WJCMS

Wasit Journal of Computer and Mathematics Science

Journal Homepage: https://wjcm.uowasit.edu.iq/index.php/WJCM

e-ISSN: 2788-5879 p-ISSN: 2788-5879

An Automation system over Cloud by Using Internet of Things Applications

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DOI: https://doi.org/10.31185/wjcm.88

Received: August 2022; Accepted: October 2022; Available online: December 2022

ABSTRACT: By the virtue of blooming automation industry and wireless connectivity, all the devices within the home can be connected. Today's World is moving to digitalization where everything is made easy and comfortable for people i.e., young youth as well as senior citizen. Smart Automated House Application using IOT (Internet of Thing) is a system where basic house facility can be handled by device from any place such as ON and Off of Light, Fan, AC, Water pump, Gardening of Water. One can handle all these things with help of device NodeMCU ESP8266, Android Application, Internet Connection. This paper include functionality of node esp8266 are connected with either of above given house application like fan, light, water pump, gardening with help of coding and hosting online with web server. All the functionality is handled by Mobile App created in android application, from which house application are controlled with help of internet. This paper is clarifying that monitoring of circuit devices through wireless using Node MCU and controlling using App Blynk. According to requirement of need one can connect multiple device like sensors, appliance and many more till 8.

Keywords: MCU, cloud, IOT, automation.

1. INTRODUCTION

IoT (internet of things) in recent years have become lifestyle of human being with great potential. Even it is focusing on different task that are requirement of human intelligence. In today's scenario IoT has opened doors to that cover up all requirements of human dealings in their daily life.

Example like purchasing of goods, monitoring of resources and remotely control them from any corner of the world. Think about a world were personal refrigerator will provide you list of all your stuff required for upcoming few days base on your present utilization in it. Even envisage your fridge is interactive with Home automation refers to remotely monitoring the conditions of home and performing the required actuation. Through home automation, household devices such as TV, light bulb, fan, etc. are assigned a unique address and are connected through a common home gateway. These can be remotely accessed and controlled from any PC, mobile or laptop. That can drastically decrease energy consumption and get better the living environment as well as enhancing the indoor safety [1] [2].

Along with the quick developments in technology, the devices in the recent past are becoming smarter. The real-world appliances are being prepared with intellect and computing capability so that they can configure themselves accordingly. Sensors attached to embedded devices along with the low power wireless connectivity can facilitate to remotely monitor and control the devices. This

forms an integral component of Internet of Things (IoT) network. IoT also helps in transferring of data from sensors through wireless network, achieving recognition and informational exchange in open computing network. Things that we are using in our daily life are becoming smart with the current technologies but it isn't sufficient until we connect

them to act with the dynamic environment and in addition to make their own inter-network, that is, machine-to-machine communication [3]. The Objects like electronics devices, softwares, sensors, actuators, home appliances and vehicles are connected to a wireless network.

Internet of Things is considered as a wireless network of these objects and they can exchange data through light weight protocols like MQTT, CoAP etc. There are so many types of radio modules out of which GSM, 3G, WiFi, Bluetooth, ZigBee, etc. are common. However, owing to the surging number of WiFi hotspots and range sufficient to perform the required control and monitoring, WiFi is chosen as the mode of communication in the prototype and the devices are controlled through Blynk App implemented using ESP8266 [4].

2. LITERATURE

The ease of doing things in the most accurate, lowest cost and shortest time are what human beings have been researching since their first day on earth. The process of almost everything has been modified in a manner of which every last drop of outcome is achieved with the minimum effort possible. The technology revolution led to the information age where each activity is based on cluster of information collected via various methods. the simplest example of the importance of the role of information is shown by the fuel level reader in automobile, where change in fuel levels are sensed constantly so that drivers are aware of the fuel level all the time not mentioning the low level notification that flash on when the fuel scanted. The Information value loop as described by jonathan Holdoesky el al. [5] would describe the principle behind the fuel level example. Figure below shows the information value steps that starts with a sensor which and in according to IEEE formal definition is “a device that convert non-electrical input into electrical signal that can be sent to an electronic circuit”. An action triggers the sensor that uses a network to communicate using communication standards and protocols to transmit special type of data. The information from many different sensors are aggregated by those standards and then analyzed to create an intelligent activity required upon the sensors’ aggregated data [5]. Figure (2.1) shows the information value loop diagram. A 1991 definition of the “ubiquitous computing” by Mark Weiser where sensing, communicating, analyzing, and acting would be what objects of all kinds do. The model described by Weiser was pure information value loop [5]. It is agreed that the previously mention information value loop with all stages outlined

