

Controlling of Smart Inverter via Internet of Things

Amit Sharma

Department of Electronics and Communication Engineering
Faculty of Engineering, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

ABSTRACT: *In most household applications, inverters and GSM modules are widely available in current life applications. Smart Managed Inverter Based on the Internet of Things in this research paper designs and performs simulations using GSM module technology to establish a two-way contact with the proposed device and user. Today, when it is not balanced in a power grid, massive demand & supply will suffer. Nowadays, when it does not match in a power grid, massive demand & supply will suffer. The best approach in this paper to increase power efficiency for consumers with the use of PV-battery systems is to produce power without operating costs, maintenance and technical knowledge of solar power generation. A solar panel is used in this paper to charge the battery, which discloses a solar tracking circuit that increases the solar panel's working efficiency. It also uses GSM module technology to communicate with the user in two ways and allows the user to monitor the on/off switching of the device. With the assistance of the Node MCU & a relay module, home automation is completed. Whenever the load is on or operating due to the unwanted usage of an electrical unit, the user can turn it off from anywhere, the user can switch it off wherever the user can do with the help of the internet.*

KEYWORDS: *Inverter, GSM module, IoT, Battery, Solar panel, Photo voltaic cells, Sun light.*

INTRODUCTION

The Internet of Things (IoT) is debated in different sectors as a hot subject, but this notion is not a new idea. IoT refers to a physical object network that is able to exchange & collect electronic information [1]. It reveals a wide range of advanced instruments, from various industrial machines that pass production process data to sensors that verify information about the process of production to sensors which check information about the body of humans. These sensors can use different types of local area connections such as NFC, RFID, Bluetooth, Zigbee & Wi-Fi. Sensors can also have wide area connectivity with the help of LTE, GPRS, GSM, & 4G.

In the electrical system, power loss plays an important part in the daily livelihood of all. Nowadays, when it does not match in a power grid, massive demand & supply will suffer. The best approach in this paper to increase power efficiency for consumers with the use of PV-battery systems is to produce power without operating costs, maintenance and technical knowledge of solar power generation [2]. There are various types of operations available in this system: technique used is stage conversion to improve the working efficiency of the system & to make the system cost efficient, reduce size as well as weight of the system. PV systems have increased dramatically, with energy storage, a solar PV system becomes a stable source of energy & it can be transmitted at the request, which results in performance improving & the value of solar PV systems [3].

LITERATURE REVIEW

Energy demand is rising day by day due to rapid population growth and industries that have now given way to the use of renewable sources to meet energy demand, resulting in the rapid consumption of fossil fuels. Among renewable energy sources, solar energy, which generates electricity using PV modules, is of high interest. There is a need for more productive use of the smart inverters needed for the day. The solar energy can be used to charge the batteries during day time and the stored energy in the battery can be used when solar energy is not present [4].

Generally, smart inverters are inverters that are charged with the help of solar energy and conduct solar monitoring. To carry out solar monitoring using an algorithm, a stepper motor is used. Smart inverters, however, can also be used as inverters with bidirectional contact with the consumer and other individuals in the device. The research explored the possibility through the implementation of interaction between the user & the inverter with the help of IoT [5].

Nowadays Huge demand & supply will suffer when it is not matched in a power system. Generating the power without running cost, maintenance and technical knowledge solar power generation is the best way in this paper to enhance the power reliability to customers with the use of PV-battery systems [6]. There are various types of operations available in this system: technique used is stage conversion to improve the working efficiency of the system & to make the system cost efficient, reduce size as well as weight of the system [7].

The block diagram of the IOT based Solar Smart inverter is shown in fig.1.

It discloses a microcontroller, Battery, a Solar Panel, Inverter circuit, Charge controller circuit, GSM module, a Solar tracking circuit & relays of 5v. This paper consists of three different sections such as Storage, solar tracking, conversion of energy & transfer of energy to the loads.

- (1) Solar tracking: This section discloses a LDR module connected to a microcontroller with a DC motor with drivers for movement of the solar panel with respect to obtain maximum solar energy.
- (2) Conversion & Energy storage: This section discloses a charge controller for charging the cell of battery at low voltage & an Inverter for changing DC voltage to AC voltage. It also discloses an LCD display attached with arduino for monitoring percentage of battery.
- (3) Transfer of energy to the loads: This section of the IOT module for controlling different loads with the help of Relays.

