



# IOT BASED HOUSEHOLD APPLIANCES CONTROL AND TAMPERING DETECTION OF ELECTRICITY ENERGY METER

Lekha Lavanya K., Jegan G. and Ranganathan M. D.

Department of Electronics and Communication Engineering, Sathyabama University, Chennai, Tamilnadu, India

## ABSTRACT

With the change of IOT (Internet of things), the thought of canny device has ended up being all the more understood. Devices are joined with the web and amplify their range. Cell telephone is by all record by all account not the only ordinary sharp device. Keen TV, savvy, shrewd rings, brilliant air screen, shrewd sensors, an extensive variety of standard contraptions swing to brilliant and can get to the web. This adds to the progression of remote home computerization. The principle point of this paper is to plan the brilliant home machine control in light of web and Wi-Fi innovation. In this paper, Wi-Fi based machine control is utilized, so client can control the apparatus in indoor and outside area. In past framework one and only individual might control the home machine however in the present framework any one might control the apparatus. It encourages the altering location of force of power meter, if the force robbery is identified every one of the apparatuses will be ended by ending the heap from substation side.

**Keywords:** internet of things (IOT), wi-fi, electricity meter, tampering detection.

## 1. INTRODUCTION

Remote control is an essential future for brilliant home framework or home robotization structure. Huge attempts have been put into the progression of remote control structures for home computerization. Former structures are for the most part considering the use of telephone line present phone based controller of home and office computerization. Composes an answer using a PC to control home mechanical assemblies remotely through telephone lines. The above structures make usage of the telephone as the remote control information device and have no any intriguing customer interface. In an offer robot some assistance with being used to go about as another interface in the insightful home by taking after the individual and seeing the individual's voice orders for taking notes, scrutinizing notes and controlling sharp home contraptions. Likewise as with the progression of the Internet, Internet based remote control answers for home robotization has been proposed. Display some auxiliary getting ready for online remote computerization control. These Internet based techniques require a home server realized on a PC running always. It is hard to supply a headed together organization for different home computerization structures.

Remote control relies on upon the phone line or remote methods, for instance, GSM or Internet. Considering the progression of the web and its flexibility, online remote control philosophy will be a good choice. There are various approaches to manage develop the area framework between devices or sharp units. Physical wiring or not entirely hardwired course of action is hard to move or develop, which is all the more extravagant. In remote sensor systems (WSNs) and electrical cable interchanges (PLCs) are used to realize a sharp home control framework. ZigBee, Bluetooth and Wi-Fi are customarily used to develop the area framework. Under this condition, a home portal is required between the web and WLAN. Generally speaking, the home entrance is more like a web server with a known IP out in the open

web; however this is not sensible for each home owning a server. It is in the period of examination however far from pervasiveness and application.

## 2. REVIEW OF LITERATURE

Gomez *et al* [1] proposed a survey on WHANs (Wireless Home Automation Networks). It clarifies major present and rising architectures and advancements uniquely crafted to or suitable for WHANs. A non-intensive once-over of cases is given. Some essential destinies are recorded, for instance, light control, remote control, sharp imperativeness, remote thought, security and wellbeing. Particular system may focus on assorted edges. Alam *et al* [2] proposed a review of Smart home which talks about the past, present, and possible destiny of shrewd home. It bare essential exhibits the definition of sharp home from relative artistic works besides gives an elaboration of savvy home destinies and contemplates assorted approaches to manage the execution. There are various asks about on essentialness organization and artificial knowledge in sharp home structure starting late [3, 4], while we mostly focus on the building outline change in this study.

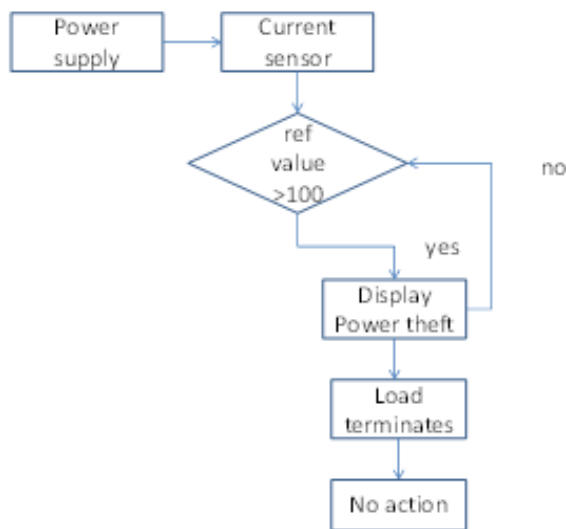
Liang *et al* [5] exhibited some building outline for online remote motorization control. These Internet based systems require a home server executed on a PC running always. It is hard to supply a unified organization for different home computerization structures. The studies in [8-10] have a couple of outlines of online robotization. Then again, they are not exceptionally feasible to be executed as a negligible exertion plan. Alkar *et al* [11] proposed an insignificant exertion secure electronic, flexible, remote course of action where the home mechanical assemblies of most sorts can be connected with a central center point through a server. It is like manner require an individual PC as web server in home and offer web organization as the control interface. Al-Ali *et al* [12] added to a Java based home robotization system. An embedded board physically related all the home



