Smart Power Monitoring System and Theft Detector

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Abstract: **This   project   describes AT89S52 Microcontroller based   design and implementation of energy meter using IoT concept.. The proposed system design eliminates the human involvement in Electricity maintenance. The Buyer needs to pay for the usage of electricity on schedule, in case that he couldn't pay, the electricity transmission can be turned off autonomously from the distant server. The user can monitor the energy consumption in units from an android app. Theft detectionunit connected to energy meter   will notify the user when theft occurs in energy and it will send theft detect Information through   the   server   to the user's Android mobile. The server performs the IoT operation by sending energy meter data to android app. The Hardware interface circuit consists of AT89S52 Microcontroller, a computer as server, theft detection unit. The server performs IoT operation by sending energy meter data to web page which can be accessed through the android app.**

Key words: ATMEGA 328 controller, WIFI module, IOT technology, Current Transformer, ADC.

INTRODUCTION:

In the Internet   of Things (IoT) model, many of the living and nonliving things that encompass us will   be on the internet in one form or another. Driven by the popularity of gadgets empowered by wireless technological innovation such as Wireless Bluetooth, Radio Frequency Identification, Wireless-Fidelity, embedded sensor, IoT has moved out from its beginning stage and it is actually on the edge of changing the present fixed internet into a well featured upcoming Internet. Currently there are almost nine billion internet - connected gadgets and it is estimated to touch almost fifty billion gadgets by 2020.

Today the world is facing such an environment that offers challenges. Energy crisis is the main problem faced by our society. A relevant system to control and monitor the power usage is one of the solutions for this problem. One approach through which today's energy crisis can be addressed is through the reduction of power usage in households. The consumers are increasing rapidly and also burden on electricity offering divisions is sharply increasing. The consumers must be facilitated by giving them an ideal solution:-i.e. the concept of IoT (Internet of Things) meters and on the other hand service provider end can also be informed about electricity thefts using theft detection unit and PLC modem. By keeping above factors, the concept of IoT meters thrived consisting of 3 units: Microcontroller unit, Theft detection unit, server. The project describes AT89S52 Microcontroller based design and implementation of energy meter using IoT.

The user can monitor the energy consumption in units from an android app by logging in into the app. Theft detection unit connected to energy meter will notify user when theft occurs in energy and it will send theft detect information through server and theft detected will be displayed on the app.

The Hardware System:

Microcontroller:

It is interfaced with the wifi module to send the information regarding the data usage and power theft. It also counts the power unit which provided by the current transformer   and   ADC.   The   limit   of   the   power consumption is set in the controller.

WIFI Module:

Microcontroller gather the data of ADC and then the data is send over the WIFI. All WIFI modules are connected to the mobile phone having the required app through the router.

Current Transformer:

The current transformer converts the high power current to a lower value which can be easily measured in the microcontroller. Since our microcontroller have a low power rating therefore the transformer is used in this circuit.

ADC:

Since the microcontroller requires digital input on its serial data line , the ADC converts the analog current signals to digital value which is then fed in the controller for the further proces

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Working:

The system here consists of microcontroller interfaced with ESP8266 wifi module which is connected wirelessly with the user's android mobile where our consumption by a particular device is shown.

The device's wattage consumption is controlled by the current transformer and the subordinate circuits.

The rate is calculated by the microcontroller which inputs all the required parameter for calculation. ESP8266 wifi module sends all the data from microcontroller to the user's android mobile (App). If the thief tries to open the meter, the limit switch goes high and user is notified through the app.

User is notified about the exhaustion of meter usage on android app.

Also usage can be monitored weekly.

Block Diagram:
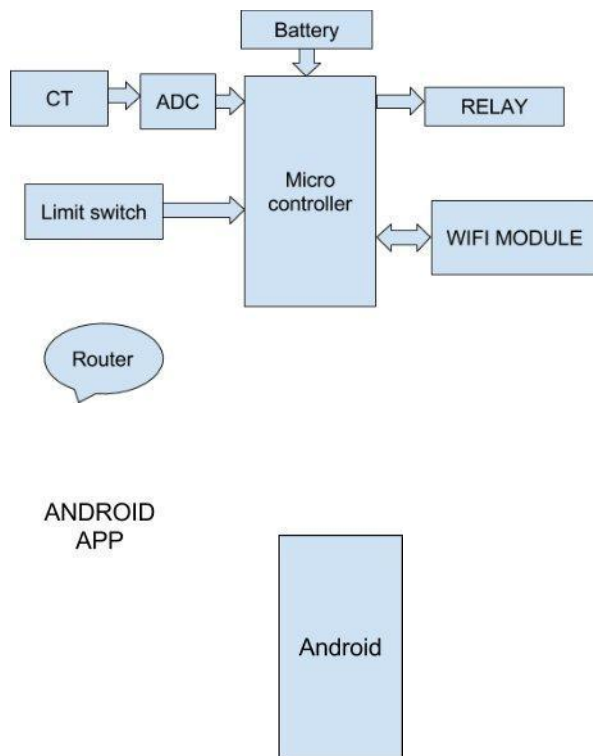
CONCLUSION:

The successful development of the automatic meter reading system described in this project is based on the high performance, extremely low power consumption, high level of integration, and low price technology.

The technology has strong market competitiveness. Meter reading system uses short-range wireless communication and computer network technologies to read and process metering data automatically. Automatic meter reading technology can not only save human resources, but also improve the accuracy and instantaneity of the meter reading. It enables management sector to timely and accurately access power consumption messages. Moreover, no cabling is required with relatively economical investment. For the proposed automatic meter reading system, wireless communication links can be quickly built, engineering period significantly shortened, and it has better scalability compared to a wired system. In the present work Automatic Power Meter (APM) unit is designed to continuously monitor the meter reading. It avoids the human intervention, provides efficient meter reading and reduces the maintenance cost.

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