Home Automation Using IOT: A Literature Review

One of the most recent catchwords within the world of technology is internet of Things. In Future internet of things can remodel the important world objects into intelligent virtual objects. The IoT direct to amalgamate everything in our world underneath a standard infrastructure. Current study on IoT that addresses ideas through totally different systematic review of academic analysis papers, company white papers, skilled discussions. This review Paper focuses on definitions, basic necessities, Applications, characteristics of internet of Things. The objective of this paper is to supply a summary of internet of Things, requirements, and very important technologies and their usages in our way of life.

Introduction

The Internet of Things may be a massive evolution in IT world. The term “Internet of Things” that is additionally shortly well-known as IOT is conceive from the 2 words i.e. the primary word is “Internet” and therefore the second word is “Things”. The web may be a world system of interconnected pc networks that use the quality internet protocol suite (TCP/IP) to serve billions of users worldwide. it's a network of networks that consists of millions public personal and government networks.

In 21th century, the internet of Things (IoT) is one in all the foremost constructive and dominant wireless communication models. it's the common conception of things that square measure classifiable, readable, governable, available, and locatable via the internet. within the IoT frame, all entities of our standard of living are often related to the internet delinquent to their computing and communication capabilities. IoT enlarges the perception of the internet and makes it additional appropriate for various applications. Because of this reason, IoT has become more useful in various domains like health observation, power-assisted living observation, and good home automation systems. In these systems, many sorts of sensors square measure connected wirelessly to develop distributed networks. The wireless device networks (WSNs) is one in all the foremost essential technologies used in IoT-based good home automation. These square measure distributed networks of little and light-weight weighted wireless device nodes that might be extended counting on the need of physical parameters like pressure, temperature, and ratio. Every device node within the WSNs includes 3 subsystems i.e., device scheme for surroundings sensing, process scheme for computation of the detected data, and a communication scheme for exchanging the collected information between totally different sensors.

Definition

There is no correct definition of IOT on internet.so it's going to say that there's no distinctive definition offered for net of Things that's acceptable by the bulk of users. In fact, there square measure many various teams as well as academicians, researchers, practitioners, innovators, developers and company folks that have outlined the term in their own words , though its initial use has been dedicated to Kevin choreographer, UN agency is knowledgeable on digital innovation. What all of the definitions have in common is that the plan, that the primary version of the web was all concerning the information that is created by folks, whereas consecutive version is concerning information that created by things. The simplest definition for the web of

Things would be:

“An open and inclusive network of intelligent objects that have the capability to auto-organize, share data, information and resources, reacting and acting in face of things and changes within the environment”

Internet of Things is growing and continues to be the most recent, most well liked conception within the IT world. Over the last decade the term net of Things (IoT) has seeking attention by sticking the vision of a world infrastructure of network of physical objects, facultative anytime, anywhere property of something and not just for anyone.

Requirements

For flourishing implementation of inernet of Things (IoT), the conditions are

(a) Dynamic resource demand (b) Real time desires (c) Exponential growth of demand (d) availableness of applications (e) information protection and user privacy (f) economic power consumptions of applications (g) Execution of the applications just about finish users (h) Access to associate degree open and lay operable cloud system.

According to another author, there are 3 elements, that needed for seamless net of Things (IoT) computing (a) Hardware—composed of sensors, actuators, IP cameras, CCTV and embedded communication hardware (b) Middleware—on demand storage and computing tools for information analytics with cloud and massive information Analytics (c) Presentation—easy to know image and interpretation tools which will be designed for the different applications.

Architectures

One of the major problems with the IoT is that it is so wide and such a broad concept that there is no proper, uniform architecture. In order for the IoT to work, it must consist of an motley of sensor, network, communications and computing technologies, amongst others. Here are some of IoT architectures or models which are given by several researchers, authors and practitioners.

- a) European FP7 Research Project
- b) ITU Architecture
- c) IoT Forum Architecture
- d) Qian Xiaodong, Zhang Jidong Architecture
- e) Kun Han, Shurong Liu, Dacheng Zhang and Ying Han’s (2012)’s Architecture

These are some popular architectures and used in different ways to develop IOT. Different architectures are used by different vendors according to their requirement and usage.

Technologies

The Internet of Things was ab initio galvanized by members of the RFID community, UN agency noted the likelihood of discovering info a couple of labelled objects by browsing an online address or information entry that corresponds to a selected RFID or close to Field

Communication technologies. within the analysis paper “Research and application on the sensible home supported element technologies and web of Things”, the enclosed key technologies of IoT ar RFID, the detector technology, nanotechnology and intelligence embedded technology. Among them, RFID is that the foundation and networking core of the development of web of Things. the web of Things (IoT) enabled users to bring physical objects into the sphere of cyber world. This was created doable by totally different tagging technologies like NFC, RFID and second barcode that allowed physical objects to be known and referred over the web. IoT, that is integrated with detector Technology and Radio Frequency Technology is that the omnipresent network supported the ubiquitous hardware resources of web, is the web contents objects along. it's conjointly a brand new wave of IT business since the appliance of computing fields, communication network and world roaming technology had been applied. It involves additionally to sophisticated technologies of laptop and communication network outside, still together with several new supporting technologies of web of Things, like grouping info Technology, Remote Communication

Technology, Remote info Transmission Technology, ocean Measures info Intelligence Analyzes and dominant Technology etc.

