# IoT based electricity energy meter using Arduino

**Ronda Ravindra Reddy[1], Gosukonda Lalitha[2]**

Assistant Professor[1,2]
Department of ECE
MREC

*Abstract-* This Project is about Electricity energy meters which are installed in everyone's house or offices to measure the electricity consumption. At last of every month, many areget worried about the high electricity bill and to look at the energy meter once in a while. But what if can monitor our electricity uses from anywhere in the world and get a SMS/E-mail when the energy consumption reaches to a threshold value. Here there is a scope for building an IOT based Project of Energy Meter. Previously there isan Energy Meter circuit which sends you SMS about the bill using GSM module. In this project, a Smart Electricity Energy meter using Arduino and ESP8266 Wi-Fi module which can not only sends you a SMS/Email of your electricity Bill but also you can monitor the energy uses anytime and from anywhere in the world. Here you use a Current Sensor ACS712 to measure the energy consumption. Withthe help of IFTTT platform to link Wi-Fi to SMS/E-mail notifications and also use MQTT Dashboard Android App to monitor the Energy uses.

*Index Terms-* MQTT Dashboard, MQTT Dashboard, Android App
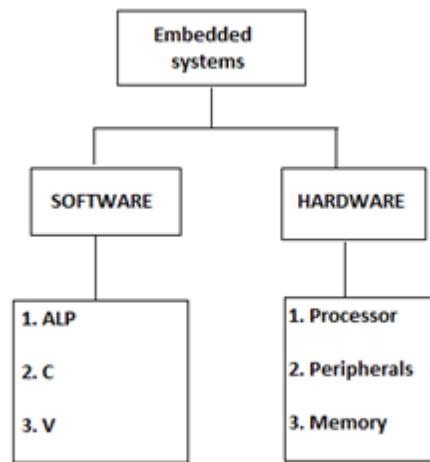
## I. INTRODUCTION

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious.

All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer.

The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system. The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. The applications software on such processors is sometimes referred to as firmware.

The simplest devices consist of a single microprocessor (often called a "chip"), which may itself be packaged with other chips in a hybrid system or Application Specific Integrated Circuit (ASIC). Its input comes from a detector or sensor and its output goes to a switch or activator which (for example) may start or stop the operation of a machine or, by operating a valve, may control the flow of fuel to an engine.

As the embedded system is the combination of both software and hardware

**Fig 1:Embedded System**

## II. EXISTING WORK

The origin of the Arduino project started at the Interaction Design Institute Ivrea (IDII) in Ivrea, Italy. At that time, the students used a BASIC Stamp microcontroller at a cost of $100, a considerable expense for many students. In 2004, Colombian student Hernando Barragán created the development platform Wiring as a Master's thesis project at IDII, under the supervision of Massimo Banzi and Casey Reas, who are known for work on the Processing language. The project goal was to create simple, low cost tools for creating digital projects by non-engineers. The Wiring platform consisted of a printed circuit board (PCB) with an ATmega168 microcontroller, an IDE based on Processing and library functions to easily program the microcontroller.

In 2005, Massimo Banzi, with David Mellis, another IDII student, and David Cuartielles, added support for the cheaper ATmega8 microcontroller to Wiring. But instead of continuing the work on Wiring, they copied the Wiring source code and renamed it as a separate project, called Arduino.

The initial Arduino core team consisted of Massimo Banzi, David Cuartielles, Tom Igoe, Gianluca Martino, and David Mellis, but Barragan was not invited to participate.

Following the completion of the Wiring platform, lighter and less-expensive versions were distributed in the open-source community.

