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Substation, Monitoring & Control Using GSM Module

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ABSTRACT

This project proposes an innovative design to develop a system based on AVR microcontroller that is used for monitoring the voltage, current & temperature in substation & to protect the system from rise in mentioned parameters. The protection of substation is done with the aid of the GSM Communication. Moreover the system displays on a LCD & that will lead to avoid the damages in substation. The display unit in the substation is where the voltage, current & temperature are monitored continuously by AVR microcontroller & is displayed through the display unit. In general, the proposed design is developed for the user to easily recognize the substation that is suffered by any open or short circuit & rise in temperature. The ultimate objective is to monitor the electrical parameters continuously and hence to guard the burning of distribution. Existing processes for substation vital data collection require a great deal of authorized person to collect, input and analyse the information. These processes are usually slow and error prone, introducing a latency that prevent real time data accessibility. This scenario restrains the power substation monitoring capabilities. In this project we propose a solution to automate this process by using somebody sensors attached to existing isolation transformer which will be act as distribution point that are inter-connected through microcontroller to monitor the devices. The proposal is based on the concepts of monitoring using wireless sensor networks. The information becomes available to authorized person to operate particular device in particular region and it can take according to action. The proof-of-concept design applies to power substation to monitor devices in a cost effectiveness and simple integration.

Keywords: Substation, Algorithm, Microcontroller, GSM, ATMEGA16, Microcontroller, Sensors.

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I. INTRODUCTION

In substation or distribution as power is done to different regions. We need to monitor parameter like voltage, current, temperature or tilt and vibration in devices. These devices are located far from authorised person who operates devices at a particular position. Sometimes we run through a problem in substation like overheating, over voltage, over current. It causes harm to our domestic appliances. We need to monitor these parameters. In this system we are doing so

by using isolation transformer of rating 230volts/ 1A. It will represent substation. We are using temperature sensor to measure its temperature, current by using current sensor WCS2720, voltage measurement will be done by AC to DC step-down circuitry. Potentiometer is used to vary the voltage. All these parameters will be displayed on LCD 16X2. If any of the parameter exceeds referred threshold value, buzzer will beep for indication purpose and an SMS

will be send to authorised person as per programming of microcontroller. Heart of the system is a Microcontroller. We are using AVR Microcontroller to monitor and control the system.

II. LITERATURE SURVEY

Dr. Ghous Buksh Narejo & etc. [1] This model is designed for “Microcontroller Based Monitoring Of Substation And Control System Through Gsm (Global System for Mobile Communication) MODEM”. This paper stated that the proposed project which is GSM network based controlling of substation. The substation faults are immediately realised and reported to their concerned departments via GSM .The measured parameters will be sending in the form of SMS messages.

V. Thiyagarajan & T.G. Palanivel & etc.[2] This project presents “An Efficient Monitoring Of Substations Using Microcontroller Based Monitoring System”. The paper proposes an innovative design to develop a system based on AVR microcontroller that is used for monitoring the voltage, current and temperature of a distribution transformer in a substation and to protect system from the rise in mention parameters.

S.Sangeetha, S.Muruganand& etc. [3] This project presents “An Efficient Monitoring Of Substation In Power Transmission Lines Using Zigbee In Embedded System”. This paper proposes based on PIC microcontroller is used to monitor and control the power in the distribution transformer continuously throughout its operation.

Nagender Kumar Suryadevara & etc. [4] This project presents “WSN- Based Smart Sensors and Actuator for Power Management in Intelligent Buildings”. The paper discusses the design and development of a smart monitoring and controlling system for household electrical appliances in real time has reported in this paper.

III.OBJECTIVE

- **Collaboration:**

In many cases specific information may be needed in one place. Through substation monitoring technologies, the information is synchronized and sends to the authorized person.

- **Speed:**

Using substation monitoring tools can upgrade and improve their features faster, less expensively and with minimal or no service interruption.

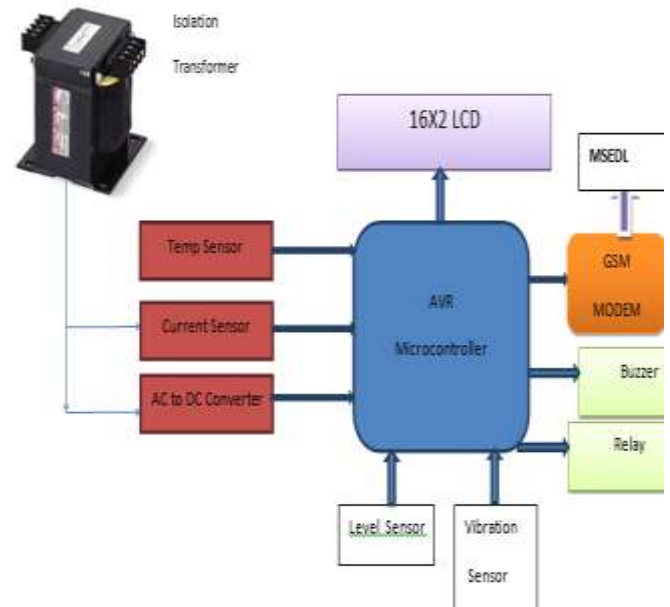
- **Security and privacy:**

Substation monitoring providing security of about avoidance damages industrial and home appliance component.

- **Decreased costs:**

Due to this monitoring system we can avoid damages in the distribution power devices and therefore cost will be decreased.

IV. PROPOSED SYSTEM



Description:

Sometimes we run through a problem of substation like overheating, over voltage, over current. It causes harms to our domestic appliances. We need to monitor these parameters. In this system we are doing so. We are using isolation transformer of rating 230volts/ 1A. It will represent substation. We are using temperature sensor to measure its temperature & also measure its current by using current sensor WCS2720. For voltage measurement used to derive AC to DC step-down circuitry & potentiometer to vary the voltage. All these parameters will be displayed on LCD 16X2. If any of the parameter exceeds to some threshold value, buzzer will beep for indication purpose. Also an SMS will throw to some authorised person. Heart of the system is Microcontroller. We will use ARM Microcontroller to monitor and control the system.

Temperature Sensor:

Temperature sensors are used to sense the temperature. We have used a Temperature sensor called LM35. This temperature sensor can sense the temperature of the atmosphere around it or the temperature of any machine to which it is connected or even can give the temperature of the human body in case if used. So, irrespective of the application to which it is used, it gives the reading of the temperature. The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. Temperature sensor is an analog sensor and gives the output into form of analog signal. This signal is feed to ADC which will convert it into digital form. Once converted into analog

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