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SCADA For Fault Detection (IOT BASED)

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***Abstract*— Now-a-days every institution needs automation. As a part of college automation, we have decided to do a project Phase absence is a very common and severe problem in any industry, home or office. Many times one or two phases may not be live in three phase supply. Because of this, many times, some electrical appliances will be on in one room and OFF in another room. This creates a big disturbance to our routine work. This project is designed to check the availability of any live phase, and the load will be connected to the particular livephase only. Even a single phase is available, and then also, the loadwill be in ON condition. Phase absence is a very common and severe problem in any industry, home or office. Many times one ortwo phases may not be live in three phase supply. Because of this, many times, some electricalappliances will be on in one room and OFF in another room.**

***Index Terms*—Alarm, Control monitoring, phase fault, SCADA.**

1.INTRODUCTION

Generally, we are transmitting power from the generating stationthrough the transmission line. Mainly, there are two type of transmission lines. Overhead transmission lines Undergroundtransmission lines

As from the latest research 70% to 90% of faults are occurred in overhead transmission line which are transient. There are many fault due to some kind of error or natural error. Mainly there are three types of faults as following way. A transient fault, such as an insulator flashover.

Different type of fault in 3 phase is:

L-L fault (line to line fault)

L-G fault (line to ground fault)

2L-G fault (double line to ground fault)

Is a fault which is cleared by the immediate tripping of one or more circuit breakers to isolate the fault, and which does not recur when the line is re-energized? Faults tend to be less transient (near the 80% range) at lower, distribution voltages and more transient (near the 90% range) at higher, sub transmission and transmission voltages. Lightning is the most common cause of transient faults, partially resulting from insulator flashover from the high transient voltages induced by the lightning. Other possible causes are swinging wires and temporary contact with foreign objects. Thus, transient faults can be cleared by momentarily de -energizing the line, in order to allow the fault to

clear. Auto reclosing can then restore service to the line that's why we make this made this project.

The project is designed to develop an automatic tripping mechanism for the three phase supply system. The project output resets automatically after a brief interruption in the event temporary fault while it remains in tripped condition in case of permanent fault.

The electrical substation which supplies the power to the consumer's i.e., industries or domestic can have failures due to some faults which can be temporary or permanent. These faults lead to substantial damage to the power system equipment. In India it is common to observe the failures in supply system due to the faults that occur during the transmission or distribution.

The faults might be LG (Line to Ground), LL (Line to Line), 3L (Three lines) in the supply systems and these faults in three phase supply system can affect the power system. To overcome this problem a system is built, which can sense these faults andautomatically disconnects the supply to avoid large scale damageto the control gears in the grid sub-stations.

This system is built using three single phase transformers which are wired in star input and star output, and 3 transformers are connected in delta connections, having input 220 volt and output at 12 volts. This concept low voltage testing of fault conditions isfollowed as it is not advisable to create on mains line. 555 timers are used for handling short duration and long duration fault conditions.

A set of switches are used to create the LL, LG and 3L fault in lowvoltage side, for activating the tripping mechanism. Short durationfault returns the supply to the load immediately called as temporary trip while long duration shall result in permanent trip.

2. Problem Statement

The faults might be LG (Line to Ground), LL (Line to Line), 3L(Three lines) in the supplysystems and these faults in three phase supply system can affect the power system. To overcome this problem a system is built, which can sense these faults and automatically disconnects the supply to avoid large scale damage to the control gears in the grid sub-

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stations.

The project is designed to develop an automatic tripping mechanism for the three phase supply system. The project output resets automatically after a brief interruption in the event temporary fault while it remains in tripped condition in case of permanent fault. In this project we can easily detect faults in phase with the help of SCADA. Also we can easily identify the faults when comes on system and this detection provide backup

protection to the system**.**

Means, SCADA determine or provide graphical or pictorial representation of faults and where the faults actually present and solve this problem**.**

