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IOT SMART ENERGY GRID SYSTEM

K.Anil Kumar, G.Manoj, B.Murali Veera Prasad, K.V.N.Hemanth, J.Anji

Abstract
Energy generation companies supply electricity to all the households via intermediate controlled power transmission hubs known as Electricity Grid. Sometimes problems arise due to failure of the electricity grid leading to black out of an entire area which was getting supply from that particular grid. This paper aims to solve this problem using IOT as the means of communication and also tackling various other issues which a smart system can deal with to avoid unnecessary losses to the Energy producers. IOT Smart Energy Grid is based on AT mega family controller which controls the various activities of the system. The system communicates over internet by using Wi-Fi technology. A bulb is used in this paper to demonstrate as a valid consumer and a bulb to demonstrate an invalid consumer.
The foremost thing that this paper facilitates is re-connection of transmission line to active grid. If an Energy Grid becomes faulty and there is an another Energy Grid, the system switches the Transmission Lines towards this Grid thus facilitating uninterrupted electricity supply to that particular region whose Energy Grid went OFF. And this information of which Grid is active is updated over IOT Gecko webpage where the authorities can login and can view the updates. Apart from monitoring the Grid this paper has advances capabilities of monitoring energy consumption and even detects theft of electricity. The amount of electricity consumed and the estimated cost of the usage gets updated on the IOT Gecko webpage along with the Energy Grid information. Theft conditions are simulated in the system using two switches. Switching one each time will simulate a theft condition and also will notify the authorities over the IOT interface. In this way the Smart Energy Grid paper makes sure that the electricity supply is continuous and helps in maintaining a updated record of consumption and theft information which is quite a valuable information for the energy producing companies.
Keywords: IOT, Smart Energy Grid

* Correspondence Author
K.Anil Kumar[1] ,G.Manoj[2] ,B.Murali Veera Prasad[3], K.V.N.Hemanth[4], J.Anji[5]
Assistant Professor, Dept.of ECE, CIET, Andhra Pradesh, India [1]
UG Student, Dept.of ECE, CIET, Andhra Pradesh, India [2],[3],[4],[5]

INTRODUCTION

Energy generation companies supply electricity to all the households via intermediate controlled power transmission hubs known as Electricity Grid. Sometimes problems arise due to failure of the electricity grid leading to black out of an entire area which was getting supply from that particular grid. This paper aims to solve this problem using IOT as the means of communication and also tackling various other issues which a smart system can deal with to avoid unnecessary losses to the Energy producers.

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ARDUINO UNO

The Arduino Uno is a microcontroller board based on the AT mega328 (datasheet).It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the AT mega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0.

Block diagram:

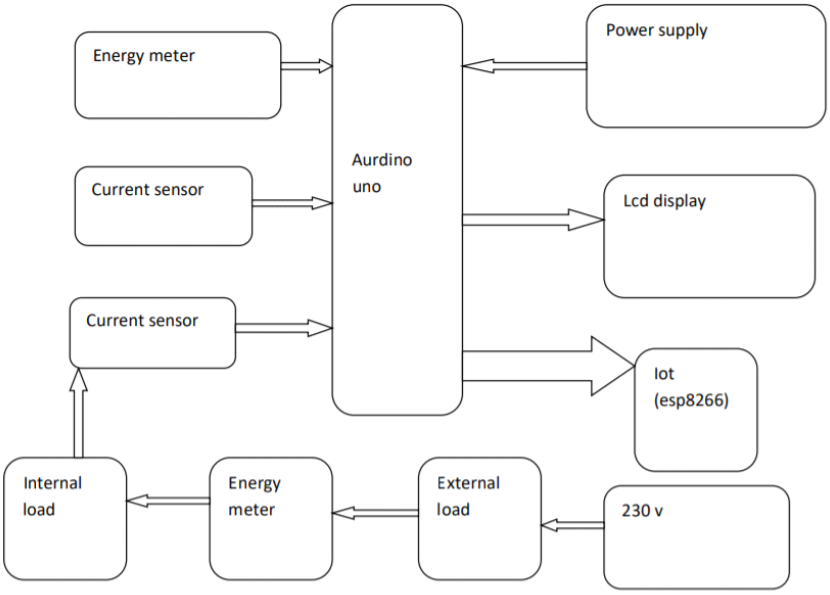

Figure 1

The Uno and version 1.0 will be the reference versions of Arduno, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform for a comparison with previous versions, see the index of Arduino boards.

Current Sensor

A current sensor is a device that detects electric current (AC or DC) in a wire, and generates a signal proportional to it. The generated signal could be analog voltage or current or even digital output. It can be then utilized to display the measured current in an ammeter or can be stored for further analysis in a data acquisition system or can be utilized for control purpose.

A "current output" CT needs to be used with a burden resistor. The burden resistor completes or closes the CT secondary circuit. The burden value is chosen to provide a voltage proportional to the secondary current. The burden value needs to be low enough to prevent CT core saturation.

Isolation

The secondary circuit is galvanic ally isolated from the primary circuit. (i.e., it has no metallic contact) Safety In general, a CT must never be open-circuited once it's attached to a current-carrying conductor. A CT is potentially dangerous if open-circuited. If open-circuited with current flowing in the primary, the transformer secondary will attempt to continue driving current into what is effectively infinite impedance. This will produce a high and potentially dangerous voltages across the secondary Some CT's have

built-in protection. Some have protective Zener diodes as is the case with the SCT-013-000 recommended for use in this paper. If the CT is of the 'voltage output' type, it has a built in burden resistor. Thus, it cannot be opencircuited.

IOT

The Internet of Things (IoT) refers to the use of intelligently connected devices and systems to leverage data gathered by embedded sensors and actuators in machines and other physical objects. IoT is expected to spread rapidly over the coming years and this convergence will unleash a new dimension of services that improve the quality of life of consumers and productivity of enterprises, unlocking an opportunity that the GSMA refers to as the ‘Connected Life’. For consumers, the IoT has the potential to deliver solutions that dramatically improve energy efficiency, security, health, education and many other aspects of daily life.

RESULTS

Figure 2

Figure 2

CONCLUSION

The Internet of Things promises to deliver a step change in individuals' quality of life and enterprises' productivity. Through a widely distributed, locally intelligent network of smart devices, the IoT has the potential to enable extensions and enhancements to fundamental services in transportation, logistics, security, utilities, education, healthcare and other areas, while providing a new ecosystem for Application development.

A concerted effort is required to move the industry beyond the early stages of market development towards maturity, driven by common understanding of the distinct nature of the opportunity.

This market has distinct characteristics in the areas of service distribution, business and charging models, capabilities required to deliver IoT services, and the differing demands these services will place on mobile networks. GSMA's Connected Living Programme is an industry initiative which seeks to expedite the development of mobile-enabled IoT services. It is hoped that a common understanding of the characteristics of IoT will enable industry stakeholders to collaborate more effectively in order to propel the market forward for the benefit of consumers and society

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