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TRANSMISSION LINE FALLING DETECTION SYSTEM WITH IOT

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Abstract - *Automatic transmission line stand fall detection and power monitoring system in agriculture field using the arduino.A energy monitoring and transmission line stand fall detecting system.Arduino uno Microcontroller is used in this method.MPU6050 sensor is used to detect position of transmission line stand and line connections of the stand.MPU6050 sensor it will detect any stand fall and line fall.GSM modem is used to send data to Cloud with location and stand number.GSM SIM800C modem is used to send data from transmission line to cloud and correspondent person.*

Key Words: *Arduino, Accelerometer, IOT, LCD, Relay.*

1. INTRODUCTION

The electric power infrastructure is highly vulnerable against many forms of natural and malicious physical events, which can adversely affect the overall performance and stability of the grid. Additionally, there is an impending need to equip the age old transmission line infrastructure with a high performance data communication network[1]. That supports future operational requirements like realtime monitoring and control necessary for smart grid integration.

Many electric power transmission companies have primarily relied on circuit indicators to detect faulty sections of their transmission lines. However there are still challenges in detecting the exact location of these faults[2]. Although fault indicator technology has provided a reliable means to locate permanent faults, the technical crew and patrol teams still has to physically patrol and inspect the devices for longer hours to detect faulty sections of their transmission lines.

A digital fault locator by dynamic system parameter estimation for a double end fed transmission line. The authors of and were the first to propose a two level model specifically for supporting the overhead transmission line monitoring applications[3]. But considering the topological constraints posed by the transmission lines, the low band-width, low data rate wireless nodes would fail to transmit huge amount of data in a multi hop manner.

The several works and propose to improve the state of the art in transmission line monitoring by harnessing the power of wireless sensor networks for real time monitoring and control GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity[4,5]. The GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the Americas (including Canada and the United States) use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated GSM has used a variety of voice codices to squeeze 3.1 kHz audio into between 5.6 and 13 kbps[6].

2. EXISTING SYSTEM

The system is used to monitoring transmission line position avoiding short circuit connections[7]. With wind speed, ambient temperature, and line current data, as well as the sunshine information at a span, the line temperature and sag value could be compute. However, it might be difficult to acquire these parameters with high accuracy in real time.

3. PROPOSED METHOD

- IOT based transmission line stand fall detection and line detection. This method is used MPU6050 sensor for fall detection.

- MPU-6050 module is a DMP(Digital Motion Processor) embedded on the same silicon die, since it support 9-axis Motion Fusion algorithms while correcting any alignment problems and errors caused by small components.
- SIM800 is a complete Quad-band GSM/GPRS solution in a SMT(Surface-Mount Technology). SIM800 modules can transmit Voice,SMS and data information with low power consumption

4. OBJECTIVE:

The main aim is to detect the fault in the transmission line and warn the server about the fault and its location. To detect the accurate fault in the transmission lines, the sensors such as voltage sensors and MPU6050 sensor for fall detection is used.

5. DESCRIPTION

5.1 ACCELEROMETER

An accelerometer is an electromechanical device that measures acceleration forces. These forces may be static, like the constant force of gravity pulling at our feet, or they could be dynamic - caused by moving or vibrating the accelerometer. There are many types of accelerometers developed and reported in the literature. The vast majority is based on piezo electric crystals, but they are too big and to clumsy. People tried to develop something smaller,that could increase applicability and started searching in the field of microelectronics[8]. They developed MEMS (micro electromechanical systems) accelerometers. Fig 1 shows the Accelerometer pin diagram. The first micro machined accelerometer was designed in 1979 at Stanford University, but It took over 15 years before such devices became accepted mainstream products for large volume applications[9] . In the 1990s MEMS accelerometers revolutionised the automotive-airbag system industry[10]. Since then they have enabled unique features and applications ranging from hard-disk protection on laptops to game controllers. More recently, the same sensor-core technology has become available in fully integrated, full-featured devices suitable for industrial applications[11] . Micro machined accelerometers are a highly enabling technology with a huge commercial potential. They provide lower power, compact and robust sensing. Multiple sensors are often combined to provide multi-axis sensing and more accurate data.

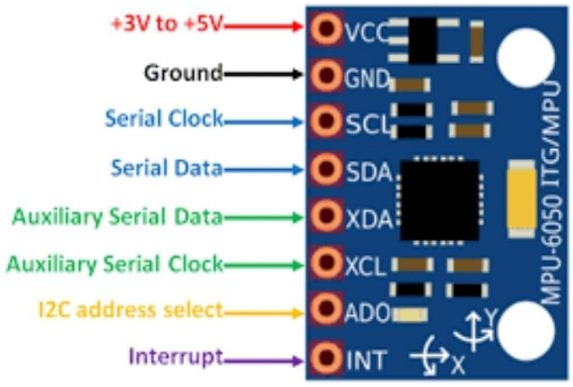

Fig -1: Accelerometers

5.2 ARDUINO

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter[13]. Arduino Uno has a number of facilities for communicating with a computer, another Arduino board, or other microcontrollers.

