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IOT Based Meter Reading and Overload Protection

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ABSTRACT: The main aim of the project is to process the real time data acquisition under meter reading monitoring and supervisory over load control for large scale remote industrial/home environment. In large industrial establishments many processes go on related to electricity, therefore it is essential to monitor all the reading process and control the factors affecting overload. Adapting a technology like IOT (Internet of Things) one can achieve the above mentioned objective effectively, and thus record and control is clear than manpower.

KEYWORDS: Arduino Uno Board, Thing Speak Server, Sensors,WI-FI Module,LCD Display,Meter,Load.

I. INTRODUCTION

This project IOT based meter reading and overload protection system is a very innovative system which will help to keep the reading and record clean and neat.This system monitors the unit and its related bill and current level and informs about the level of bill and current collected in the meter via a thing speak server.For this the system uses pulse sensors placed in the circuit to detect the pulses.Current sensor is used to detect current level if it is greater than required level it alert and break the system.The system makes use of arduino uno board/atmega328 microcontrollers,wi-fi module to send data over thing speak server.The system is powered by a 12v transformer.

The LCD Screen is used to display the status of the indicating parameters,like meter reading and current,currently using with meter.The data on things speak in graphical format consists with reading,related to all meter parameter.The LCD screen shows the status of the parameter.The system puts on LCD screen continuously monitoring of units and current with arduino board.Thus this system helps to keep the monitoring easy for user and provider,with the help of thing speak server.

II. ESP 8266 WI-FI MODULE

The ESP8266 wi-fi module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your wi-fi network . The ESP8266 is capable of either hosting an application or offloading all wi-fi networking functions from another application processor . This module comes with AT commands firmware which allows you to get functionality like arduino wi-fi shield, however you can load different firmwares to make your own application on the modules memory and processor . Its a very economic module and has a huge and growing community support .

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Fig1.WI-FI Module

This module has onboard 80MHz low power 32 bit processor which can be used for custom firmwares . This also means that you can host small webpages without any external controller . For more details see:NODEMCU. The ESP8266 supports APSD for VOIP applications and Bluetooth co-existance interfaces; it contains a self calibrated RF allowing it to work under all operating conditions,and requires no external RF parts.
ESP8266 is transforming the world with its low cost and high features which makes it an ideal module for Internet Of Things (IOT). It can be used in any application where you need to connect a device to your local network or internet.

III. WORKING

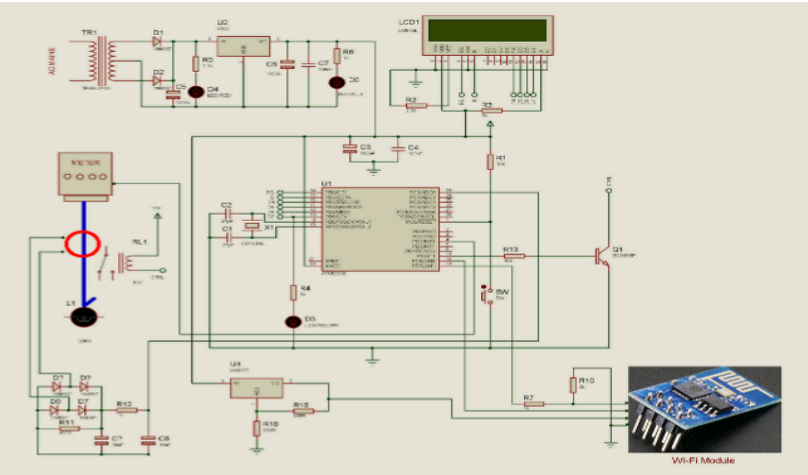

Fig2.Circuit Diagram Of IOT Based Meter Reading And Overload Protection.

Circuit requires 5v DC for microcontroller,sensor and 12v for relay and relay driver.12v transformer is used to step down 230v to 12v and rectified with (1N4007 diode) center tap rectifier with capacitor filter of 1000 micro farad; output is DC 12V-14V according to transformer ratings.The battery output is given to the arduino board,which is required to convert in 5v regulated for microcontroller and other devices,here we have used LM7805 regulator for getting 5v regulated DC for motor driver it is separately used to cancle loading effect.
In this arduino board (atmega328 28pin microcontroller) works with 16MHz frequency used for (timer configuration),the unwanted frequency produced is bypassed by the capacitor of 27pf capacitor.Reset pin is connected to resistor of 10k whenever reset requires the reset switch (2 lead push to ON switch /micro push to switch) required pressing.6 channel 10 bit inbuilt ADC available,6 PWM pins available,multiple serial communication available, upto 20 programmable pins available .
ATMEGA328 microcontroller pins 14,15,16,17,18,19 are connected to LCD as RS,E,D4,D5,D6,D7 respectively .LCD shows text as our programming conditions .Like dam level is 25% etc. Microcontroller input current sensor is connected with A0 (current transformer) , pulse sensor input is attached with meter and converts it into pulse format by

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pulse generator circuit.Output of pulse generator circuit connected with microcontroller interrupt pin no 2. Wi-fi modem is connected to 12 and 13 pin of microcontroller to Tx and Rx pin for wi-fi modem ESP8266. It requires 3.3v supply provided with LM317 variable voltage regulator, with 330 ohm and 560 ohm resistors.
All capacitors of 0.1 micro farad near analog/digital/microcontroller ICs are connected to reduce spikes in the circuit, spikes produced by inductive load/sparking contacts of loads and capacitor of 1000micro farad/25v at regulator output is connected for the cancle loading effect in the circuit while driving the high current source.

IV. ADVANTAGES

1.Measures pulses , calculate bill automatically and current monitoring.
2.Wi-fi based long distance communication.
3.The circuit is compact in size,so small space is required.
4.Automatic control for billing and overload monitoring is difficult,reduced by this circuit.

V. APPLICATIONS

The above mentioned method will ease the process of water level management on a large scale. We can solve many water related issues by this method by installing a central command center we are decreasing the manpower required at each and every dam. Since this is a fully automated project, any kind of human intervention has been avoided, so the possibility of faults has also decreased.
1.The main application of this project is to measure pulses and calculate billing and current monitoring.
2.This system can be implementing as power theft monitoring .
3.It can be used in automation system also, to control electrical equipment from long distance .

VI. CONCLUSION

Thus our group actively coupled with project, and me develop this project named as "IOT BASED METER READING AND OVERLOAD PROTECTION".
In this project we have used multiple sensors like pulse sensor ,current sensor.As respective condition detected microcontroller takes action and shows results on LCD display. This whole system updates data on thing speak server using internet connection.

REFERENCES

1.Himshekhar Das,L.C.Saikia,"GSM Enabled Smart Energy Meter and Automation of Home Appliances", PP-978-1-4678-6503-1,2015 IEEE .
2.OFoegbu Osita Edward,"An Energy Meter Reader with Load Control Capacity and Secure Switching Using a Password Based Relay Circuit",PP-978-1-4799-8311-7,'Annual Global Online Conference on Information and Computer Technology',IEEE 2014.
3.Yingying Cheng,Huaxiao Yang,Ji xiao,Xingzhe Hou,"Running State Evaluation Of Electric Energy Meter",PP-978-1-4799-4565-8,'Workshop on Electronics,Computer and Applications',IEEE 2014.