

Wireless Home Automation For Multi-functional Devices Using Social Network

CH.Pragnya & Ms.K.Jhansi Rani

Research Associate, Dept. of Electronics and Communication Engineering, UCEK (A), JNTUK, Kakinada, Andhra Pradesh, India¹

Assistant Professor, Dept. of Electronics and Communication Engineering, UCEK (A), JNTUK, Kakinada, Andhra Pradesh, India²

Abstract:

We are living in the realm of automation where a large portion of the frameworks are getting computerized. With the vitality sparing idea, home automation or building computerization makes life exceptionally straightforward these days. It includes programmed controlling of all electrical or electronic gadgets in homes or even remotely through remote correspondence. Brought together control of lighting types of gear, aerating and cooling and warming, sound/video frameworks, security frameworks, kitchen machines and every other hardware utilized as a part of home frameworks is conceivable with this framework. With the appearance of Internet of Things, Wireless Home Automation Systems (WHAS) are steadily picking up ubiquity. energy management through home automation also save you money. It certainly can for many people, provided it's used correctly. Technology is great, but smart technology is better because it saves time and money. Smart technology offers the same benefit, but with a bonus, as it can learn and make adjustments based on our behaviours. These frameworks are confronted with various difficulties, for example, security; controlling an assortment of home apparatuses with a solitary interface and ease of use. In this paper we propose a framework that utilizes secure verification frameworks of long range informal communication sites, for example, facebook, for controlling, monitoring and for getting alerts from our home.

Keywords:

Home energy management; automation techniques; social networks; microcontroller(cc3200); IoT clouds; APIs; smart living.

1. INTRODUCTION

The family unit exercises are robotized by the advancement of exceptional apparatuses, for example, water warmers to diminish the time taken to bubble water for showering and programmed

clothes washers to decrease physical work of washing garments. In developed nations, homes are wired for electrical power, doorbell, TV outlets, and phones. The diverse application incorporates when a man goes into the room, the light turns on. In cutting edge innovation, the room can detect the nearness of the individual and who the individual is. Considering the day of the week, time and other such factors it can likewise set well-suited lighting, temperature levels, TV slots or music levels. On account of a smoke identifier when fire or smoke is recognized, the lights in the whole house start to squint to alarm the occupant to the likely fire. If there should arise an occurrence of a home theater, the home automation framework can maintain a strategic distance from diversion and bolt the sound and video segments and can likewise make a declaration. The home mechanization framework can likewise dial up the house proprietor on their cell phone to caution them or call any alert observing organization. Home automation frameworks are headway to the automation forms wherein human endeavors are required with the hardware supplies to work different loads in homes. Demand-side management, together with the integration of distributed energy storage have an essential role in the process of improving the efficiency and reliability of the power grid[1]. It includes programmed controlling of home apparatuses utilizing diverse advancements and controllers over desktops, portable PCs PDAs or tablets. When it comes to energy saving, energy management is the process of monitoring, controlling, and conserving energy in a building or organization. Home energy management systems (HEMS) are quickly picking up notoriety around the globe as the innovation behind them enhances and as little scale sun oriented power and battery stockpiling turn out to be more suitable. The development of storage device capacity enables customers to store electricity for longer period of time. In addition, such devices are expected to save money for customers by charging their energy storage devices at periods of lower prices and use that energy to supply for their home devices during peak periods instead of purchasing energy from the energy provider. Devices

in a distributed fashion is becoming a primary method of smoothing energy consumption pattern as well as reducing peak load in future smart grid. However, without intelligent control strategies, the charging and discharging process of such storage devices can overload the grid capacity and endanger the reliable operation of the grid system at peak periods due to supply for their home devices during peak periods instead of purchasing energy from the energy provider. Devices to the increase in electricity consumption. This motivates to develop advanced mechanisms to find the global optimal scheduling solution which can both minimize the total energy payment for customers and reduce the peak load of the grid system[1] Utility companies have higher electric rates during peak periods, so the smart grid or home energy management system emphasizes off peak energy consumption. . If continuous feedback on instantaneous price per unit of power demand is provided, the user would need to decide whether to activate the demand immediately and pay an instant price or postpone the demand for later, with the hope that price is lower. Another possibility could be that each consumer makes its proposition to the provider in terms of its own flexibility in time shift based on the announced price[2]. One of the main challenges in the deployment of wireless cellular networks in the countries with the higher potential increment of the number of customers in the coming years will lie in the possibility to provide power for BSs, and to do so reliably and at limited cost, in order to offer dependable services at prices compatible with the population income. Of course, providing power to recharge user terminals is also important, but this is less of a challenge, because of the limited amount of energy involved (simple solutions, such as dynamos, can be a very inexpensive option)[3].Today, social networking is as normal as sending an email at home or work. Representatives swap reports on Facebook furthermore, Twitter, log sentiments at websites, and transfer previews to photograph sharing locales. Hence using social networks for energy management in home automation brings the life smarter through a secure channel.