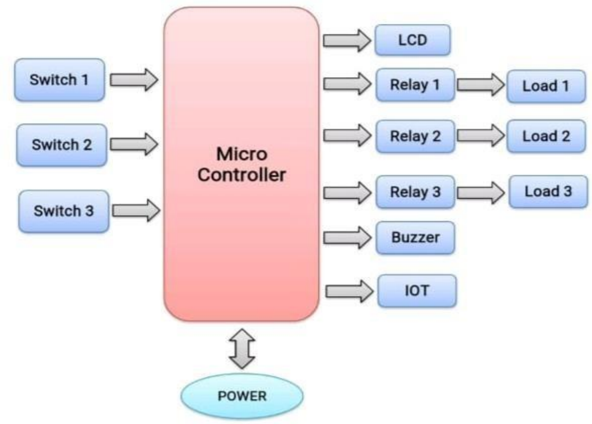

Fig 1: Block Diagram of Proposed System

3. Motivation & Objectives

During operation of the electrical networks, the electrical equipment and electrical machines, the chances of occurring of fault is more. Such faults are undesirable, as they may change the characteristic value of impedance of the electrical network and may interfere with the normal operation of the power system. Temporary fault is a fault whichis caused by insulation flashover and needs to be immediately tripped. This mechanism ensures the safety for the rest of the equipment from the aftermath of the fault. This project is aimed to design reduce the outage time due to faults and provide a higher level of service continuity to the customer. Furthermore, successful high-speed reclosing auto reclosing. On transmission circuits can be a major factor when attempting to maintainsystem stability. For those faults that are permanent, auto reclosing will reclose the circuit into a fault that has not been cleared, which may have adverse effects on system stability (particularly at transmission levels).

4. Methodology

Now a day's every system is automated in order to face new challenges. In the present days Automated systems have fewer manual operations, flexibility, reliability and accurate. Due to this demand every field prefers automated control systems. Especially in the field of electronicsautomated systems are giving good performance.

Generally common problem for 3 phase supply is absence of one of any of the phase. So, in this Project, we are using 3 phase supply i.e.., R-Ø, Y-Ø, B-Ø are the three single phase supply's which are used to put some load continuously when any one of the 3-phase supply has gone the other are ready to give supply to single phase load and LCD is ready to display which phase in working condition.

In this project we continuously on Load using three phases. If all phases are present microcontroller turn on Load on phase 1.at that on-LCD displayas "Phase 1 selected "If first phase absence, Load automatically shift to phase 2 with the help of relay circuit. Same if first two phase absent microcontroller shift that load to phase 3 with the help of rely circuit. System will display selected phase on LCD. System also sends the data to the IOT Thing speak+ Server. This project uses regulated 5v, 750mA power supply. 7805, a three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectifythe ac output of secondary of 230/12v step down transformer. The faults might be LG (Line to Ground), LL (Line to Line), 3L (Three lines) in the supply systems and these faults in three phase supply system can affect the power system. To overcome this problem a system is built, which can sense these faults and automatically disconnects the supply to avoid large scale damage to the control gears in the grid sub-stations. In methodology, we collect the component and make circuit with the help of block diagram and basic components. Also, now we working on software to run or develop the whole program tomake complete model.

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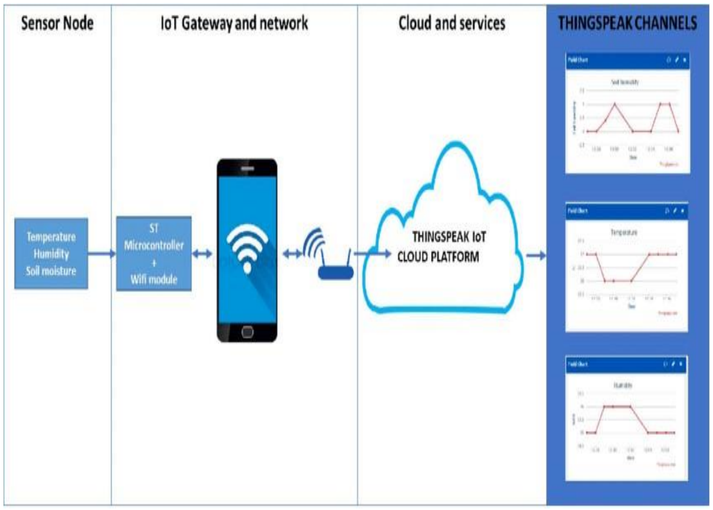
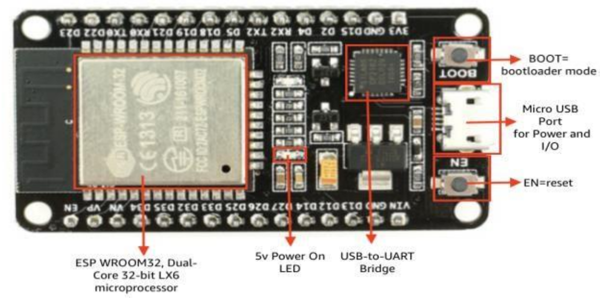


