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IoT based Energy Metering Technique using Wi-Fi module with Load Parameter Analysis

Vaishali Lokhande [1], Prof. Naqvi syed s. hussain[2]

M. Tech Student Department of Electrical Engineering Jawaharlal Nehru Engineering College - [JNEC]

Aurangabad, affiliate with BATU lonere. Maharashtra, India[1]

Department of Electrical Engineering, Jawaharlal Nehru Engineering College - [JNEC]Aurangabad, affiliate with

BATU lonere. Maharashtra, India[2]

ABSTRACT: This paper is review on "Internet of things (iot) based energy meter with load parameter analysis" In the most of the developing countries, the effort of collecting electricity utility meter reading and detecting illegal usage of electricity is a very difficult and time consuming task which requires a lot of human resources. Energy meter reading and monitoring system using Internet of Things (IoT) present an efficient and cost-effective way to transfer the information of energy consumed by the consumer wirelessly as well as it provides facilities to detect the illegal usage of the electricity. Aim of this study is to measure electricity consumption in the household using IoT and telemetric communication techniques. Also this study aims to detect and control the energy theft. The microcontroller is employed to coordinate the activities with digital energy meter system and to connect the system to a Wi-Fi network and subsequently to the Internet and Server. A passive infrared sensor is engaged with the system to detect when any illegal alteration happen in the metering system. In such case, system will send an alert to the server as well as it has the facility to disconnect and re-connect the electricity supply automatically. The proposed system is capable of continuously monitor and being notified about the number of units consumed to the energy provider and consumer. The energy consumptions are calculated automatically internet by using a network of Internet of Things.

KEYWORDS: Internet of Things (IoT), Microcontroller, Electricity theft, AMR or ARMS (Automatic Meter Reading System), IOT (Wi-Fi) as communication, Real Time Clock (RTC),

I. INTRODUCTION

The systems consists of a microcontroller Wi-Fi module, LCD display, V/I controller. EEPROM, RTC. In the system Microcontroller continuously reads the energy meter using the Wi-Fi module. It is used to transmit the information to the receiver. Irregularities of bills and reduce man power are overcome by AMR system in high buildings and luxury housing plots. System the e-meter will sense the energy consumed and automatically this method is more useful for the current scenario. The increase in power or energy consumption is automatically increase the cost to avoid these types of problem this paper will be helpful to protect our house more save and save more energy and cost. Cayenne.com is used as a cloud server to communicate between the consumer and Electricity board. Voltage and current values are sensed by the sensor and stored in the server.
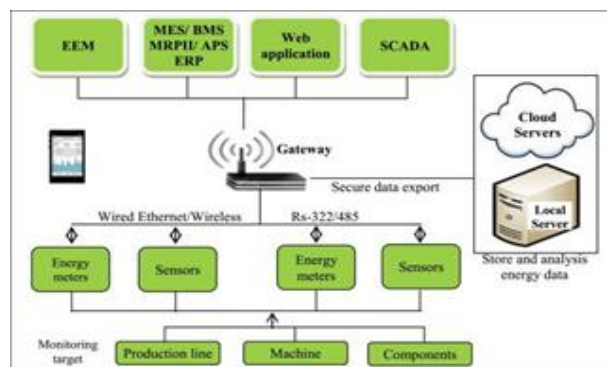

Fig.1. General System Architecture for Energy Monitoring Using IoT

II. LITERATURE SURVEY

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Chunchi Gu, Hao Zhang, Qijun Chen ; "Design and Implementation of Energy Data Collection System Using Wireless Fidelity (WiFi) Module and Current Transformer" In this paper the outcome of the test, we can see that the data collection system can work properly and transmit the data to the remote IP address wirelessly through the Internet router. With this kind of design, the data collection system can finish the work no matter what kind of the electricity meter.