2.RELATED WORK

Utilization of Home computerization framework is expanding because of its various advantages ,easiness and so on. Home automation framework is that in which the different appliances inside the house are remotely controlled[4] There are diverse advancements exist which are utilized for Home Automation .By utilizing Bluetooth or ZigBee we can remotely control all appliances inside home yet them two having zone constrain or inside some particular separation we can work that gadgets remotely yet by utilizing Internet of Things (IoT) we

can control our home machines from anyplace around the world. The work manages discourse about different splendid home mechanization frameworks and advancements. Different home automation systems and techniques considered in review with central controller based (Arduino or Raspberry pi), Bluetooth-based, ZigBee based, email based, web based, SMS based, mobile-based, cloud-based, Dual Tone Multi Frequency based, and the Internet(Wi-Fi) based.

Important Controller: It is hardware interface that communicates with user interface by controlling home services.

Mode of communication: wired connections (example Ethernet) or Wireless (radio waves, infrared, Bluetooth, GSM) etc.

Electronic Devices: A bulb, an AC or a heater, which is compatible with the transmission mode, and connected to the Central control system.

User interface: Give orders to control System for example as a monitor, computer, or Phone. All the home control mechanization framework utilizes remote innovation. Advanced mobile phone assumes an exceptionally basic part in every one of these frameworks. GSM innovation is utilized as a part of two frameworks. Small scale Controller, ARM7(ARM7 LPC2148 board, PIC16F877 (40 stick IC), ARM9,etc. goes about as a controller in above home mechanization framework. For driving the transfers ULN2003 is utilized as a part of all framework. In programming App innovator, installed C, Keil Compiler, VB.NET and so on this all product's are utilized and Bluetooth modules LM400 having separation 100 meters, frequencies 2400Hz, speed 3 Mbps.

3. PROPOSED SYSTEM

*Description of the Proposed system:*Aim of the proposed algorithm is to build a secure home automation system for monitoring, controlling and to manage home energy through social networks such as facebook.the block diagram of this system shown below.

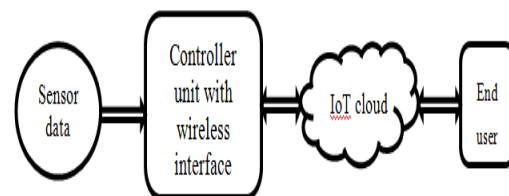


Fig 1:Simple block diagram of home automation

*System components:*The proposed home automation system was build with Ti's cc3200 microcontroller which has on chip Wi-Fi connectivity to access the controller in access point,

station, and in both modes. Below is the list of various components used in this proposed system are Cc3200 microcontroller unit, Gas leakage detecting sensor, PIR motion sensor, fire detection sensor, Relay systems to control appliances.

The description of each component is given in detail. *cc3200 controller*: The Simple Link™ Wi-Fi® CC3200 LaunchPad™ advancement unit (with QFN-bundled device) is an assessment improvement stage for the CC3200 remote microcontroller (MCU), the industry's initially single-chip programmable MCU with worked in Wi-Fi availability. CC3200 Wi-Fi module is a low-power 802.11 b/g/n module, which is designed for realizing wireless network communication of embedded system. Users can connect a physical device to a Wi-Fi network by means of CC3200 Wi-Fi module, so as to realize the control and management of IOT. The board includes on-board copying utilizing FTDI and incorporates sensors for a full out-of-the-crate understanding. This board can be straightforwardly associated with a PC for use with improvement devices, for example, Code Composer Studio™ Cloud incorporated advancement condition (IDE) and IAR Embedded Workbench. This LaunchPad has driver support and a software development kit (SDK) with 40+ applications for Wi-Fi protocols, Internet applications and MCU peripheral examples. *Features*: CC3200 Wi-Fi wireless microcontroller (MCU) in QFN package; Industry's first devices to be Wi-Fi CERTIFIED™ at the chip level by the Wi-Fi Alliance™; USB interface to PC for CCS/IAR using FTDI USB drivers; Flash update over the USB using SimpleLink Programmer; 2 20-pin connectors enables compatibility with Booster Packs with added functions (Booster Pack headers); Standalone development platform featuring sensors, LEDs and push-buttons; Power from USB for the LaunchPad as well as external Booster Pack; Operates from 2 AA alkaline batteries; On-board antenna and U.FL connector selectable using a capacitor re-work; Supports 4 wire JTAG and 2 Wire SWD; GNU Debugger (GDB) support over Open On chip debugger (OpenOCD)

