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IoT Node Performance Monitoring for Wireless Sensor Network

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ABSTRACT ------*The Internet of Things is an emerging technology across the world, which helps to connect sensors, vehicles, hospitals, industries and consumers through internet Connectivity. This type of architecture leads to Smart Cities, Smart home, Smart agriculture and Smart World. Architecture of IoT is very complex because of the large number of devices, link layer technology and services that are involved in this system. However, security in IoT is the most important parameter. IOT is a smart technology that connects anything anywhere at any time. Such ubiquitous nature of IoT is responsible for draining out energy from its resources. Therefore, the energy efficiency of IoT resources has emerged as a major research issue. In this paper, an energy-efficient architecture for IoT has been proposed, which consists of three layers, namely, sensing and control, information processing, and presentation. The architectural design allows the system to predict the sleep interval of sensors based upon their remaining battery level, their previous usage history, and quality of information required for a particular application. The predicted value can be used to boost the utilization of cloud resources by provisioning the allocated resources when the corresponding sensory nodes are in sleep mode. This mechanism allows the energy-efficient utilization of all the IoT resources. The experimental results show a significant amount of energy saving in the case of sensor nodes and improved resource utilization of cloud resources.*

Keywords—*Internet of things (IoT) resources, Sensors, Cloud resources ,security, wireless sensor network*

I.INTRODUCTION

The power consumption is the main part of the electrical equipment used in home or industry. Our project aim is to monitor individual power consumption by the load or devices which will be online using "IOT". It will help to monitor and analyse the performance of the device and if any load is consuming more power than that device require maintenance. This will help to improve the device life as well as it will save money as energy billing is maintained .We are building the wireless sensor network based current and temperature monitoring node for each load which will send data to the cloud server that we can monitor online.

Internet of things as the name suggests, is the connectivity of everyday devices with each other. With the advancement in technology, numerous devices are using sensors, actuators, embedded computing and cloud computing. This has enabledcommunication between devices. To put it simply, the Internet of Things enables devices (things) to interact and co-ordinate with each other thereby reducing human intervention in basic everyday tasks. To get a better understanding of IoT consider the scenario of a smart home. As soon as the alarm rings it sends a signal to the coffee maker and the toaster, which automatically start doing their jobs without any human intervention. Thus, saving time and

making our everyday tasks easy, this type of device communication is the Internet of Things. The IoT enables physical objects to see, hear, think and perform jobs by having them "speak" together, to share information and to co-ordinate decisions. A network of heterogeneous devices/applications has its own set of challenges. Moreover, as the communication among these devices as well as with related services, is expected to happen anytime, anywhere, it is frequently done in a wireless, autonomic and ad-hoc manner. In addition the services become much more fluid, decentralized and complex. Consequently, the security barriers in the Internet of Things become much thinner. The IoT architecture, like the Internet, will grow in an evolutionary fashion from a variety of separate contributions, rather than from a grand plan. Security is amajor concern while dealing with the Internet of Things. A majority of IoT enabled devices are not very secure and can be accessed by a third party easily. Thus there is a severe need to standardise it to ensure that the privacy of the user is not invaded . Research into the IoT field is still in its early stage, and a standard definition of IoT in not yet available. IoT can be viewed from three perspectives.

II. LITERATURE SURVEY

Internet of things (IoT) is a smart technology that connects anything anywhere at any time. IoT is responsible for draining out energy from its resources. Therefore, the energy efficiency of IoT resources has emerged as a major research issue.