Li Li , Xiaoguang Hu, Weicun Zhang "Design of an ARM-Based Power Meter Having WI-FI Wireless Communication Module,"In this paper designs the PMWCM hardware system and software system. The ARM based hardware system is consisted of processor core board and peripheral board, and the software program is basing on embedded Linux. This paper also proposes the functions of wireless communication module and design detail and discusses the security of the communications.

Anitha.K, Anitha.V ; "Smart Energy Meter Surveillance Using IoT" In this paper proposed energy meter, the meter gives the energy consumed on daily basis, its corresponding rupees, billing details and payment using IoT. Additionally, it has the main objective of giving the pre-initiation of power schedule and an alert system for producing\ an alarm when the energy consumption exceeds beyond the certain limit.

III. PROPOSED SYSTEM DEVELOPEMENT

A. Energy Meter
Electromechanical meter consists of an aluminium disc positioned between two electromagnets, one of whose coil is connected to the load and is the current coil and the coil of another electromagnet is connected to the supply voltage. The interaction of the fluxes between the two coils is responsible for providing a torque to the disc, which starts rotating, with the revolutions proportional to the load current. The counter records the number of revolutions and displays them, which indicates the energy consumed. We are converting voltage or current into signals measured by energy meter which fed to Wi-Fi module.

Fig.2. Energy Meter

B. Controller

A controller collect data from energy meter via sensing devices . according to collected signal data controller can take decision fed signal to wifi module which connected main cloud server.

C. RTC

A Real Time Clock (RTC) is used to reset the data and it's stored in online and offline mode.

D. IOT Server

Iot or data server utilize for Voltage and current values which are continuously stored in server. Alerts can be scheduled in a server.

E. Wi-Fi Module

Wi-Fi module which appropriate for adding Wi-Fi usefulness to a current microcontroller venture by means of a Universal Asynchronous Transmitter Receiver (UART) serial association. The module can even be reinvented to go about as an independent Wi-Fi associated gadget.

F. Voltage Sensor

To get DC motion from an AC framework for contribution to a microcontroller, we are utilizing this voltage detecting circuit. The circuit gives a precise technique to making this DC flag. The voltage is detected by utilizing a potential transformer and the got flag is amended at the primary operation amp stage and enhancer at the second operation amp arrange.

G. Current Sensor

The current is detected from by utilizing current transformer and it is corrected at the main operation amp stage and enhancer at the second operation amp arrange.

H. LCD

A Liquid Crystal Display (LCD) is additionally has 64 bytes of character-generator (CG) RAM. This memory is utilized for characters characterized by the client.
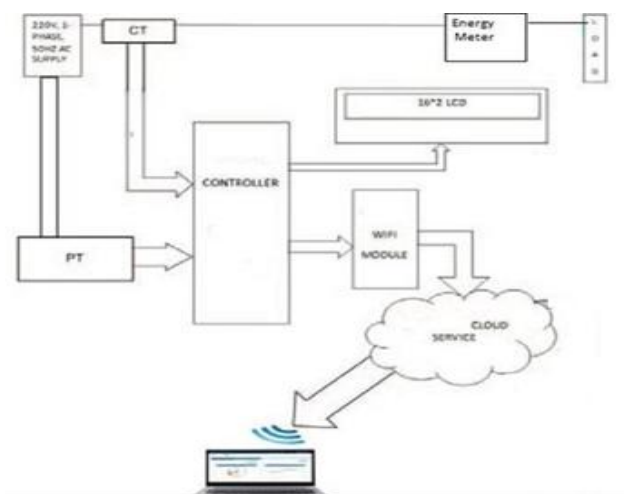

Fig.3. Proposed system Block Diagram

IV.CONCLUSION

The main cause for the design of IOT based E-meter is to reduce the power consumption in house. It avoids the human intervention reduces the cost, save human power. It works both automatically and manually. This computerization for diminish the work costs as well as makes the framework more effective and exact. It continuously monitor system or load parameter to such as current ,voltage , power to trace abnormalities in power consumption