5.3 LCD

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on[14]. A 16x2

LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

5.4 RELAY

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. As Fig 4.5 shows the relay switch.They are often used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at very high voltage. For example, a relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. Thus a small sensor circuit can drive, say, a fan or an electric bulb .

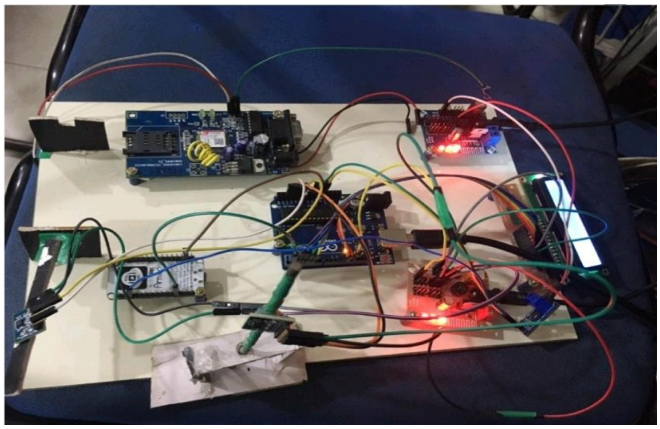

Fig 2-: Protoype working model

6. RESULT AND ANALYSIS

Surveys were performed on a real overhead power transmission line. The measurement system was mounted directly on a 110 kV OTL power line wire which was energized. The proper construction of the optomechanical system, provided its compact size and weight, makes it negligible to the mechanical workings of the power line. A photograph of the measurement system mounted on an ACSR 26/7 Hawk wire. As Fig 3 shows the Snapshot of Current Value.

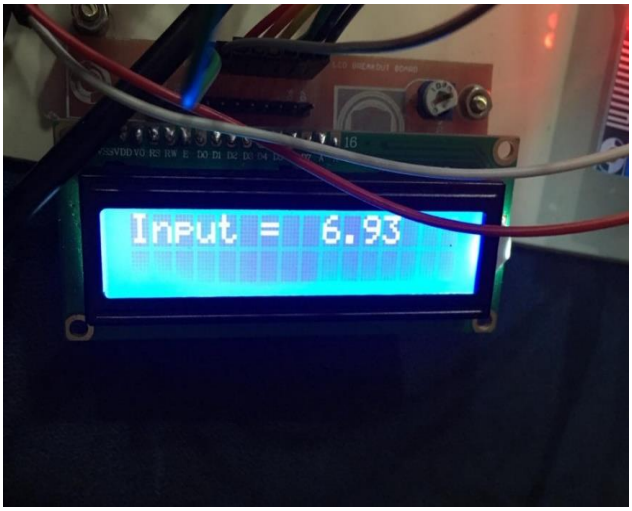

Fig 3-: Output Results

The influence of temperature variations on the measurement system described above was measured for a short segment of the power line wire with the mounted complete system (clamps, steel plate with attached optical fiber). The OTL wire segment was placed in a climate-control chamber with a temperature range established at 10–90 ◦C.The spectral characteristics of the CFBG reflected signal measured for border cases of the surrounding temperature: 10 ◦C and 90 ◦C. The increase of the surrounding temperature of the wire changes the CFBG spectral characteristic by shifting the whole spectrum to longer wavelengths. As shown Fig 2, Snapshot of Kit. The spectrum is not widened so the FWHM parameter of the sensor output characteristics has a quasi-constant character. However, the shift of the spectrum could be distinguished and measured and in this paper is called SSH (spectral shift). On other hand, the

variations of signal propagation between power line carrier (PLC) stations is considered as an indicator of the sag in overhead high voltage transmission lines.

7. CONCLUSION

Automatic transmission line stand fall detection and power monitoring system in agriculture field using the arduino .Controller is send current and voltage value and sends Stand number with location to cloud using GSM SIM800c modem when the transmission line falls this process are done automatically.Power transmission is performed using two or more conductors for single-phase or multiphase systems. A problem appears in three-phase lines as a result of distribution of the phases over the length of the line. Positions of phase a, b, and c lines change in a cycle that puts each phase in three possible positions over the line span. In order to simplify the following analysis without affecting its generality, the branching cables are assumed identical to the transmission cables and the interconnections between the transmission and branch conductors are fully activated. On theother hand, the variations of signal propagation between power line carrier (PLC) stations is considered as an indicator of the sag in overhead high voltage transmission lines.

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