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Implementation of Light Intensity Monitoring System Based on Cloud and Linux Platform

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ABSTRACT:
Accurate and quantifiable measurement of light is essential in creating desired outcomes in practical day to day applications as well as unique applications such as Traffic lighting system, Poultry Industry, Gardening, Museum lighting system, at emergency exits etc. Hence, Light measurement and analysis is an important step in ensuring efficiency and safety. Many of the industries are burdened with limited number of resources and real shortage of experts on their fields; real time remote monitoring presents an effective solution that minimizes their efforts and expenditures to achieve the desired results within time. This paper introduces real time remote Light intensity monitoring system using Raspberry Pi which enables the user to track the lighting system remotely. Raspberry pi is a low cost ARM powered Linux based computer which acts as a server, and it communicates with clients with LAN or external Wi-Fi module. The key feature of this system is light intensity being monitored instantaneously and data stored in the database for future use, and shown in the form of dynamic charts to the user according to the user requirement in a terminal device like Tablet or Smart Phone or any internet enabled device. This empowers experts to make right decisions at right time to get desired results.

Keywords:
Light Intensity; Remote Monitoring; Raspberry Pi; Web Server; Dynamic Charts.

I.INTRODUCTION:
Wind energy is a fast-growing sustainable energy technology and wind turbines continue to be deployed in several parts of the world.

Driven by the need for more efficient energy harvesting, the size of the wind turbines has increased over the years (several MW of rated power and over 100m in rotor diameter) for both off-shore and land-based installations. Therefore, structural health monitoring (SHM) and maintenance of such turbine structures have become critical and challenging [1]. In order to keep the number of physical inspections to minimum without increasing the risk of structural failure, a precise and reliable remote monitoring system for damage identification is necessary. Condition based maintenance (CBM) [2] is increasingly being used recently since it is cost-efficient and significantly improves safety compared to periodic non-destructive evaluations and visual observations [3].

CBM is performed when one or more indicators show that the structure needs maintenance. This type of maintenance necessitates a means to determine the condition of machines while in operation and involves the observation of the system by sampling dynamic response measurements from a group of sensors and the analysis of the data to determine the current state of system health. This goal is being pursued through the development of reliable sensors, and intelligent algorithms. Although any part of the wind turbine is prone to failure [4], considerable attention is often given to the turbine blades as they are the main elements of the system. The blades could cost up to 20% of the total cost and theirs are the most expensive type of damage to repair [5]. Numerous wind turbine blade damage detection and health monitoring techniques exist, each with its own advantages and drawbacks:

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Acoustic emission sensors [6], ultrasonic testing [7], thermal imaging method [8], x-ray radioscopy [9], Eddy current method [10], fiber optic (FO) sensors [11], PZT patches [12], smart materials and strain memory alloy method [13], wavelet transforms [14], and microwave techniques [15] are the key examples. The majority of these methods have limitations with regard to large-scale sensing, difficult signal interpretation, or have safety issues. FO strain sensors and particularly fibre Bragg gratings (FBGs) [16] are currently the most widely used in wind turbine structural monitoring.

II. RELATED WORK:

2.1 BLOCK DIAGRAM:

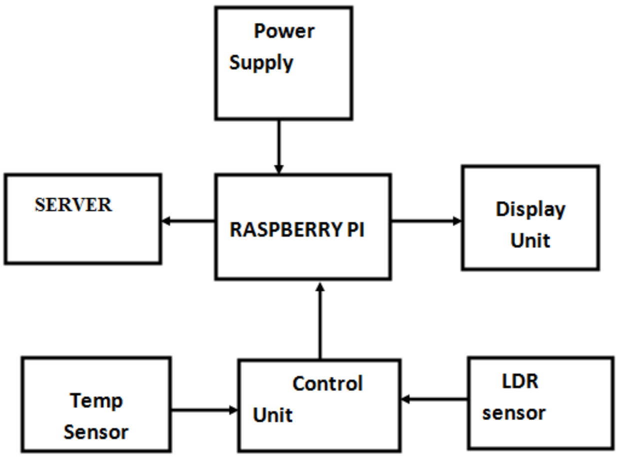

Figure-1: Block diagram

2.2 EXISTING METHOD:

THE SMART GRID is an intelligent monitoring system, distribution, and control system. The proposed system is helpful in collection and analysis of real time data. emphasizing the importance of the communication infrastructures required to support data exchange between the various domains which comprises the smart grid.

2.3. PROPOSED METHOD:

In proposed system we extend our data transmission to server so that the relevant parameters are monitored controlling through server. This is very useful in the case when the user is moving in industrial area.

Along with the data monitoring devices is also controlled based on the values.

III. HARDWARE COMPONENTS:

3.1 RASPBERRY PI PROCESSOR:

Figure-2: Raspberry Pi diagram

The Raspberry Pi board involves a processor and snap shots chip, Random Access Memory (RAM) and more than a few interfaces and connectors for external devices. Some of these instruments are main others are optional. It operates in the identical method as a ordinary pc, requiring a keyboard for command entry, a show unit and a vigor give. considering that raspberry Pi board operates like pc it requires 'mass-storage', but a tough disk pressure of the variety observed in a ordinary pc is not relatively in maintaining with the miniature dimension of Raspberry Pi.

3.2 TEMPARATURE SENSOR:

In this project, in order to monitor the temperature continuously and compare this with the set temperature preprogrammed in the microcontroller, initially this temperature value has to be read and fed to the microcontroller. This temperature value has to be sensed. Thus a sensor has to be used and the sensor used in this project is LM35. It converts temperature value into electrical signals. LM35 series sensors are precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Celsius temperature.

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The LM35 requires no external calibration since it is internally calibrated. . The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a full −55 to +150°C temperature range. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μA from its supply, it has very low self-heating, less than 0.1°C in still air.

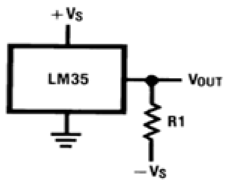

Figure-3: LM35 sensor

3.3. LIGHT DEPENDENT RESISTOR:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1,000,000 ohms, but when they are illuminated with light, the resistance drops dramatically. Thus in this project, LDR plays an important role in controlling the electrical appliances based on the intensity of light i.e., if the intensity of light is more (during daytime) the loads will be in off condition. And if the intensity of light is less (during nights), the loads will be switch. LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.

Figure-4: LDR sensor

IV. RESULTS:

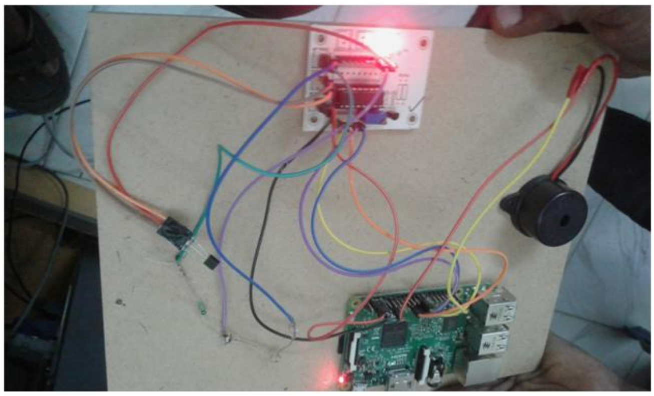

Figure-5: Hardware of the project

V. CONCLUSION:

The project "Development of Cloud Based Light Intensity Monitoring System Using Raspberry Pi" has been successfully designed and tested. It has been developed by integrating features of all the hardware components and software used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced ARM11 board and with the help of growing technology the project has been successfully implemented.

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