gives the earliest identification to the Internet of things (IoT), although the term where not used until 1999 [5]. The wide spreading of the internet and the ability of connecting objects and devices of various type from different location inspired Kevin Ashton to come with an idea of connect RFID tags using the internet to decrease the human intervention in corporate supply chains [5].

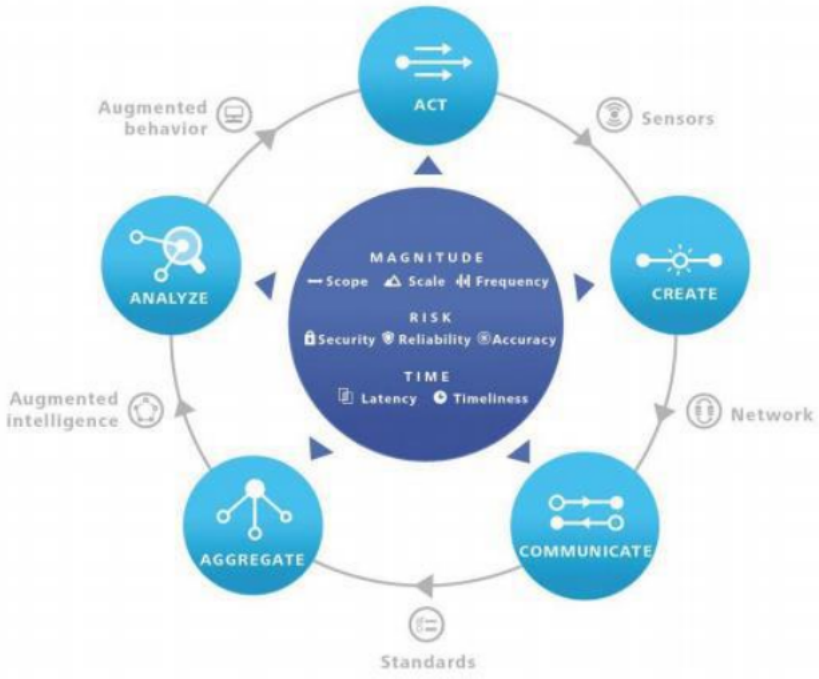

FIGURE 1. Information value loop diagram

IoT revolutionize the way of life in many different aspects and the technology is spreading widely over the entire world occupying almost every single detail around human being. Daily life gadgets and appliances, economic, industrial, health care, security and many other fields. Numbers of connected devices have been projected in billions within the current years. IoT connected objects will rise from 0.9 billion connected devices to nearly 26 billion devices by the 2020. Cisco figured 29 billion devices connected to the internet by the end of 2019 [6]. Figures are to be growing readily according to Morgan Stanly to reach about 75 billion devices by 2020. Yet 25 billion connections foresee by Huawei by 2025 .Surly, leveling up connected devices shall level up the global economy by about 185% by 2025 as expected numbers shall rise up from $3.9 trillion to $11.1 trillion [4]. The numbers will hit $14.4 trillion according to Bradley, Barbier and Handler [6].

IoT influence the manufacturing and servicing industries via its impact on the availability of data related to these fields. Researches yield to a developed IoT technology, hence increased numbers of IoT connected devices as mentioned before, and this was a main reason behind firms adopting the new technology. IoT application can be classified into three main categories [6] :

1. Monitoring and Control Applications: quite wide range of exist applications fall under this category data about equipment's performance, energy using and environmental condition are to be collected and sent to either managers or automatic controllers to track the performance of different platform as per request. Smart grid is an example of a monitor and control IoT application where the collected data are used to highlight operational pattern, discover areas that need improvement, yield to the prediction of future outcome and optimize of the operation [2].