4. SENSORS

MQ 5 lpg leakage sensor: Structure and setup of MQ-5 gas sensor is made by smaller scale AL₂O₃ artistic tube, Tin Dioxide (SnO₂) touchy layer, measuring anode and radiator are settled into a covering made by plastic and stainless steel net. The radiator gives fundamental work conditions to work of delicate segments. The wrapped MQ-5 have 6 stick, 4 of them are utilized to get signals, and other 2 are

utilized for giving warming current. It has the features of High sensitivity to LPG, natural gas, town gas Small sensitivity to alcohol, smoke. Fast response, Stable and long life, Simple drive circuit

PIR motion sensor: The PIR sensor itself has two spaces in it, each opening is made of a unique material that is touchy to IR. The focal point utilized here is not by any stretch of the imagination doing much thus we see that the two spaces can "see" out past some separation (fundamentally the affectability of the sensor). At the point when the sensor is sit out of gear, the two spaces identify a similar measure of IR, the surrounding sum transmitted from the room or dividers or outside. At the point when a warm body like a human or creature cruises by, it initially captures one portion of the PIR sensor, which causes a positive differential change between the two parts. At the point when the warm body leaves the detecting region, the invert happens, whereby the sensor produces a negative differential change. These change beats are what is identified.

Fire detection sensor: A fire detector is a sensor intended to recognize and react to the nearness of a fire or fire, permitting fire identification. Reactions to a recognized fire rely upon the establishment, however can incorporate sounding an alert, deactivating a fuel line, (for example, a propane or a petroleum gas line), and enacting a fire concealment framework. At the point when utilized as a part of uses, for example, modern heaters, their part is to give affirmation that the heater is appropriately lit; in these cases they make no immediate move past informing the administrator or control framework. A fire finder can frequently react speedier and more precisely than a smoke or warmth indicator because of the components it uses to identify the fire

5. RELAY SYSTEM

Relay boards are used in many different applications. Some products are used to control lights, motors, and other electronic devices in industrial and commercial applications. Others are also used to control heater temperatures, or are used in power switching applications. Relay boards that are designed for specific types of industrial equipment are also available in the market.

6. IOT CLOUDS

Cloud computing is getting a lot of consideration. However it is not generally obviously defined. Cloud

registering is a membership based administration where you can acquire arranged storage room and PC assets. One approach to consider distributed computing is to consider your involvement with email. Your email customer, in the event that it is Yahoo!, Gmail, Hotmail, et cetera, deals with lodging the greater part of the equipment and programming important to help your own email account. When you need to get to your email you open your web program, go to the email customer, and sign in. The most imperative piece of the condition is having web get to. Your email is not housed on your physical PC; you get to it through a web association, and you can get to it anyplace. On the off chance that you are on an outing, at work, or down the road getting espresso, you can check your email as long as you approach the web. Your email is not quite the same as programming introduced on your PC, for example, a word handling program. When you make an archive utilizing word handling programming, that record remains on the gadget you used to make it unless you physically move it. An email customer is like how distributed computing functions. But as opposed to getting to only your email, you can pick what data you approach inside the cloud.

7. Proposed Algorithm

Inorder to implement home automation and energy management with respect to social network we have to create temboo account and run choreos. As social network used here is facebook authenticate facebook by getting access tokens from facebook developers page. A special programming platform energia is taken into consideration for running the code. The code is taken from the choreos. Upload the code by connecting the Launchpad cc3200 to the system with the help of USB cable. Output is being checked in the serial mount. Login to facebook for running comments, to set status and automate home appliances.

8. POWER CALCULATION

In this paper power consumption of each appliance is calculated depending on the power rating of each device.