## III. PROPOSED WORK

**The main blocks of the project are:-**
1. Arduino UNO

2. Wi-Fi Module ESP8266 (Node MCU)

3. Current Sensor ACS712
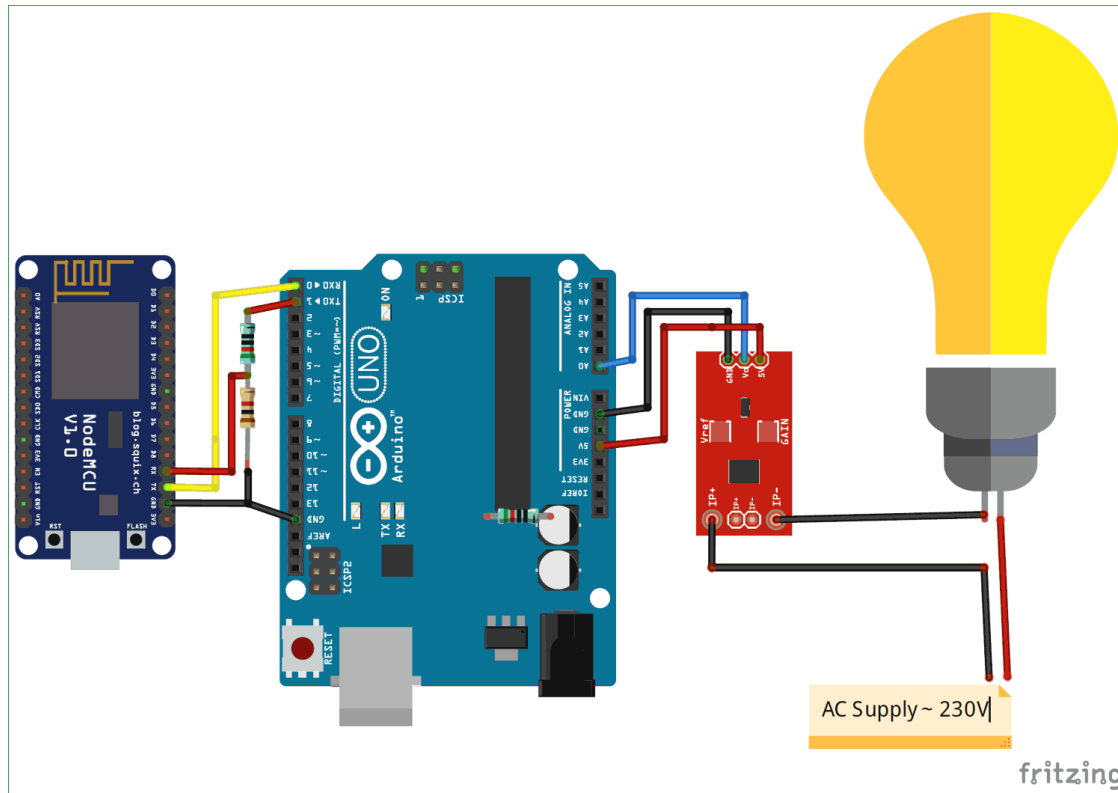
4. Any AC appliances (230 v)

5. Bulb With Holder

**Fig 2:Block diagram**

## IV.    RESULTS

Step 1: Connect your NodeMCU to your computer

You need a USB micro B cable to connect the board. Once you plugged it in, a blue LED will start flashing. If your computer is not able to detect the NodeMCU board.

Step 2: Open Arduino IDE

You need to have at least Arduino IDE version 1.6.4 to proceed with this.

Go to File > Preferences. In the "Additional Boards Manager URLs" field, type (or copypaste) *http://arduino.esp8266.com/stable/package_esp8266com_index.json.* Don't forget to click OK!

