

# Electric meter reading through IOT by using Raspberry pi model B2

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**ABSTRACT:** In the current creating years most created nations like the United States and other European nations utilized computerized meter per using frameworks (AMR). These are more precise estimating gadget than the ordinary electromechanical meter perusing framework. This paper shows a usage approach for a remote programmed meter perusing framework (WAMRS) by utilizing Wi-Fi module which is allowed as (ESP8266). In numerous nations WI-FI module ,GPS and GPRS organize is broadly known for its tremendous scope territory, cost adequacy and furthermore for its aggressive regularly developing business sector. Preparing stream is as heartbeat sensor, detects the beat and send it to the microcontroller and the beats are perceived by processor raspberry pi utilizing shape calculation, by taking contrast between two readings of back to back months charging is done and send it to the buyer utilizing Wi-Fi module remote innovation.

**Keywords :** ATMEGA 328 (microcontroller), Raspberry pi model B2, Wi-Fi module (ESP8266).

## 1. INTRODUCTION

Web of things (IOT) is a system including electronic gadgets and sensors associated with trade data over the web in our investigation the current is separated from the electronic gadgets and sent to the ADC , where the changed over qualities are sent to the Raspberry Pi where the power esteem is figured a then sent to the database crosswise over web . Prior to the creation of the savvy meter customary meters were utilized.

However, they had issues, for example, more inclined to blunders and not having the capacity to identify hardening. IOT is nearly financially savvy than SMS which influences checking vitality to meter at bring down cost conceivable. Month end utilization reports are produced which is observed by means of online interface. Enrolled clients can likewise make their installment on the web. The client at first needs to go to the site and enlisted, this is the place the client points of interest gets recorded in the information base, with an auto created number which turns into the essential key. He later need just to sign into his record for installment points of interest. The installment notice can be send either to his messages or as a SMS to the client. Through such a framework the clients can know about their power utilization and give some assistance towards vitality meter. We will investigate the working of vitality meter and its circuit graph.

## 2. RELATED WORK

Programmed meter perusing Systems (AMR) persistently watches the vitality meter and sends information. This is point by point in paper [1], there are different methods accessible for estimating the vitality utilization of electronic gadgets and report this information over the system. The procedures are plug stack observing framework, non-meddling burden checking system[2] gadget level load checking framework.

Imparting power supply incorporates power metering which measures the power utilization of gadget, utilization, and association between the electronic gadgets. Shrewd meter associated with the web, builds vitality mindfulness among gadgets and clients.

## 3. IMPLEMENTATION

Vitality meter perusing based IOT is actualized as appeared in the figure in which we utilizes the vitality meter for perusing reason. The vitality meter perusing is get past the beat sensors and every heartbeat is included and put away the microcontroller database and the perusing of the vitality meter is appeared in the LCD show. the transmitted and got pins (Rx and Tx) transmitted the information to the raspberry pi circuit and with the assistance of WI-Fi module (ESP8266) the perusing is transmitted to the web database. Also, the cost per unit is computed through the calculation and the month to month utilization of the units can be appeared on the web.

#### 4. ANALYSIS

The objective of this project is to use the concept of wireless meter reading to get the monthly usage reading of our household and society. The flow chart for the project is shown in the figure

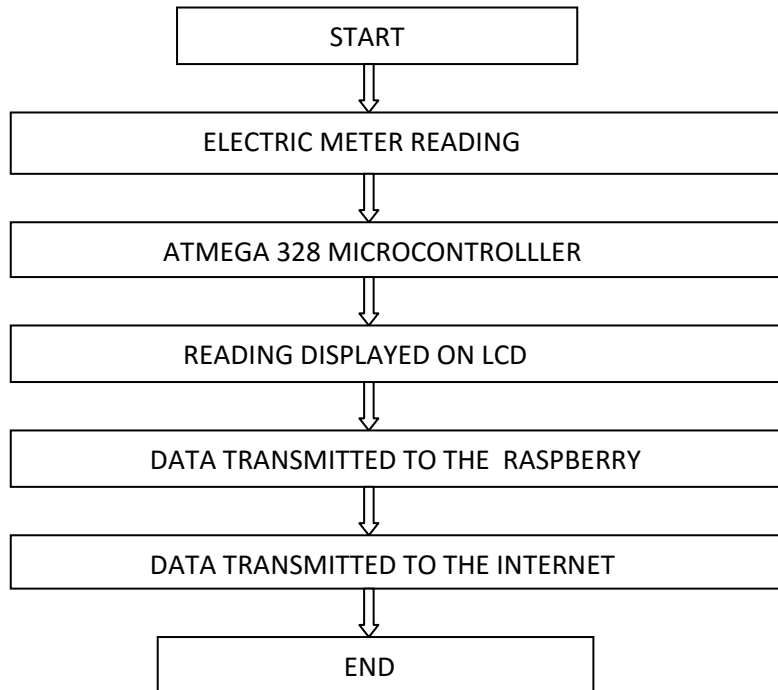
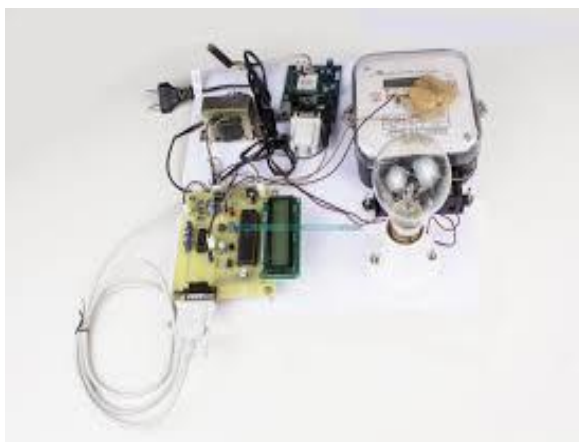


