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Research Article

Wifi based Low Power Consumption Home Automation System using IOT

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ABSTRACT

Smart home appliances nowadays can be networked utilizing the IoT communication protocols. Appliances can be monitored and controlled using local switches and remote access via mobile phones. Many systems are reported in the literature based on single monitoring and controlling mode utilizing text, voice or gesture commands. This paper presents an IoT-based Dual-mode system to monitor and control home appliances. In the proposed system, home appliances are interfaced with a general purpose digital and analog inputs and outputs of a single chip microcontroller. The microcontroller has a built-in wireless access point that enables the system to communicate with a home server. The system has two different operation modes. The first mode makes use of a mobile app interface with virtual switches and sliders to monitor and control appliances. The second mode is chat-based that uses text or audio commands fitted with natural language processing to monitor and control the home appliances. The proposed system is scalable in that it is able to add and remove rooms on demand. For validation and testing purpose, a prototype is built that includes home appliances, room controllers, home server and a mobile app.

While the cost of living is going up, there is a growing focus to involve technology to lower those prices. Covering a wide application field, WSNs can play an important role by collecting surrounding context and environment information. Some of the challenges are security and quality of service management and network configuration. Effective implementation for Internet of Things used for monitoring regular environmental conditional process by means of low cost omnipresent sensing unit. This project illustrates an effective low-cost and flexible solution for power management, condition monitoring and energy management in home. The basic operations include remote management and control of domestic devices such as electric lamp; water heater etc., unobtrusive monitoring of domestic utilizations and providing ambient intelligence to reduce the energy consumption through technology are the key functions of the developed system.

Keywords : Wife, home automation, IOT

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I. INTRODUCTION

Smart home remote monitoring and controlling systems are not new. In the literature, many systems are reported and implemented using single chip controllers to monitor and controller

home appliances. Communications protocols such as Zigbee, Bluetooth, WiFi, GPRS, Ethernet, Power Line Carrier (PLC), SPI, I2C and RS485 communication protocols are used to interface the home controllers to the Internet. For example, a recent IoT-Cloud based smart home automation system using a web platform to control home appliances was reported . In this system, a homeowner can change the appliances' status using HTTP requests. The important feature of the IoT-Cloud approach is to store the home appliances' status and perform more data analytics. An end-to-end text-based remote control system for home appliances using a secure mobile applicant was reported in . Based on ZigBee and PLC, an energy management system was reported in . The system monitors and controls lights, the status of appliances, and energy consumption via the Internet based on text commands . The above-mentioned systems use mobile and internet applications, however they are limited to text-based commands. This paper proposes an IoT-Based Dual-Mode Smart Home Automation System that uses a touchscreen interface mode and Natural Language Processing (NLP) mode. A mobile app is This research is sponsored by the American University of Sharjah, UAE. developed to enable home users to monitor and control their home appliances using mobile. The proposed system has an additional advantage of scalability where new rooms controllers can be added/removed on demand.

In existing method there is no advanced technology for measuring the reading of electric bill in home's, humans are placed for take readings from home. In such cases no one is present in home and previous month current reading will be noted and also no one person which is not present in the home means fan is not switched off when person leaves from home.

It will cause the waste of electricity. Whenever persons enter in the room and it will not automatically adjust environment based on the temperature and humidity**.**

In this project can distantly control domestic objects. The unified system will assist the inhabitants to avoid multiple systems to monitor their domestic utilization. The sensing unit measures the environmental conditioning values such as temperature, light etc. The PIR sensor which is used to detect person in the room and automatically turn on the fan and adjust the fan based on the room temperature. All the sensor values are displayed in Mobile App through Node MCU.

The Embedded Unit works in a two mode. One is sensor mode and another one is a mobile application mode. These two modes controlled by the one toggle switch

II. MID-POINT FILTER

Recent advancements in the Internet, web and communication technologies cut across many areas of modern-day living and enabled interconnection of every physical object, including, sensors and actuators. Web-enabled smart objects empower innovative services and applications for different domains and improve utilization of resources. In this paper, we propose an interoperable Internet-of-Things (IoTs) platform for a smart home system using a Web-of-Objects (WoO) and cloud architecture. The proposed platform controls the home appliances from anywhere and also provides the homes' data in the cloud for various service providers' applications and analysis. Firstly, we proposed a Raspberry PI based gateway for interoperability among various legacy home appliances, different communication technologies, and protocols.

Secondly, we bring the smart home appliances to the web and make it accessible through the Representational State Transfer (REST/RESTful) framework. Thirdly, we will provide the cloud server for smart homes' to store the homes' data due to low storage capabilities at a gateway and

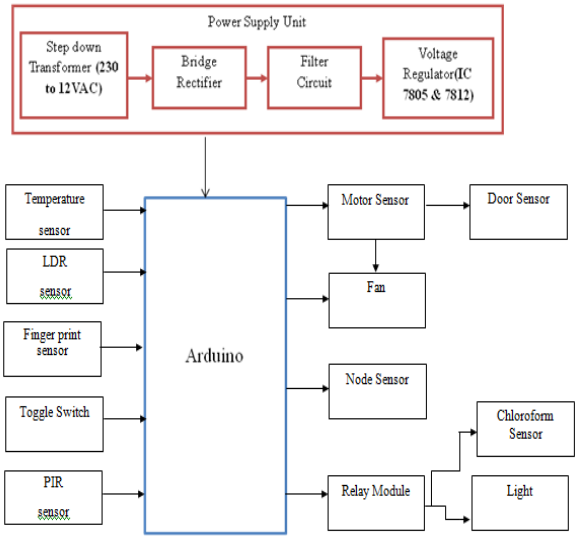
provide the data for various application's service providers and analysis. In the proposed smart home platform, we implement a water-tank control using Zigbee communication, an automatic door security using a normal camera as an IP camera, and provide web connectivity to different home devices for web-based controlling. We aim to reduce the human intervention, secure access control to home devices from anywhere, provide smart homes data for application services as well as for analysis, and improve the utilization of resources. In most existing remote-control services for smart home appliances, a controller outside the home network can be used to control these appliances in the home network using a remote-control support server installed on the Internet. However, if the service provider ends the service, a user cannot control these appliances from outside the home. To solve this problem, we have proposed a secure end-to-end remote-control system based on the "Network Traversal with Mobility," which can solve a NAT traversal problem and achieve end-to-end encrypted communication and IP mobility.

