Study on Industrial Energy and Static Analysis System

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Abstract - It describes the monitoring of energy consumption with Arduino Uno board and Ethernet using IoT (Internet of Things) concept. This proposed design eliminates human inclusion in the conservation of electricity. The consumer can receive the information about consumption of energy by using IP address on their devices. The web client code is uploaded for checking the client information such as location, content, connection, and disconnection to the web server. This proposed system gives reliable and accurate information regarding electrical energy management system (EMS) through Internet of things (IoT).

***Keywords*—**Internet Of Things (IoT); Arduino Board; GSM Modem; Microcontroller AtMega328p; Modbus -2-RS232 Convertor

I. INTRODUCTION

The contribution of this paper is to develop an IoT wireless energy meter prototype using open source Arduino Microcontroller (ATmega328P) which facilitates sensing and actuation of controls from ubiquitous sources/devices. This work will benefit utilities, retail providers and customers. Such benefits will reflect on the increased efficiencies and labor cost as a result of automatic readings, Connections and disconnections. With timely usage information available to the customer, the benefits will be seen through the opportunities offered to manage their energy consumption.

Some other relevance of the work include: accurate meter reading eliminating estimate billing, improved billing, less accrued expenditure, improved billing and tacking of usage. The rest of the paper is organized as follows. Section 2 discussed relevant studies associated with smart metering. Section 3 presents the materials and methods. It discussed the various components used and exposes the methods that were implemented in this work using block diagram, it also highlighted the design consideration, specification and the technology used. Section 4 discussed the results obtained after the final testing. Chapter 5 presented the validation discussions. Finally, a conclusion and summary of the work as well as recommendations for future research is generally the measure component of the electricity bill.

II. METHODOLOGY

First understand the standard metering and industrial smart meters. Above stated diagram show the typical implementation of the MSEB meter and these meters are only capable of showing incremental energy consumption by means of some digits only, but we can't see exact load like voltage, current, power factor, etc. and not even the previous consumption details like daily usage, day time usage, night hours usage, etc. to solve this problem

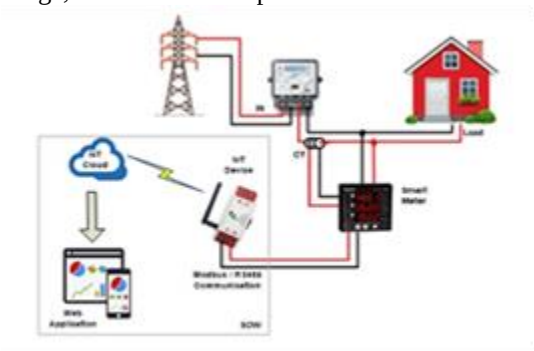

Figure 1 : Architecture

Figure 2. IOT Communication

As all the monitoring or the IoT devices works the proposed system implements the same process, as we can see different stages of the data uploading and monitoring. First phase is to collect the energy parameters information from smart meter with the help of IoT device. Secondly as IoT device works as a middleware between hardware and software it will push the data to web service which will then store the data in database in tabular format for further analysis along with timestamp. With the help of timestamp we can get the data from any date time slot. Now this data can be fetched by graphical analysis tool in charts, graphs or the tabular report format. Using ML or AI predication system or notification system in case of abnormal behavior can be generated. That's all from my side. Microcontroller can understand it. In order to communicate with web system will be having GPRS modem which deal with internet communication and finally as this device is intentionally designed for industry where stable power source matters a lot we need SMPS power supply module clubbing all these together will result in to IoT based

EMS. As we seen the working strategy of proposed system and its functionality let's see the internal clock of IoT

Arduino board is the heart of our system. Entire functioning of system depends on this board. Arduino reacts to the 5v supply given by opto-coupler and keeps on counting the supply and then calculates the power consumed and also the cost. This data, it continuously stores on webpage, so that users can visit any time and check their consumption. It even reacts accordingly as per programed, to the situations like message sending during threshold value etc.

GSM stands for Global System for Mobile communication. It is widely used mobile communication modem system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHZ, 900MHZ, 1800MHZ, 1900MHZ frequency bands. It has ability to carry 64kbps to 120Mbps of data rates

III. RESULT AND Discussion

1. our proposed hardware is shown below it consist of smart with IOT device we have smart meter these meters are capable enough to show multiple parameter along with storing log of almost a month, but again this will raise a problem these meters can transmit this information to any other device and not this is feasible to note all reading manually periodically. So next we need to develop an IoT based device to read all the parameter from meter over MODBUS protocols and upload this information to IoT server so that using the web or mobile application user can see the energy parameter consumption graphically. Hence this is the exact scope of the work to develop the IoT based device, deploy IoT server and develop web application for data analysis.

Figure 3 Smart meter with IOT Device

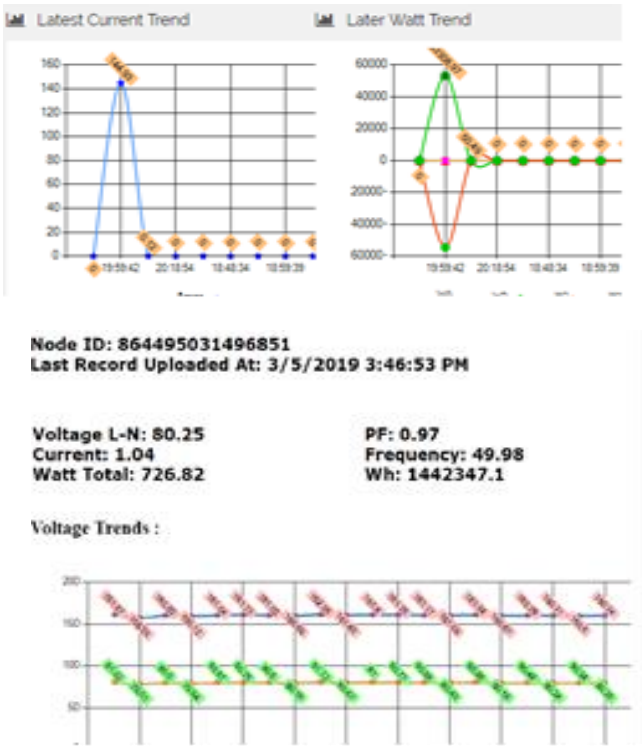

Figure 4 graphical representation over IOT

IV. CONCLUSION

An attempt has been made to make a practical model of 'IoT Based Smart Energy Meter.' The propagated model is used to calculate the energy consumption of the industry , and even make the energy unit reading to be handy. Hence it reduces the wastage of energy A comparison with revealed that the developed IoT smart metering satisfied these requirements viz: Quantitative measurement, control and calibration, communication (sending and receiving of data effectively); ability to receive upgrades from firmware, effective power management, display as well as timing synchronization. These are essential between the meter and the utility provider's system. In the work, Demand Side Management concept has been satisfactorily achieved. However, the present research currently does not cover concepts for the validation of the system specification roadmap as presented in. Hence, future research will be carried out to investigate possibilities for an automated validation of the system specification regarding the requirements for extending GSM wireless communication, with WiMax (4G LTE)

V. REFERENCES

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