart home by changing often using things into smart object.

Keyword: -Pervasive, Ubiquitous, IoT, Smart home, HCI, Pervasive IC.

Introduction

The technology and service collaboration through a network for better quality leaving is the key for the smart home. Automation home provides ease and convenience to day to day activities and makes home smarter. This technology is used to make all electronic appliances to act 'smart'. Through

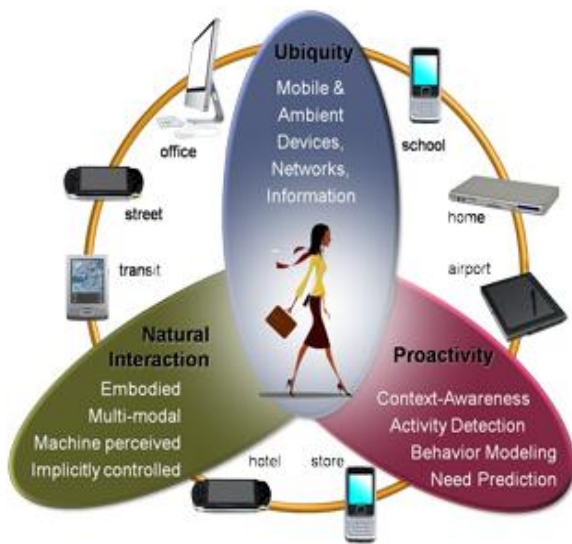
home networks and the internet all electronic appliances will take advantage of this technology in near future. Smart home technology is combination of both pure networking and reduction of work load, but it is much more what it actually looks. The particular areas focused for smart home implementation is kitchen and living room. This technology facilitates users with security, energy management and comfortable living features. This smart home adds manageable features which benefits the disabled individuals.

The dream of smart home can be achieved by using pervasive computing and internet of things. Where the pervasive computing allows the human computer interaction anywhere at any time and internet of things will connect different things to a network for communication of things.

Ubiquitous computing definition

The dissemination and use of modern Information and Communication Technologies (ICT) are considered to be the preconditions today for dynamic economic growth and future viability in global competition. Meanwhile, ICT is responsible for the processes of change triggered, enabled and accelerated are

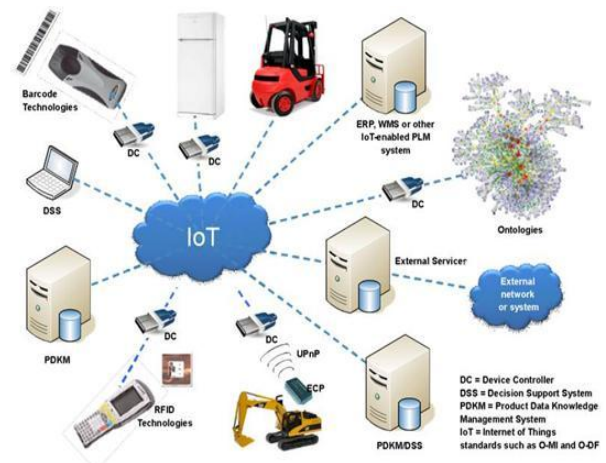
enormous. The new technologies are showing an ever-expanding ripple effect on the economy, private life, scholarship, science and public administration. They exert influence on social and private life. The ICT's transformative potential is exemplifying by the development of internet technology and mobile telephony during the past decade. Digital information and services are going mobile and can be called up from any location. The invisible use, processing, creation, storage and transmission of information is used to characterize the trend of emerging ubiquitous computing. Everyday objects are becoming smart objects, which are linked together into networks, react to their environment, and interact with their users



IoT definition

The Network of Everything, IoT is a system of interrelated computing devices,

mechanical and digital machines, objects, animals or people that are provided with identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. In this present generation, we want to be connected with anything anytime and anywhere, the core component of this hyper connected society is IoT, which is also referred to as Machine to Machine (M2M) communication or Internet of Everything (IoE). This is happening in several of the areas in the country.



Area of focus

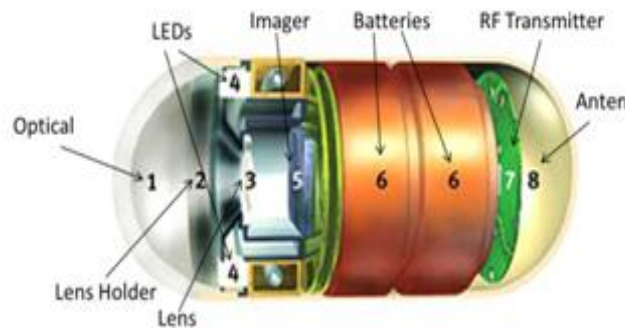
When we think of smart home the first thing comes in our mind is safety of home. We already have much technology for the safety of home where IoT is used. But IoT doesn't provide high range of access for the safety of the home. For example if you are in the office then you can't assure the safety of the home and can't access the hardware through office. Here the pervasive computing will be very useful which will allow you any time access from anywhere to the hardware for the safety of home.

