An Efficient Method of Designing Smart Homes with Smart Technology using IoT

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Abstract

The Internet of things (IoT), is a system of combination or integrated collection of various computing devices which may be mechanical or any kind of digital machines, objects or people which are predefined with some unique identifiers called UIDs as well as the ability to transmit the data over a wide network without the requirement of a human-to-human or human-to-computer interaction. IoT also focuses on conceptualizing and remotely relating different objects making use of the Internet. Once we focus this scheme to a house or a building, it makes a more intelligent, secure and mechanized way to life. This IoT innovation helps in building a shrewd remote home security framework by which the needful interrupts regarding security or any kind of alerts are being sent to the proprietor by utilizing Internet. In case of an occurrence of any trespasses or any security issues an alert is raised automatically. Also, a similar innovation can be induced for home computerization, by utilizing smart sensors. This paper mainly focuses on the best feature of this framework over the comparable existing framework, that the alarms and the status sent by the Wi-Fi associated microcontroller is intimated to the client on mobile phones from any long distance, independent of whether their cell phone is associated with the web. The microcontroller adopted in this paper is Arduino Uno board which accompanies an implanted small scale controller and a local Wi-Fi shield using which each one of those electrical appliances can be controlled and spied.

I. INTRODUCTION

An IoT ecosystem usually is an enormous collection of web-enabled smart devices which frequently make use of embedded systems, like processors, sensors and communication hardware's in order to attain, send and respond on data that is retrieved from their environments. IoT devices mainly share the sensor data they collect through an IoT gateway or any other device where data is either sent to the cloud which would be later analyzed. Sometimes, there can be communication between inter related devices and action performed on the information they gather from other devices. The devices usually work without any human intervention, even though people can interact with the devices. The connectivity, networking and protocols incorporated with these devices highly rely on the specific IoTapplications deployed. They can also deploy artificial intelligence (AI) and machine learning to make data collection processes simpler and more dynamic.

Depending on who you speak to, the Internet of Things is defined in so many extraordinary methods, and it encompasses many aspects of existence—from related houses and towns to related motors and roads (sure, roads) to gadgets that music an character's conduct and use the statistics collected for "push" offerings. Some point out a thousand billion Internet-connected devices with the aid of 2025 and outline cell phones because the "eyes and ears" of the programs connecting all of those connected "matters."

Depending on the context, others give examples that are much less smartphone-centric, talk of the

elegance of gadgets and that do not exist these days or point to Google's augmented-truth smart glasses as a

demonstration of factors to return. Everyone, however, thinks of the IoT as billions of connections (a form of "widely wide-spread international neural network" inside the cloud) on the way to embody everything of our lives. All of this public dialogue suggests the IoT is sooner or later turning into a warm topic within the mainstream media. Many latest articles point to the IoT because the interplay and trade of facts (masses of it) among machines and objects, and now there are product definitions reflecting the same concept.

II. LITERATURE SURVEY

In the prevailing tool, the research carried out on Home Automation System addresses the problems regarding electricity consumption, difficulty in reachability and price of the whole device. In order to automate the domestic equipment, various techniques were used like SMS and Emails. K. Mandula [1] et al. came up with an art work of using Bluetooth for Home Automation System along with the usage of an Arduino board instead of a Wi-Fi gadget.

Utilizing a Bluetooth antenna of the board, the instructions are shipped or transmitted to cell phone or cell devices but one of the main drawbacks was that it was only applicable and effective for a reachable distance. Sukhen Das et al. [2] proposed a method which is reliable and compact, which highly relies on Arduino microcontroller and Android app. They utilized a Bluetooth chip with Arduino, instead of the usage of personal computers (PCs).Several other devices such as DC Servomotors, lights etc. have been interpolated in the designed system to achieve the required feasibility, reliability and operation of the proposed smart home system. The entire designed system has also been tested with the capability of running successfully, like switching functionalities, speed control of D.C motor and light intensity control. The drawback was that it did not

offer any kind of safety to their gadget and a confined number of gadgets were utilized for their work. B. Pandya et al. [3] proposed a work on the Android Based Home Automation System using Bluetooth & voice command. They made use of an Arduino microcontroller for connecting the home equipment as in [1], a Bluetooth section for detecting the signal while in motion on Smartphone Android software. The predicament of these paintings is that it uses the microcontroller which converts the byte signal into string layout so there should be a put off inside the system. Rajeev Piyare and Seong Ro Lee [4] made use of a low price and flexible domestic manipulator in addition to the tracking machine. In this system the embedded micro-net server was adopted for attaining access to and controlling devices and home equipment remotely.