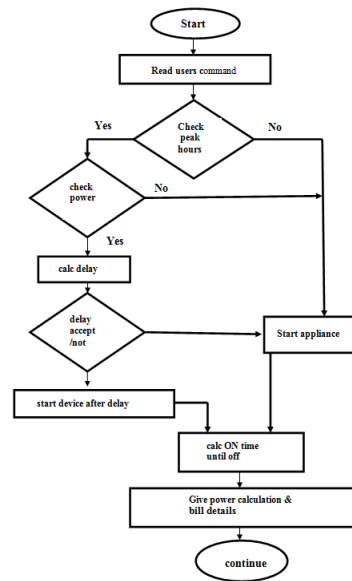


Fig.2. flowchart for power calculation

$$t' = (t - 5)$$

$$P = \text{Power rating (kW)} * \text{time (hours)}$$

$$= 1 * (t' * 0.000277778)$$

$$c = \text{unit price} * \text{no. of units}$$

where,

$$P = \text{Number of units consumed};$$

$$t = \text{starting time of appliance};$$

$$t' = \text{appliance off time};$$

$$c = \text{cost};$$

Example

LOAD	POWER RATING ASSUMED TO BE	PEAK HOUR	SUCCESS RATE	FAILURE RATE	COST PER UNIT WITH ENERGY MANAGEMENT	COST PER UNIT WITHOUT ENERGY MANAGEMENT
WASHING MACHINE	2	3hrs/day	92%	8%	Rs.2/-	Rs.7/-
DISH WASHER	1	3hrs/day	91%	9%	Rs.1/-	Rs.4/-
AIR CONDITIONER	4	3hrs/day	93%	7%	Rs.2/-	Rs.8/-

9. RESULTS AND DISCUSSIONS

The experimental procedure can be moved in some stages. It includes creating an account in cloud services, storing the data in the database, authentication procedure from facebook and finally the code

Stage 1: registering cloud API

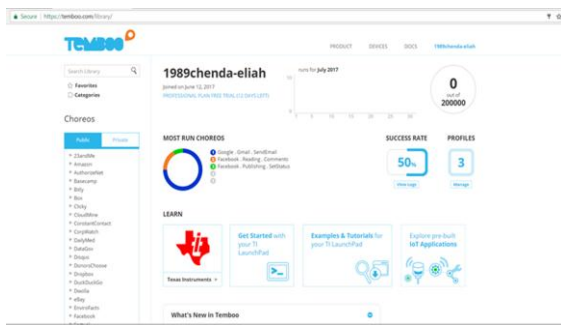


Fig.3. Registering cloud API

Stage 4: monitoring and controlling.

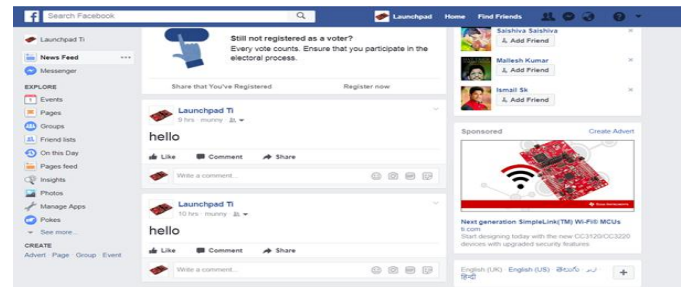


fig.6. monitoring and controlling

Stage2: setting facebook API.