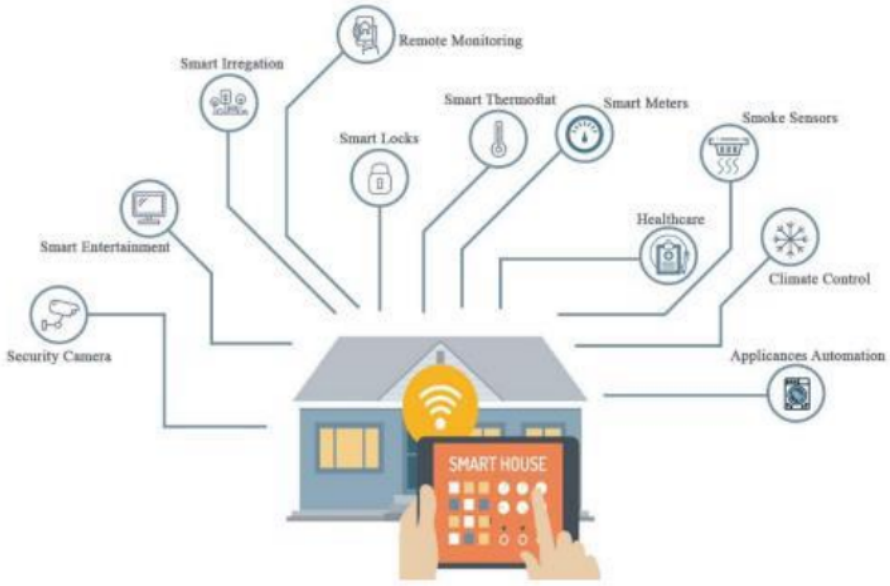

FIGURE 2. Smart home system applications

Verizon Home Monitoring System and control network prove to deliver property protection and energy saving for families using it. The company used special designed wireless technology to control and monitor application in home automation. Figure (2.2) shows the smart home system applications. Automobile IoT systems also classified under the same category where Ford and Intel gives the first go when special facial recognition software were used with a mobile application to personalized the user experience [6].

2. Big Data and Business Analytics: as number of connected IoT devices increases the amount of data collect shall hit a peak. The enormous amount of data collected could be used to find and correct issues in business. The collected data are transmitted what is known as business intelligence and analytic tools where decision are made by humans. The Big data application proved customer satisfaction factors with the valuable services provided such as the health monitoring systems [7]. Many health systems have been developed to observe aggregate and analyze data related to different health conditions such diabetes and blood pressure. Health monitoring systems using wearable health sensor and back by the business analytic gather huge amount of health data of patient. IoT makes it possible to observe patient's everyday habits and health enabling caregivers to influence the patients in a better way. Elderly fall detection application is another example of this category where data from different types of sensors are collected to obtain the state of an elderly by his/her caregiver. The collected data shall give a precise prediction of the elderly state and distinguish among different pattern like, sitting, running, falling, walking and etc. [8].

3. Information Sharing and Collaboration: information sharing is one of the most valuable application of IoT system. The entire process starts with a predefine event sensing, and then sharing information. The sharing of information could occur in three scenarios: people sharing information other people, things sharing information to people or things sharing information to other things [8]. It comes to mind the example mentioned in the first section of this chapter where the fuel tank sensor senses the level of car fuel in the tank. Reading of the level sensor are transmitted over a known period of time to a kind of user interface. The data are shared with the main processor of the car to set the low fuel indicator once the fuel gets to its minimum accepted levels. Another example of the information sharing and collaboration applications of IoT is the one used by Macy by deploying shopkick's Shop-Beacon technology [8]. A mobile application and BLE were used as location based technology to notify customers about available deals, discount and recommendation according to their location of the market. The result of engaging such technology was clear by increasing customer engagement and promotional yields to increased revenue [8].

3. CONCLUSIONS

The home automation using Internet of Things has been experimentallyproven to work satisfactorily by connecting simple appliances to it and the applianceswere successfully controlled remotely through internet. The designed system not only monitors the sensor data, like temperature, gas, light, motion sensors,but also actuatesaprocessaccording to the requirement, for example switching on the light when it gets dark. It also stores the sensor parameters in the cloud (Gmail)in a timely manner. This will helpthe user to analyze the condition of various parameters in the home anytime anywhere.

FUNDING

None

ACKNOWLEDGEMENT

None

CONFLICTS OF INTEREST

The author declares no conflict of interest.

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