The proposed gadget architecture is divided into three most important layers: domestic environment, home gateway and remote environment. The proposed domestic automation device sorts the software programs for server software (it's far a library implementation of a micro Web-server running on Arduino Uno using the Ethernet guard to speak among far off purchaser and the Home Gateway) which is different for a microcontroller firmware.

III. EXISTING SYSTEM

The existing system for controlling home appliances is both manual and remote management system. Many home equipment like light, fan and many others devices run under the control of people. Because of this there can be lot of energy wastage in terms of electricity, time intake and so on. The existing system makes use of Arduino and GSM. The present infra-pink (IR) or Blue-tooth far off controls which are within the market that are popular equipment in particular but it cannot be used interchangeably.

Electrical home equipment linked using Bluetooth cannot be managed from a far off place. Thus

features together with having the ability to control an air-conditioner whilst returning to the house cannot be accomplished with Bluetooth linked kind of systems. The problem confronted through modern-day home safety or surveillance structures in providing facts relating the state of affairs to customers at the same time as being far away from domestic is tried to triumph over in this undertaking.

IV.   PROPOSED SYSTEM

The proposed system is an IOT Based generation used for operating domestic home equipment with the use of android cellphone. The Smart Home improves the standard of residing at domestic. Control of home appliances through the cellular software is much more robust and efficient. Vibration sensor and fire sensor are also utilized as well as GSM and Arduino.
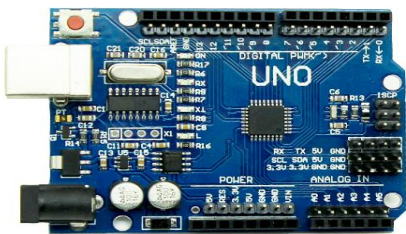

FIG1: ARDUINO UNO R3 CH340G ATMEGA328

V. DESIGN FLOW

System evaluation makes use of numerous kinds of the information systems to help many processors to perform their commercial enterprise characteristic. Each gadget has a specific purpose; this "lifestyles of its very own" concept is known as the System Development Life Cycle.

- **Step 1**: First a connection is established between client and server, by enabling the Wifi option in the Smartphone.

- **Step 2**: Connection established with Wifi module of the system.

- **Step 3**: The Arduino Uno Board is made to connect each electronic/electrical device in the system via digital pins on the them.

- **Step 4**: To connect any device to Arduino a Relay is used, that helps in converting supply of high Voltage to low voltage

- **Step 5**: The Arduino Uno Board is loaded with a C-program which decides what action is to be performed on receiving particular inputs.

- **Step 6**: With the help of Android Application that has been developed the end user can easily monitor and control the appliances from any remote areas.

- **Step 7**: Client-Server communication is attained through Socket Programming.

- **Step 8**: Finally there is a successful control and monitor over each domestic appliances.

VI.   METHODOLOGY

Arduino Board:

The Arduino is basically an open source platform and arduino boards are a collection of a micro controller boards which are designed to simplify digital designs, prototyping and experimenting. Basically they are used by artists, hackers and so on, but additionally by many professionals. It can be even used as brains for robots, to build some virtual tune gadgets, or to construct a device that are artificially intelligent enough to tweet back at humans.