There are some technologies listed below.

- a) Radio Frequency Identification (RFID)
- b) Internet Protocol (IP)
- c) Electronic Product Code (EPC)
- d) Barcode
- e) Wireless Fidelity (Wi-Fi)
- f) ZigBee
- g) Near Filed Communication (NFC)
- h) Actuators
- i) Wireless Sensor Networks (WSN)
- j) Artificial Intelligence (AI)

Related Work

Recently, IoT has been applied in various applications as well as sensible home observance systems for motor-assisted living to predict the upbeat of residents through the observance of many home appliances building management framework to support energy-saving applications and human action patterns observance among others. Because the internet communications infrastructure develops to incorporate sensing objects, appropriate mechanisms square measure required to secure communications with such entities, within the context of IoT applications. In IoT applications, security threats and attacks have become a significant issue with reference to knowledge transmission. Hence, it is extraordinarily crucial that the IoT primarily based system ought to embrace security mechanism that might resist attainable security threats and attacks within the kind of knowledge modification, impersonation, and eavesdropping, among others

Home Automation system

Categories of Smart Home

There are two categories of smart home:

- Wired
- Wireless

At present, the majority of homes have some of the ‘‘smartness’’ because electronic appliance controllers. Devices within an SH system can be linked with one another and reached through an access point (AP) to monitor home conditions and control home appliances. For instance, lights, thermostats, TVs, door locks, cameras, washing machines, and refrigerators can be monitored and controlled via an all-in-one SH automation system. Such a system becomes an IoT-based automation system when it is provided with access to the Internet

The working of appliances is different as there structure.

Identifying the problems encountered in existing SH systems. Most considerable problems of the available systems in the market are their high initial implementation costs and unfriendly user interfaces. The modeling phase focuses on the selection of materials and components for building the SH prototype and developing the IoT@HoMe system. The SH is designed on NX10software, and the prototype is fabricated using plywood. The design and implementation of the IoT@HoMe automation system are conducted. Wiring and connection between different components (bulb, fan, motor, and sensor) in the SH prototype to the attached IoT@HoMe system (NodeMCU, relay board, DC source, and others) are installed and tested. After the connection of the microcontroller and components, coding is performed to realize the required tasks. Then, the design is rechecked to identify whether any problem exists with the system functionalities. Testing is conducted to validate the system effectiveness. The system returns to the previous phase, which is enhancement and optimization, when any problem is found. The system is ?nalized when it exhibits good performance.

Smart Box

The working of proposed method is that, the home control gateway is installed on smart tv set top box. The home control gateway has the main role for the proposed home appliance control system. It consists of a core block and device drivers. A registration process is conducted by core block. The user may register their home control gateway.

The user can register an identifier for the home control gateway, during the registration process. The core block comprises a server. In this proposed framework, the server is specially the Web Socket-capable server. Therefore, Web Socket-capable users can be connected to Web Socket-capable server. The Web Socket-capable server gets a certain command message From the Web Socket-capable user and responds to the user with the consistent report Message. A scheduler is also a part of core block. The IP packet created by the home control gateway is sent to the IP-based home appliance.

When one of the home appliances reports its status/event, the core block of the home control gateway mainly analyses the IP address of the IP packet and then call the correct device driver. The one of the candidate solutions is that the users can interact with their TV by using touch-screen technology. A screen-mirroring remote control service idea has been employed to support an intuitive user interface environment. By using this method, the user can easily

monitor and control their home appliances while relaxing and watching their TV screen. At the end, the proposed framework is implemented on a small-scaled home model. The home appliances are connected to the smart set top box through the rs-485 bus. To monitor the working of home appliances, the home appliance control rich-client application is used.

SOAP Technology

To plan and execute a canny interoperability structure that could oversee bound together gadget joining among shrewd home frameworks, we propose a SOAP-based arrangement with web service advance. The usages of soap empower unavoidable reception for web service to arrive at interoperability. The created structure offers a few administrations to expound information from heterogeneous source; b) administration to deal with all information sources c) administration to empower correspondence among heterogeneous frameworks. The fundamental parts of the system comprise of utilization interface, administration stub, and database module. The system was sent utilization Ethernet setup of home condition. Ethernet is the default network in home condition with well-characterized organized wiring and broadband accessibility just as thinking about its exhibition progressively. The structure perfume trade by means of soap informing convention. The cleanser is most popular for its interoperability nature and characterizes a standard instrument of message trade by utilizing of XML envelopes as payload.

Conclusions

IoT has been bit by bit conveyance a ocean of technological changes in our daily lives, that successively helps to creating our life less complicated and softer, although varied technologies and applications. there's the multitudinous quality of IoT applications into all the domains together with medical, producing, industrial, transportation, education, governance, mining, surroundings etc. although IoT has copious advantages, there square measure some flaws within the IoT governance and implementation level. The key observations within the literature square measure that

1. There's no customary definition in worldwide
2. Technologies are varied from vendor-vendor, thus has to be practical
3. For higher international governance, we'd like to create customary protocols. allow us to hope future higher IoT.

Future work

The developed system can be improved to make it suitable for future commercialization. Our next study will use solar panels to power the control box rather than using batteries to make the proposed system energy efficient and environmentally friendly. We will optimize all circuits using printed circuits boards to save space and minimize risk of connection losses or short circuits.