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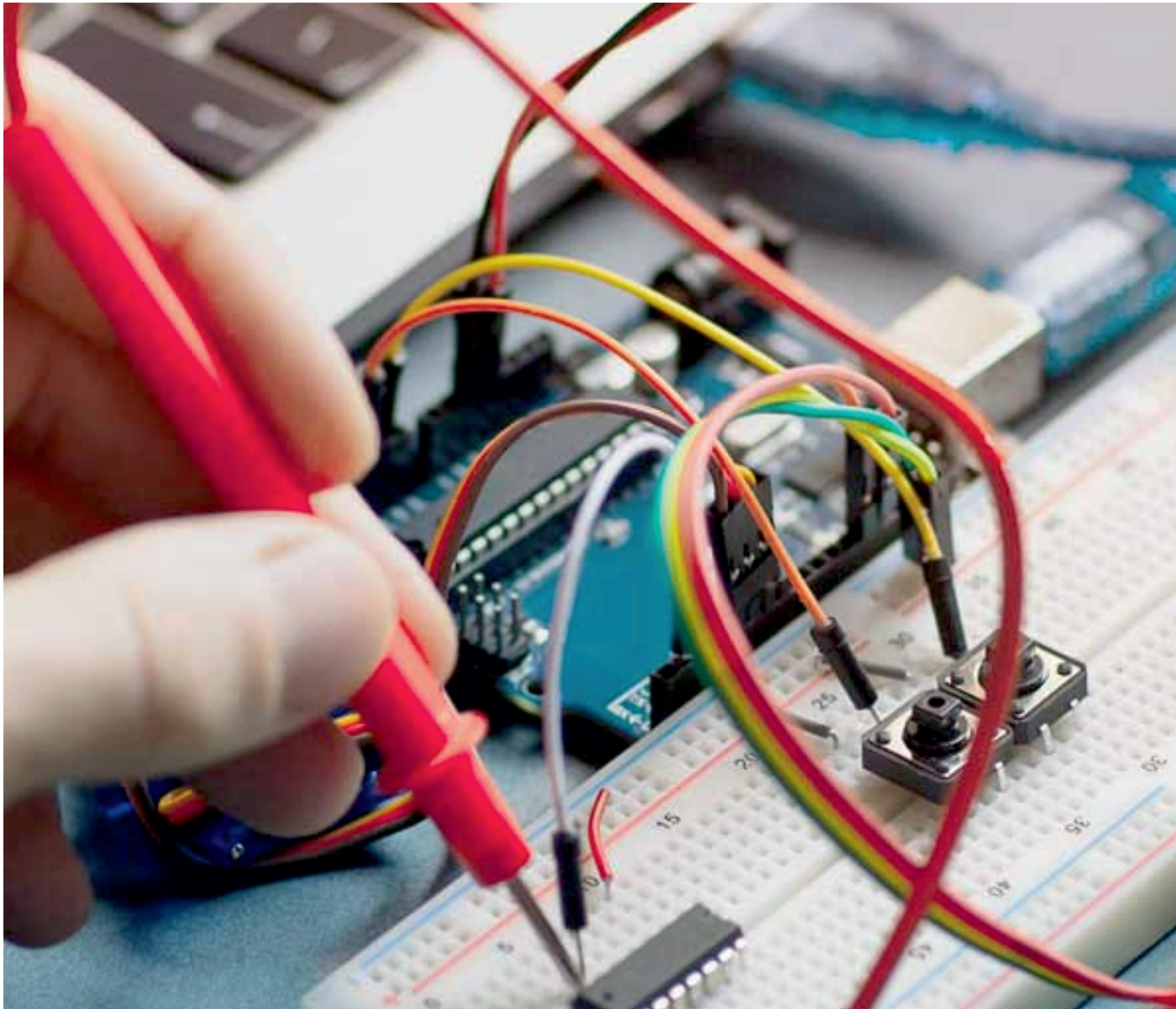
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