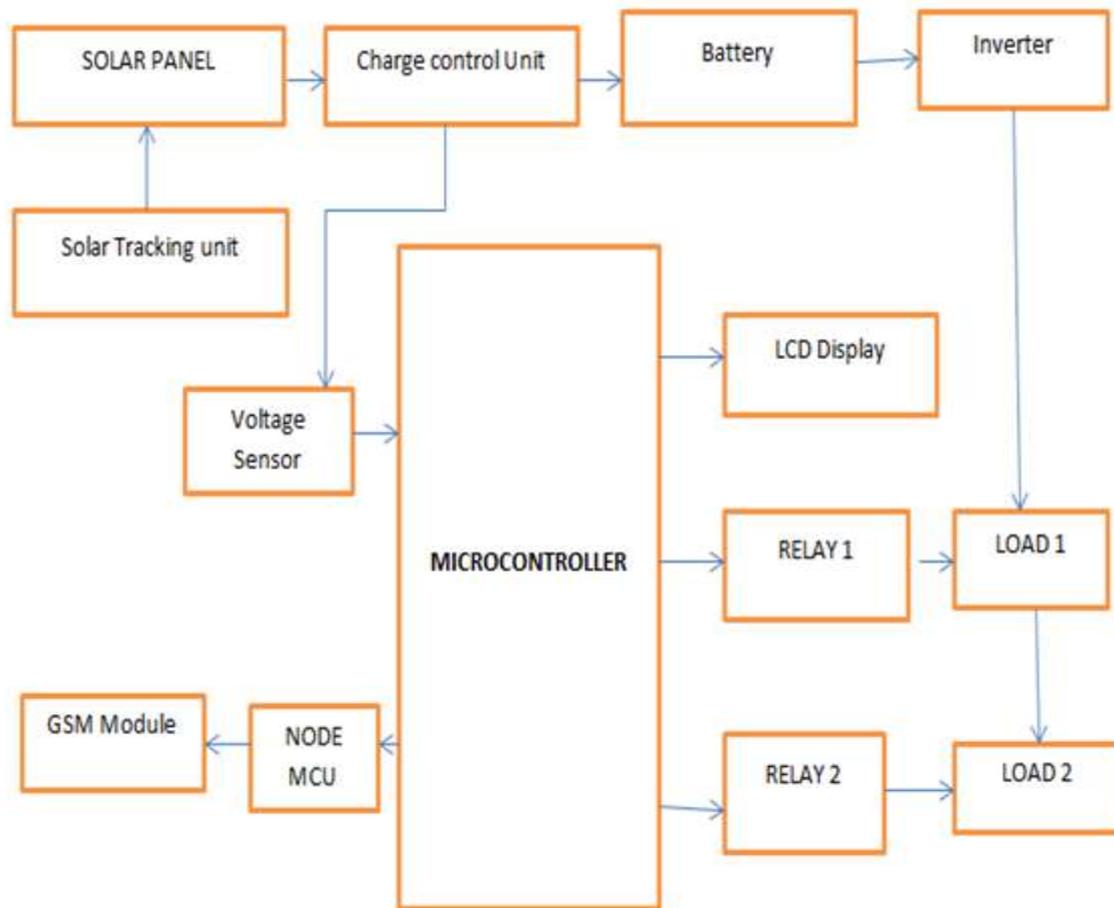


Fig 1: Block diagram of inverter.

DISCUSSION & CONCLUSION

Smart managed inverter based on IoT is designed by using an existing inverter via power management system with two directional contacts with the user. Anyone can monitor loads wirelessly at the time of power cuts, depending on preferences, while the device can observe the load current of the inverter at the same time. This prototype design offers a deep insight into the operation of a self-reliable and adequate device using existing load current to manage and track loads. The solar energy system needs investment in solar panels only in the first stage, and the smart managed inverter system is cost-effectively created. The user produces enough energy for user and uses it as an environmental friendly system. Hence in the work, Eco-friendly IoT based smart controlled inverter is designed to control the various combinations of load in the Industry or home on user choice basis intellectually through Wi-Fi.

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