In this study, we implemented a prototype of the proposed system and conducted a remote control experiment and performance evaluation for smart home appliances compliant with ECHONET Lite. Consequently, a user could directly access ECHONET Lite appliances inside the home from outside the home network with a low delay without any remote-control support server. Although much of the work has been done until today to realize the Internet of Things (IoT) into practice, most of the work focuses on resource-constrained nodes, rather than linking the existing embedded systems to the IoT network. In this paper, we propose the uID-CoAP architecture, a new architecture designed to host IoT services on common embedded systems, like usual consumer appliances. As they often need to provide a number of sophisticated functions compared to simple sensor nodes, we combine the constrained application protocol (CoAP) with the ubiquitous ID (uID) architecture. The latter plays a crucial role for keeping the knowledge and data required for practical complex IoT services. In addition, we provide a software framework for embedded appliance nodes, designed to reduce the burden of embedded appliance manufacturers by providing an intuitive, consistent, and easy-to-use API.

Based on this idea, our framework provides functions to build RESTful services in addition to the low-level communication API. We have evaluated our system through a case-study, and showed that our framework can be used effectively to implement practical IoT applications over existing embedded systems with a small programming effort.

III. MAX-MIN ADAPTIVE METHOD

This is the General Block diagram of our project. Here, first comes the Power supply unit, then the micro controller part, the micro controller used here is Arduino UNO R3, the left part of the micro controller indicates the Input and the right part of the micro controller indicates the Output. We have carefully taken the direct 230V AC supply as the input and given to the Step-Down Transformer to reduce the voltage from the primary winding to secondary winding which transforms 230V to 12VAC and then to the Bridge rectifier



Rectifier is nothing but a Pull-wave rectifier converting Alternating current I/P into a Direct current O/P and then given to the Filter circuit

The Filter circuit filters /corrects the ripples allowing Direct current of the load and blocks the Alternating current and given to voltage regulator

If more amount of voltage is generated, it may damage Arduino board. For this purpose, voltage regulator has been fixed which generates required voltage O/P needed for the load

These power supply unit has been fixed inside the Arduino board which is a open source platform used for building Electronic projects which consists of both Physical programmable board (a micro controller) and a piece of software, or IDE (Integrated Development Environment) that runs on computer, used to write and upload computer code to the physical board

Here, in the I/P section we have implemented Temperature sensor, LDR sensor (Light Dependent Resistor), PIR sensor (Passive Infrared Sensor), Fingerprint sensor and Toggle switch

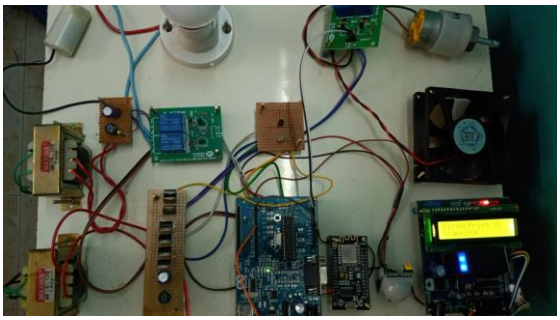
In the O/P section, Here motor is not directly connected to the Arduino board but through the driver which takes the control of fan, door motor

Relay board is also used to control fan and motor and acts as a switch. Relay is nothing, but mainly used for switching purpose

Chloroform motor is a spray motor used as a security system when fingerprint authentication is denied, quiet a number of times and also when lock has been broken, indicates theft has been occurred and chloroform motor generates, which spills limited amount of chloroform to make a person dizzy

Node MCU is used to connect to cloud using ESP-8266 WI-FI module. All the sensor values are displayed in mobile app through Node MCU. To control the Node MCU I/O, the IP address of Node MCU is to be entered on the Android app IP box. ESP 8266 and Arduino together acts as a web server and we will send control commands through Web Browser. The Wi-Fi module Node MCU ESP-8266 will receive commands from the smartphone wirelessly through the internet. To encode the ON/OFF signal, Blynk based home automation code to send it to the server and ESP-8266 board we need BLYNK, the best IOT platform.

IV. RESULTS



V. CONCLUSION

In this paper we focus on the process of operating or controlling various equipment, machinery, and other electrical and electronic appliances using various control systems remotely. This method of operating or controlling such applications is referred to as automation which has become an integral part of everyday life for human beings.

The working model we designed has its focal point on home automation providing 100% efficiency. The model has its roots on an IOT platform that allows devices to synchronize with the IOT platform so that it can be controlled remotely.

The platform uses the IOT technology to create a network between the main server and the other electrical and electronic appliances making home a smarter place to live in. The whole network consists of a single admin which makes our model a secure one as the admin only have the authority to access all the nodes present under each user.

The model is quite economical as though there is only a single admin but the number of user under the admin may increase making a large complex network but a secure one. For future work we would try to increase the number of networks under a single server making a whole city automation using IOT.

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