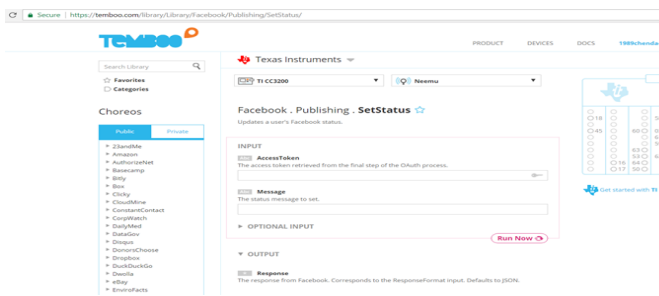


Fig.4. setting facebook API

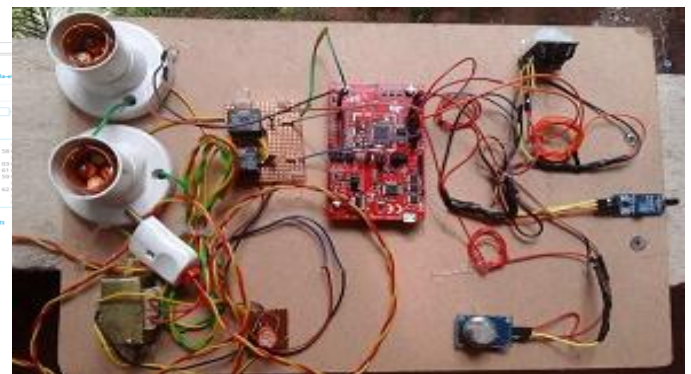


Fig.7. final kit

APIs do a lot of heavy lifting, both in mobile and on the web. They're responsible for nearly everything we do and with just a few taps or clicks, let you do things like order a pizza, book a hotel, rate a song, or download software. APIs work quietly in the background, making the interactivity we expect and rely upon possible.

Stage3: Facebook authentication.

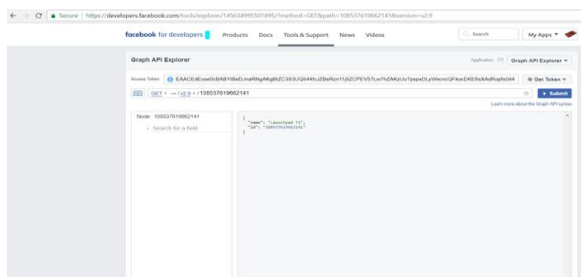


Fig.5. Facebook authentication

In order to access any social network outside rather than from web browsers, authentication process is necessary. Resulting some kind of tokens based passwords to login from apps and APIs.

10. Conclusion

The paper proposed involves automation of home appliances using social network. The proposed paper is advantageous to flexibility, convenience and integration. Automated Door Locks Increases Awareness Through security cameras which saves Money and increases convenience, gives control of appliances when out of town. The application of the Internet of Things concept in the smart home through Bluetooth Low Energy. Energy is being managed and power is calculated with depending on the status taken by facebook with the help of the proposed code. In fact, built on connections between digital devices and nearly anything that can be monitored or controlled electronically, the IoT holds promise for making homes smarter.

11. REFERENCES

- [1] H. NGUYEN, J. SONG, AND Z. HAN, "DISTRIBUTED DEMAND SIDE MANAGEMENT WITH ENERGY STORAGE IN SMART GRID," *IEEE TRANS. PARALLEL DISTRIB. SYST.*, Nov. 2014, DOI: 10.1109/TPDS.2014.2372781.
- [2] I. KOUTSOPOULOS AND L. TASSIULAS, "OPTIMAL CONTROL POLICIES FOR POWER DEMAND SCHEDULING IN THE SMART GRID," *IEEE J. SEL. AREAS COMMUN.*, VOL. 30, NO. 6, PP. 1049–1060, JUL. 2012.



-
- [3] M. MARSAN, G. BUCALO, A. DI CARO, M. MEO, AND Y. ZHANG, "TOWARDS ZERO GRID ELECTRICITY NETWORKING: POWERING BSS WITH RENEWABLE ENERGY SOURCES," IN *PROC. IEEE INT. CONF. COMMUN. WORKSHOPS, JUN. 2013*, PP. 596–601
- [4] SMART GRID WORKING GROUP (2003-06), "CHALLENGE AND OPPORTUNITY: CHARTING A NEW ENERGY FUTURE APPENDIX A: WORKING GROUP REPORTS," ENERGY FUTURE COALITION, NW WASHINGTON, DC, USA, 2008.
- [5] J. ZHENG, D. GAO, AND L. LIN, "SMART METERS IN SMART GRID: AN OVERVIEW," IN *PROC. IEEE GREEN TECHNOL. CONF.*, APR. 2013, PP. 57–64.
- [6] R. BELKACEMI, A. BABALOLA, F. ARIYO, AND A. FELIACHI, "RESTORATION OF SMART GRID DISTRIBUTION SYSTEM USING TWO-WAY COMMUNICATION CAPABILITY," IN *PROC. NORTH AMER. POWER SYMP.*, SEP. 2013, PP. 1–4.
- [7] Z. LI-MING, L. BAO-CHENG, T. QING-HUA, AND W. LI-PING, "THE DEVELOPMENT AND TECHNOLOGICAL RESEARCH OF INTELLIGENT ELECTRICAL BUILDING," IN *PROC. CHINA INT. CONF. ELECT. DISTRIB.*, SEP. 2014, PP.