Step 3: Make a LED blink using NodeMCU

For our first program, we'll blink a LED connected to one of the digital pins of the board. But before that, you need to know that the pin names printed on the board are not the pin nameswe'll be using for our program
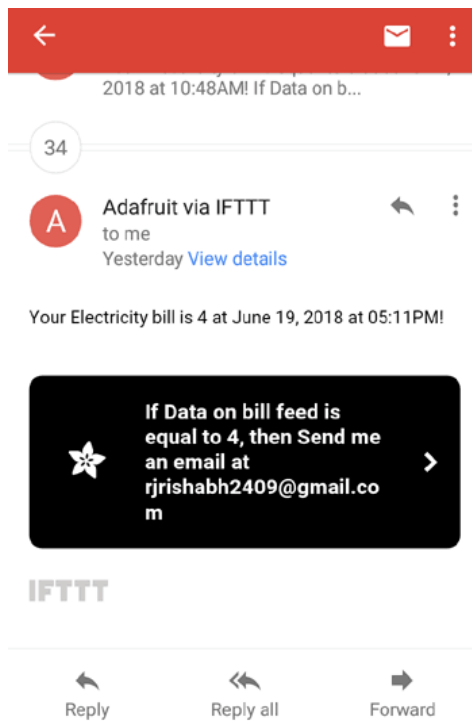
**Fig 3: Display of circuit**



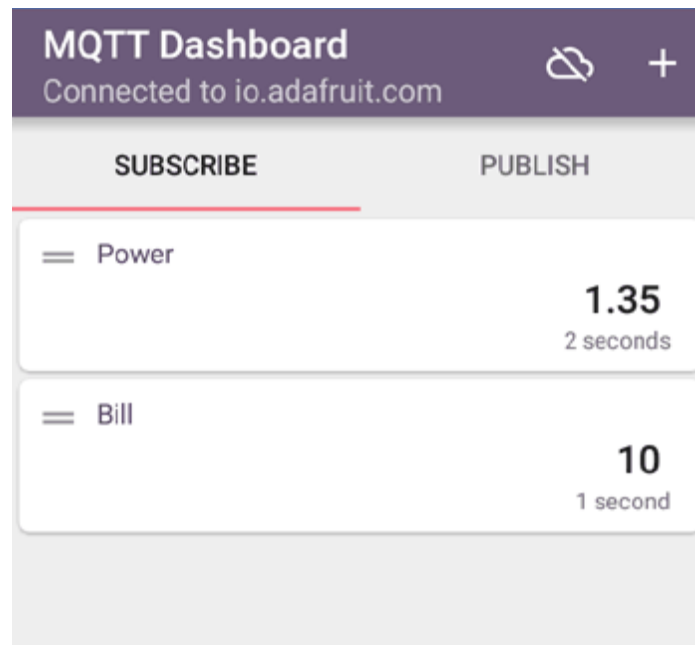**Fig 4: Mail received from Adafruit via IFTTT**

**Fig 5 Displaying Power and Bill on MQTT dashboard**

## V.   CONCLUSION

An attempt has been made to make a practical model of 'IoT Based Electricity Energy Meter using Arduino.' The propagated model is used to calculate the energy consumption of the household, and even make the energy unit reading to be handy. Hence it reduces the wastage of energy and bring awareness among all. Even it will deduct the manual intervention.

.REFERENCES

[1]    [1] Himshekhar Das, L.C.Saikia, "GSM Enabled Smart Energy Meter and Automation of

[2]    Home Appliances", PP-978-1- 4678-6503-1, 2015 IEEE.

[3]    [2] OfoegbuOsita Edward, "An Energy Meter Reader with Load Control Capacity and Secure

[4]    Switching Using a Password Based Relay Circuit", PP-978-1-4799-8311-7, ' Annual Global

[5]    Online Conference on Information and Computer Technology', IEEE 2014.

[6]    [3] Yingying Cheng, Huaxiao Yang, Ji Xiao, Xingzhe Hou, "Running State Evaluation Of

[7]    Electric Energy Meter", PP978-1-4799-4565-8, 'Workshop on Electronics, Computer and

[8]    Applications', IEEE 2014.

[9]    [4] Sahana M N, Anjana S, AnkithS,K Natarajan, K R Shobha, "Home energy management

[10]  leveraging open IoT protocol stack ", PP- 978-1-4673-6670-0, 'Recent Advances in

Intelligent Computational Systems (RAICS)', IEEE 2015.