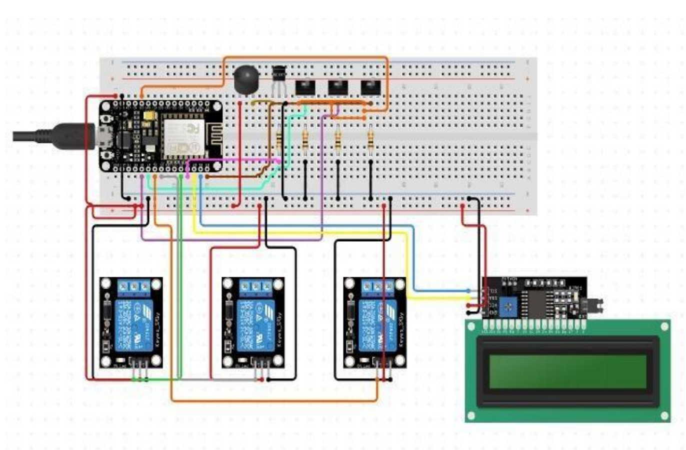


ESP32 is a low-cost, low-power Microcontroller with an integrated Wi-Fi and Bluetooth. It is the successor to the ESP8266 which is also a low-cost Wi-Fi microchip albeit with limited vastly limited functionality.

It is an integrated antenna and RF balun, power amplifier, low-noise amplifiers, filters, and power management module. The entire solution takes up the least amount of printed circuit board area. This board is used with 2.4 GHz dual-mode Wi-Fi and Bluetooth chips by TSMC 40nm low power technology, power and RF properties best, which is safe, reliable, and scale-able to a variety of applications.

MICROCONTROLLER

ESP32 is the SoC (System on Chip) microcontroller which has gained massive popularity recently. Whether the popularity of ESP32 grew because of the growth of IoT or whether IoT grew because of the introduction of ESP32 is debatable. If you know 10 people who have been part of the firmware development for any IoT device, chances are that 7–8 of them would have worked on ESP32 at some point.



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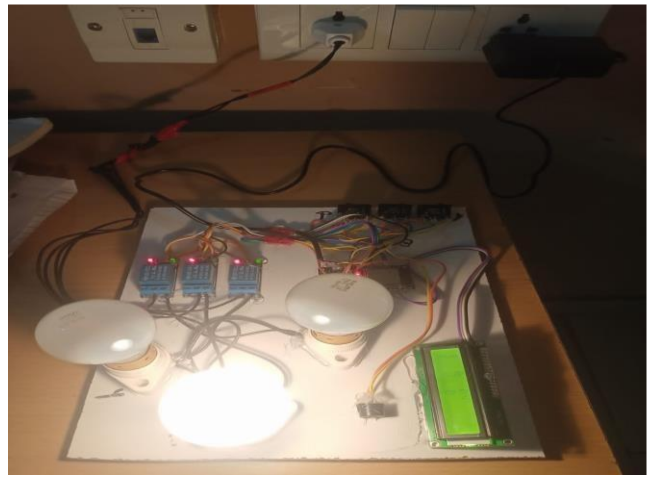
5. Advantages

This invention will accurately identify hazardous faults requiring line de- energization, and also accurately discriminates, or distinguishes, a hazardous faultfrom other events for which the line should remain energized. The invention encompasses such a load analysis system which minimizes unnecessary power service interruptions and outages. By using this system, the secondary arc current can be abruptly reduced. This system is even appropriate for long transmission line transmitting high voltage. A timer is also provided to identify weather the fault is temporaryor permanent. By doing so frequent tripping of the systemcan be avoided as temporary faults are self-correcting. An individual re-closure to every phase so that if there is fault in any one phase then that phase only is deactivated keeping the other phases in working condition.by doing so the efficiency of the system increases. This invention provides relatively low cost and reliable apparatus for the intended purpose.



6. Results

From the working model of our experiment, we were able to analyze the three-phase system fault by using individual 3 push switches as the system supply side. The project senses faults and displays on the LCD board about the fault. Also sends data to the IOT Thing speak Server via IOT Module. In case of a temporary fault, it trips the circuit for minimal time and re-establishes the connection. Whereas, in case of a permanent fault it trips it permanently.

7. Conclusions

In this system we automatically shift the phase if any phase absence. It tested on hardware with some trials and error conditions. We make some truth table for it and using truth table we checking failure condition anddepend on that condition we shift the phase automatically. The system operates smoothly as expected. It durable, portable and reliable. The costin developing it, makes it much affordable than comparable product**.**

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