robotization devices and, through blend with a (PC) based web server, if remote access to the structure. The use of Java development, which joins built in framework security highlights, conveys an ensured game plan. On the other hand, the system requires an intrusive and expensive wired foundation and the use of a top of the computer.

### 3. PROPOSED SYSTEM IMPLEMENTATION

This segment will portray the outline for the administration programming on the tampering detection of electricity energy meter and the control programming on cell telephones. The control programming can be actualized on diverse stages in light of the configuration. The workflow of the tampering detection of electricity energy meter is shown in Figure-1.



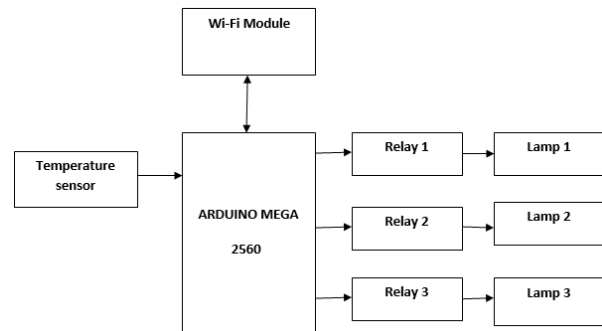
**Figure-1.** Tampering detection of electricity energy meter system.

The working course of action of the altering discovery of power vitality meter implanted board is custom android OS. The system is running as an organization of the working structure. Show collector is enrolled and once the system is started, the booting sign is gotten and the home intermediary administration starts to run. At first, current sensor will accumulate the present force. At that point it will check with reference esteem, on the off chance that it is more prominent then send a sms generally again check the present worth. What's more, check with got recognize on the off chance that it's so cut the force supply generally no activity.

### 4. PROPOSED SYSTEM ARCHITECTURE

The following Figure-2 describes the transmitter side architecture. In this block, Arduino controller is used to control the load via wifi module. Temperature sensor is used to monitor the temperature value and temperature is updated to server. All the device is controlled by the wifi module through the PWM outputs which generate in

arduino controller. Mobile phone is act as a receiver side block.



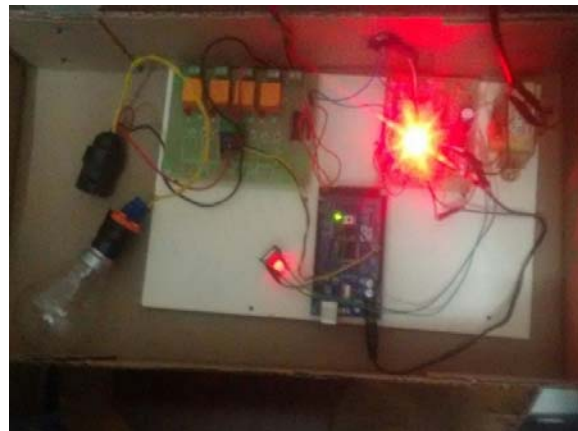
**Figure-2.** Transmitter block.

### 4. EXPERIMENTAL RESULTS

The following figures explain experimental results about our system. In this system, three cases are involved.

#### Case 1: Initial setup

In this case, the device which is connected is in off state and the webpage which we created for the particular user is used to control the devices and to check the power theft detection. This case device is off and the power consumption of the particular device is shown as 0is0 which is smaller than the reference value 100. So it displays as normal power usage.



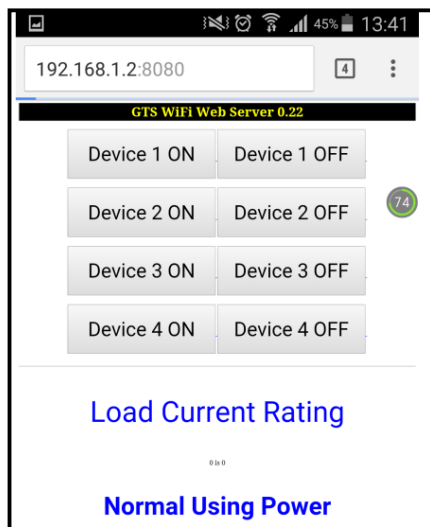


Figure-3. Initial setup.