Fig .(1) flow chart

#### 5. FUTURE WORK

Technologies developed on wireless meter reading [5] are now really affordable and converged with familiar and popular technologies through this the theft in the electricity can be minimized at a good rate and by this we can improve our economy. By this we can get the exact bill of our house and society. As our population increases day by day. The older population (65+) numbered 36.3 million, an increase of 3.1 million or 9.3% since 1994 and it's growing over time so there is much more need to get the reading of our usage on the internet.



### 3. PROPOSED WORK

Proposed framework utilizes IR sensors to take programmed meter perusing. For catching heartbeats is put before vitality meter of house. To get digits isolate out and to ascertain the bill for the month processor is utilized with form calculation. In this paper, Raspberry Pi is utilized on the grounds that it is a kind of minicomputer. We can't introduce Microsoft Windows on it as it utilizes an alternate sort of processor. In any case, you can introduce a few adaptations of the Linux working framework which feels especially like Windows. On the off chance that we need to, we can utilize the Raspberry Pi to surf the web, send an email and numerous all the more utilizing a word processor. Simple to utilize however intense, moderate and hard to break, the Raspberry Pi is the ideal for seeking after PC researchers. After that this bill is send to the server remotely utilizing Wi-Fi module and show on LCD for client's reference.

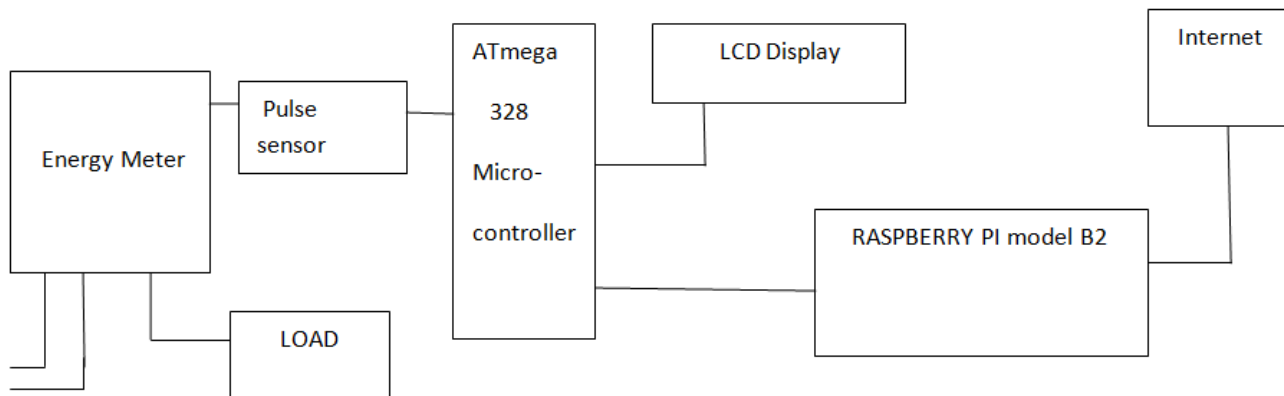


Fig 2: Block diagram

As per definition of AMR, it allows easy saving through meter reading, greater data accuracy; improve billing speed and consumer service. Here camera is placed in front of E-meter as shown in fig 1. When command is send camera takes the photograph. This image is processed by raspberry pi using contour algorithm to calculate bill and send it using GSM.