An energy-efficient technique for IoT has been proposed in this research work, which consists of sensor node which sense some data like Temperature and humidity then the monitoring system is integrated in the Node. That allows the system to predict the sleep interval of sensors based upon their remaining battery level required for a particular applicationAn Integrated System for Regional Environmental Monitoring and Management Based on Internet of Things, This paper introduces a novel IIS that combines Internet of Things (IoT), Cloud Computing, Geoinformatics [remote sensing (RS), geographical information system (GIS), and global positioning system (GPS)], and e-Science for environmental monitoring and management, with a case study on regional climate change and its ecological effects Internet of Things (IoT) A Vision, Architectural Elements, and Security Issues In this paper, authors give an overview of the architecture of IoT with the help of Smart World. also discuss the security challenges in IoT followed by the security measures in IoT. Finally, these challenges, which are discussed in the paper, could be research direction for future work in security for IoT. Design, Implementation and Practical Evaluation of an IoT Automation System for Fog Computing Applications Based on MQTT and WiFi Sensor Nodesthe use of protocols like MQTT allows for including resource-constrained devices in the system that act as sensors or actuators. Furthermore, the design and implementation of the Master nodes, which communicate WiFi devices, were detailed. As the literature studied I noticed that there is huge data transmission done at cloud server using Nodes even if the sensors are sending the constant value. So the research is come up with the idea to reduce the data flow between the Nodes to the cloud server as well as to monitor and analyse the system online in the form of chart.

III. PROPOSED SYSTEM

The major components used in this project are all the components of the system is connected Arduino Uno Board. The block diagram of the system and work flow is as follows.

Table 1 List of Components used

Arduino	Current sensor	Relay
Ethernet Shield	Temperature sensor	Diode
Power supply	Register/Transister	Node MicrocontrollerESP32

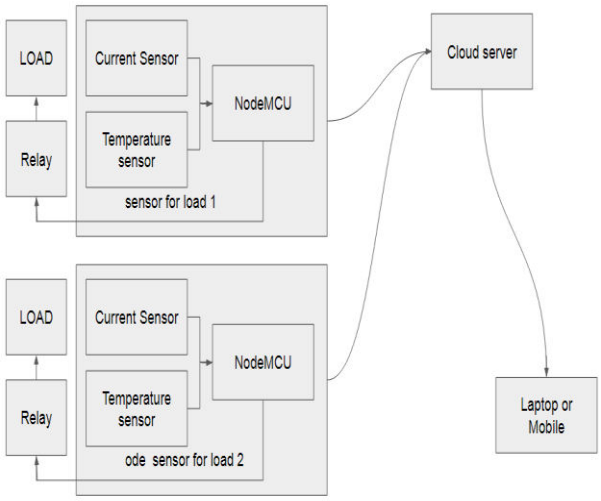

Figure 1 Block Diagram of the Proposed System

IV. IMPLEMENTATION

Work Flow

The work flow of the PV monitoring system is given in the form of step below:
Step 1: Arduino display the power usage using sensed values through current sensor and voltage divider.
Step 2: ESP32 fetch the arduino output data through serial port and display on App.
Step 3: ESP32 sends the monitoring data on to the cloud.
Step 4: Cloud display the data in the form of graph, which is visible to the entire user.

V. RESULTS AND DISCUSSION

The result of the system is displayed on the webpage in the form of the table contains current in amperes, temperature. The monitoring data sent to the cloud is store in separate fields. Each fields display the individual graphs, the output of the monitoring system obtained in different cases.

VI. CONCLUSIONSAND FUTURE WORK :

The integration of renewable energies into the electricity distribution network has become a necessity and consequently the search for new and effective solutions for remote monitoring and control is required. In this project, an IOT Node Performance Monitoring for Wireless Sensor Network has been proposed to collect data on important parameters . The continuous record of performance data and failure data enables by IoT, so that it can be used for analytics for predicting and forecasting the future power generation possibilities, income production etc. IoT will play a major role in accessing the control . IOT-based monitoring will improve the energy efficiency of the system, reduce intervention and supervision time, and facilitate network management.
After studying the architecture , the next step will be to implement, test and achieve this IOT-based system in order to obtain a reliable and secure system which will allow data collection in real time. Apart from that by using various Machine Learning algorithms and model it is possible to make system smart enough to take decision about data and performance

VII. APPLICATION

This is use to monitor the performance of the systems online like we can monitor the power rating like voltage and current and temperature of a device The main application is to protect the devices from damage of over temperature and over current

VIII.. REFERENCES

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