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IOT based Three Phase Power Failure Monitoring with SMS Alerts

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ABSTRACT -When one phase of a three-phase system gets lost, a phase loss occurs. This is referred as a 'single phasing', this failure generally caused by a blown fuse, thermal overload, broken wire, worn contact or mechanical failure. This is an advanced system that monitors power failure. There are three phases R, Y, and B when any one of the phases detects failure it notifies the concerned authority with the help of text message. This IOT system is connected with the GSM module, the call is connected for configuration purpose. Whenever the phases are been disconnected the system shows the power failure on LCD indicating voltage value and then it raises a buzzer. Then it sends SMS on the authorized number informing the disconnected phase. After reconnecting power to the phase system, raises a buzzer and sends the text message informing the phase is working fine, on the authority person number. In this way, the authority gets instantly notified and they may take appropriate action to solve the problem.

KeyWords Power transmission, PIC Microcontroller, GSM technology, Sensors, Efficiency, Transmission parameters

I. INTRODUCTION

(Size 11 , cambria font)Electrical equipment is prone to disturbances which are fault imposed on the system such as overloading and short circuit [1]. This in turn causes damage to the power equipment in the power system and also at the consumer's end. The impact can bring about a short or long-term loss of the electric power in an area. Prompt attention to power transmission faults is very vital in power systems, avoiding harm and instability to the system. To overcome these challenges, a power transmission monitoring and fault detection system using GSM technology is proposed. There are several existing systems that can be deployed but however they all have their respective limitations for electrical applications [2]. This is why GSM technology is chosen to deliver a cost effective, rigid and robust communication as it enhances speed of communication irrespective of distance [3]. Breach in pre-set short circuit limit is monitored by comparing the current sensed with the pre-set limit .If the current sensed is more than the pre-set current short circuit limit, the PIC

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II. GSM TECHNOLOGY

GSM stands for Global System for Mobile communications. Developed in 1990, it has become the most popular standard for mobile phones in the world. The implementation environment determines the coverage area of each cell. The boundaries of cells can overlap between adjacent cells (large cells can be converted into smaller cells) [11]. The technology uses a blend of frequency division multiplexing (FDM) and time division multiplexing (TDM). Different users at different time slot use different frequency, hence when user is ON, uses channel 900MHz for three seconds, then hop to channel 910MHz for the next three seconds and so on. Frequency Hoping is the term giving to such process. Amongst the various frequency of the GSM, 900MHz is the operational frequency. It has the ability to re-use frequencies in order to increase capacity and at the same time coverage [12-13].

Short message service (SMS)

Short Message Service is a common economically affordable service used for receiving and sending messages in text. It uses the GSM network to transfer information. This method of transmitting data is quite popular due to convenience and low-cost factor. A single text message can consist up to 160 characters. SMS mobile originated is a term used when a message is sent by a mobile, however when a message is received by a mobile it is termed SMS mobile terminated. Remote data communication and monitoring is supported by SMS due to it bi-directional data transfer and it stable

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performance. Amit sachen et al have discussed the user can read remote electrical parameters by sending a command in form of SMS messages [14]. Based on the setting, real time electrical parameter can be automatically sent in form of SMS periodically. Rectification of faults during occurrence of any abnormality in power lines and using SMS through GSM network to inform personnel of this action is also made available. AndriyPalamar et al proposed the system, a Cellular phone which as a Subscriber's Identifying Module (SIM) card with a specific number through which communication is made [15]. The medium of communication is wireless that works on the Global System for Mobile communication technology (GSM). Using cooperative relaying strategies [16-20].

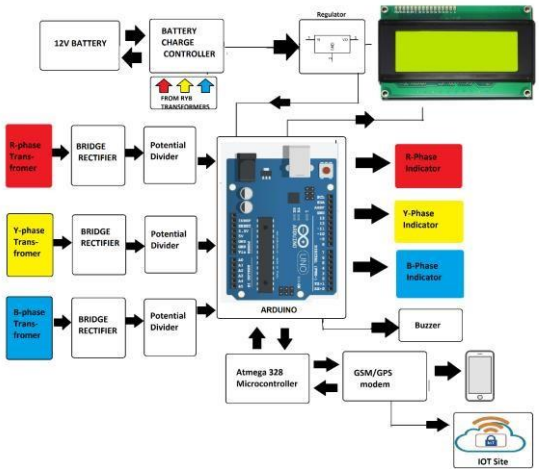

Figure No.2 Bloack Diagram of Actual Set up

IOT MODULE WITH SPECIFICATION

The ESP8266 is a small WiFi module built around the ESP8266 chip that can connect your microcontroller to the internet wirelessly for a very small cost. It can be a great option for Internet of Things (IoT) projects, but can be difficult to work with for beginner hobbyists who do not have prior experience with the module. In this tutorial, we hope to show you how to interface the ESP8266 with an Arduino and perform some basic functions like connecting it to a WiFi network.

- 802.11 b/g/n
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- +19.5dBm output power in 802.11b mode
- Power down leakage current of <10uA
- 1MB Flash Memory
- Integrated low power 32-bit CPU could be used as application processor
- SDIO 1.1 / 2.0, SPI, UART
- STBC, 1×1 MIMO, 2×1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4ms guard interval
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)

III. CONCLUSIONS

The proposed method is validated in power distribution lines. Since transmission lines are directly exposed to the environment, the probability of occurrence of fault is very high. Also the location and type of fault imposed is difficult to determine. This proposed technique provides a solution for this problem by implementing smart detector in the line. The fault can be identified and located. This method will enhance the maintenance part of the power line easily and can reduce fault occurred

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