### 4. HARDWARE REQUIREMENT.

1. ENERGY METER
2. ADAPTER 12V
3. LOAD
4. MICROCONTROLLER Atmega 328
5. Display (16x2)
6. Raspberry pi model B2
7. Power supply
8. Wi-Fi module (ESP8266)
9. Two electric bulb
10. Two holders

### 5. SOFTWARE REQUIREMENT

1. Python 3.6.0
2. Keil complies
3. Avr studio
4. PHP

### 6. ENERGY METER

An electric meter is generally used to get our monthly reading of our home and society . In the project the meter is used for reading purpose.

## 7. RASPBERRY PI MODEL B2

The raspberry pi is a progression of little single board PCs create in the unified kingdom by the raspberry pi establishment to advance the instructing of fundamental PCs science in school in creating nations the first model turn out to be more prominent at that point expected offering outside its objective market as apply autonomy .

OPERATING SYSTEM	ANDROID THINGS LINUX WINDOWS 10
SYSTEM-ON-CHIP USED	BROADCOM BCM2837
CPU	1.2GHZ 64/32-BIT QUAD-CORE ARM
MEMORY	1GB LPDDR2 RAM
STORAGE	MICROSDHC SLOT
GRAPHICS	BROADCOM VIDEOCORE
POWER	1.5 W TO MAX 6.7 W

## 8. Wi-Fi MODULE

The Esp8266 is a minimal effort Wi-Fi microchip with full TCP/IP stack and microcontroller capacity created by Shanghai based Chinese produce . The chip initially went to the consideration of western markers in august 2014 with the Esp-01 module made by an outsider fabricate .

This little module permits microcontroller/raspberry pi to interface with a Wi-Fi system and make basic TCP/IP associations utilizing hayes style orders.

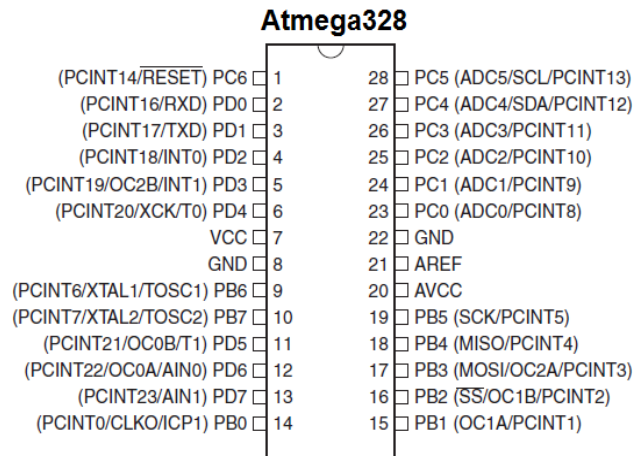


## 7. ATmega 328

The superior microchip 8-bit AVR RISC based microcontroller joins 32 KB ISP streak memory with read while compose capacities, 1 KB EEPROM 2 KB SRAM 23 broadly useful information yield lines, 32 universally useful working registers, 3 adaptable clock/counters with look at modes, interior and outer intrudes on, serial programmable USART, a byte started to wire serial interface, SPI serial port, 6 channel 10 bit A/D converter (8 directs in TQFP) .

By executing intense guidelines in a solitary clock cycle, the gadget accomplishes throughputs moving toward 1 MIPS for every MHZ adjusting power utilization and handling speed.





**Fig 4:** Actual Implementation

### 8. IR (infrared) SENSORS

1. An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surrounding by either emitting or detecting infrared radiations.
2. Infrared sensors are also capable of measuring the heat being emitted by an object.



### 9. LCD DISPLAY

1. Most regular LCDs associated with the microcontrollers are 16x2 and 20x2 showcases.
2. This implies 16 characters for each line by 2 lines and 20 characters for every line by 2 lines, separately.
3. The standard is alluded to as HD44780U, which alludes to the controller chip which gets information from an outer source and discusses straightforwardly with the LCD.



## 10. RESULT

Enormous amount of work has been done on wireless energy meter reading. In this paper various methodologies have been analyzed and received with their merits and demerits under various operational and functional strategies. Although recent researches in this field have made wireless meter reading a ubiquitous work[6], and we get our monthly reading in our database.

Our monthly reading can have seen on to our mobiles phones or laptops.

### Calculation for bill.

1. From our project our monthly consumed unit is 230.
2. And the cost of 1 unit is Rs 6.57 .
  - Total cost of our bill =  $230 \times 6.57 = \text{Rs } 1511.1$

## 5. CONCLUSION

The main aim of this project is to reduce the manpower involved in power management . It also avoids data loss. However the initial setup will cost more than the existing mechanism. It provide better power management for the utility as the values are directly sent from the meter and store in their data base. This data can be used in future to analyze the uses of power and take necessary measures to optimize power consumption. In addition to this, this mechanism can also provide self-analysis of power consumption of user so can he/she can reduce the usage.

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