#### Case 2: Device is ON

In this case 2 the device which is connected is ON by touching the device 1 ON option on the webpage. And the power consumed by the device is shown as 0is80 it does not exceed the reference value 100, So it displays normal power usage.

#### Case 3: power theft

In this case we have connected one more device in same connection of load, and the device is ON by touching the device1ON option on the webpage. Power consumption of the devices is shown as 0is165 which is greater than the reference value 100 so it displays power theft detected.

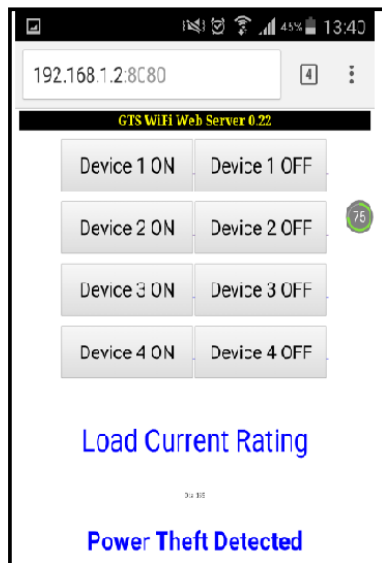


Figure-4.

## 6. CONCLUSIONS

In this paper, we proposed a flexible, insignificant exertion splendid home framework in light of Internet and WiFi. We consider Smart Units and Home Proxy. The mix of remote server and home agent is another course of action for remote control in which XMPP is utilized. Immaterial effort WiFi module is utilized to make adroit units. Relative applications in light of various stages can be made and android application is utilized to demonstrate the framework. We utilize home center individual to manage the synchronization issue and the structure underpins multiuser. In like way one telephone can enlist unmistakable Home center individuals, in this way one telephone can control more than one awe inspiring home framework or quick office structure. So the remote server can offer associations to unmistakable homes and offices and the framework will probably be promoted.

## REFERENCE

- [1] Gomez C.; Paradells J. 2010. Wireless home automation networks: A survey of architectures and technologies. IEEE Communications Magazine. 48(6): 92-101.
- [2] Alam M.R., Reaz M.B.I., Ali M.A.M. 2012. A Review of Smart Homes Past, Present and Future. IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews. 42(6): 1190-1203.
- [3] Magno M.; Polonelli T.; Benini L.; Popovici E. 2015. A Low Cost, Highly Scalable Wireless Sensor Network Solution to Achieve Smart LED Light Control for Green Buildings. IEEE Sensors Journal. 15(5): 2963-2973.
- [4] J. Byun, I. Hong, B. Lee and S. Park. 2013. Intelligent household LED lighting system considering energy efficiency and user satisfaction. IEEE Transactions on Consumer Electronics. 59(1): 70C76.
- [5] N. S. Liang, L. C. Fu, and C. L. Wu. 2002. An integrated, flexible, and Internet-based control architecture for home automation system in the Internet era, Proceedings of ICRA02. IEEE International Conference on Robotics and Automation. 2: 1101-1106.
- [6] R. J. C. Nunes and J. C. M. Delgado. 2000. An Internet application for home automation. MELECON 2000, 10th Mediterranean Electro technical Conference. 1: 298-301.
- [7] P. M. Corcoran, F. Papai and A. Zoldi. 1998. User interface technologies for home appliances and



- networks. IEEE Trans. Consumer Electron. 44(3): 679-685.
- [8] K. Tan, T. Lee and C. Y. Soh. 2002. Internet-Based Monitoring of Distributed Control Systems-An Undergraduate Experiment. IEEE Transactions on Education. 45(2).
- [9] C.C. Ko, B.M.Chen, S.Hu, V. Ramakrishnan, C.D. Cheng, Y. Zhuang and J. Chen. 2001. A Web-Based Virtual Laboratory on a Frequency Modulation Experiment. IEEE Transactions on Systems, Man, and Cybernetics-Part C: Application and Reviews. 31(3): 295-303.
- [10] N. Swamy O. Kuljaca and F. Lewis. 2002. Internet-Based Educational Control Systems Lab Using Net-meeting. IEEE Transaction on Education. 45(2): 145 - 151.
- [11] Alkar A.Z.; Buhur U. 2005. An Internet based wireless home automation system for multifunctional devices. IEEE Transactions on Consumer Electronics. 51(4): 1169-1174.
- [12] Al-Ali A.R.; AL-Rousan M. 2004. Java-based home automation system. IEEE Transactions on Consumer Electronics. 50(2): 498-504.
- [13] Gill K.; Shuang-Hua Yang; Fang Yao; Xin Lu. 2009. A zigbee based home automation system. IEEE Transactions on Consumer Electronics. 55(2): 422-430.