Arduino boards are capable of reading analog or digital input signals from various sensors and convert them into an output like activating a motor, connect to the cloud and many other actions or like turning LED on/off. Arduino is built on an ATmega328 micro controller, ie. essentially a whole computer with CPU, RAM, Flash reminiscence, and input/output pins. The functions on the board can be controlled by sending a set of instructions to the

microcontroller on the board through IDE developed of arduino.
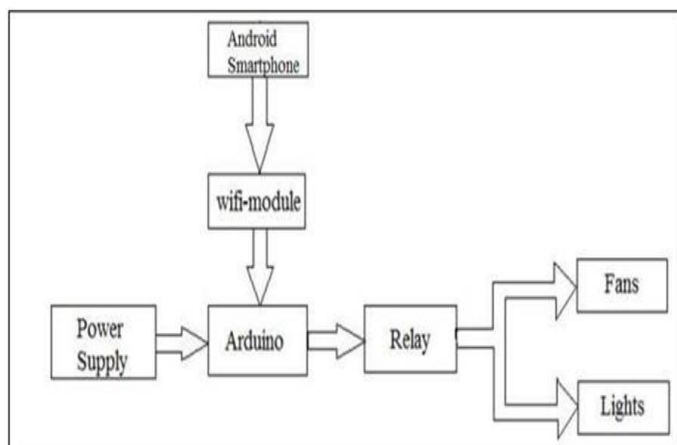
The Arduino connects can be connected to the computer via USB cable, where the program is fed in an easy language using C/C++ from within the Arduino IDE with the aid of importing your compiled code to the board. The Arduino can run with the USB hyperlink repeatedly in your pc, or standalone with or without being re-programmed, once already stored. It simply works on electricity.

VII. RESULT ANALYSIS

This paper presents a clearly flexible way of controlling the domestic appliances. The simplest downside is that a reliable network connection is a must without which controlling is never possible. So this problem can be triumph over in future. This appears to be one of the methods to be alert regarding numerous appliances of everyday use. Regarding efficiency of the system, it is worth usable for automating each and every single device at home.
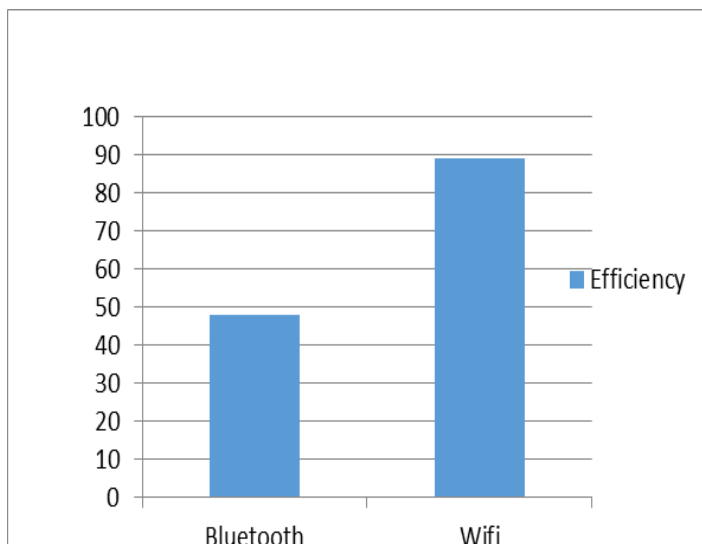
VIII. CONCLUSION

All home appliances can be manipulated using this kind of technology. This concept has been implemented via multiple ways having a very robust Internet, electrical switch, and GUI. Since Bluetooth is always limited cellular phones are all equipped with wifi technology to support any range of devices in any remote location. Basically a home control and security gadget exploitation can be built using this smart technology introducing Arduino and Internet of Things..

In case of any theft or any security issues or any emergency fire cases, an alert will be sent to the client as well as a call will be made to the emergency numbers. The device is appropriate for the real-time home protection, tracking and controlling the house appliances. The diverse future applications may be used by the controlling diverse family gadgets of house with network, industrial automation, system-driven fire exit structures and improvement of protection problems in extraordinarily limited areas. This methodology has brought about a lot of impact on daily life as everyone makes use of wifi.The same technology can be made use of in any other areas of life with latest arduino board for much more better efficiency and virulality.

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