Another thing which we are going to focus is the interaction of electrical appliances with human through voice interaction technology.

Working principle

i. Home security

Many cameras are there for security of the house but it will only record the things which can be seen afterwards. But using IoT and Pervasive computing you can monitor the video anytime from anywhere of home. A small pervasive capsule is enough for the monitoring of home from anywhere.



Above given figure of simple Pervasive IC which can be used in home security live monitoring. Following are the application of Pervasive IC:-

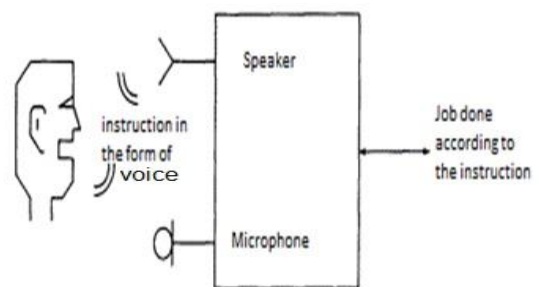
1. Optical: - This hardware is nothing but camera which will detect the intruder or any objects which are in surrounding.
2. Lens holder: - It is use to hold the lens.
3. Lens: - It is used to have a focused image (if any intruder breaks in) which will detect the intruder.
4. LED: - Light Emitting Diode for night vision.
5. Imager: - It will provide the image in night through night vision with the help of LED.
6. Battery: - To provide power supply in case of blackout.

7. Transmitter: - It is used to transmit the data. So that it will store in database.
8. Antenna: - It acts as the receiver to receive commands and signals from the controller.

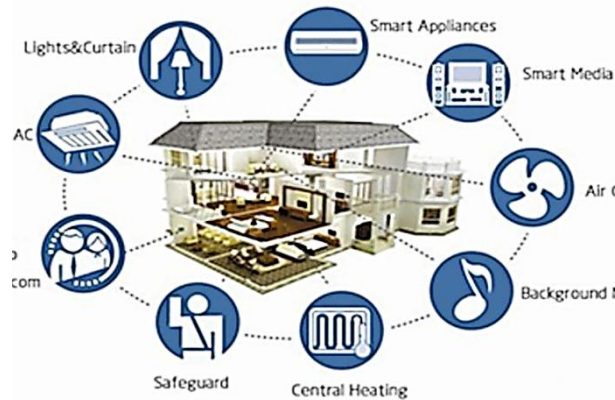
The data send by the transmitter is saved in database. The data can be stored using cloud computing also, so you can access to data whenever needed. The data can be monitored using smart phone, smart watches or laptops.

ii. Interaction of electrical appliances in home

The Pervasive IC with sensor can be helpful for human and electrical appliances interaction in home. The sensor in the pervasive IC will detect the motion of human in the room which will activate the function of HCI of IC. After activation of IC human can interact with electrical appliances and can give commands. The IC will have a microphone which is programmed with assembly language. These microphones will intake the command in the form of voice and according to the instruction given by the user.



Now the electrical appliances can be anything like fan, TV, AC, fan etc. which will on/off according to instruction given.



Example

1. Light will adjust according to the need of the user.
2. The fan can be switch on and off by just saying “Switch on the fan” or “Switch of the fan”.
3. Can be used in vehicle to make it smart. Audi A8 have self-parking which parks the car by sensing the surroundings.

Conclusion

Hence the combination of IoT and pervasive computing increases the security of the home by giving the higher range of monitoring the activities of hardware. The monitoring can be done anytime i.e. 24*7 from anywhere as the data is stored in cloud. If any intruder breaks in, then we can lock the intruder inside the home using special IoT hardware.

The human interaction with electrical appliances provides the futuristic feel of smart home. Using HCI the electrical appliances like light, fan, AC etc. can be accessed and controlled by giving voice commands.

Reference

1. <http://www.opengroup.org/iot/iotwp/p3.htm>
2. <http://internetofthingsagenda.techtarget.com/definition/pervasive-computing-ubiquitous-computing>
3. <https://www.ecnmag.com/article/2012/02/reducing-size-while-improving-functionality-and-safety-next-generation-medical-device-design>
4. International Conference on Computing, Communication and Automation (ICCCA2016), IoT Based Smart Security and Home Automation System, Ravi Kishore Kodali, Vishal Jain, Suvadeep Bose and Lakshmi Boppana Department of Electronics and Communications Engineering National Institute of Technology, Warangal
5. <https://www.engadget.com/2017/06/13/auditeases-self-parking-a8-ahead-of-launch/>
6. <http://www.zdnet.com/article/finding-a-home-for-the-internet-of-things/>
7. Pervasive Computing and the Internet of Things Maria R. Ebling, IBM T.J. Watson Research Center
8. <https://www.uniassignment.com/essay-samples/information-technology/the-introduction-to-smart-home-technologies-information-technology-essay.php>
9. Galitz's Human Machine Interaction (WIND) Paperback – 2015 by Dhananjay R. Kalbande (Author), Prashant Kanade (Author), Sridari Iyer (Author)