

Precise Fault Location Detection Using IOT

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ABSTRACT

Transmission and distribution lines are used to transmit and distribute electrical power throughout load center. The problem with these lines are, because the loads are unbalanced and their attraction towards various faults as a results of lightning, short circuits, faulty equipment's, miss-operation, human errors, overload, and aging. To avoid this case and that we need the precise location of fault occurrence. To avoid this situation, we need the exact location of fault occurrence. This problem is handled by a set of resistors representing cable length in KMs and fault creation is made by a set of switches at every known KM to cross check the accuracy of the same. Only way to solve this problem is to come up with a mechanism that can detect the fault in an electricity transmission line automatically and intimate the authorities with a precise location. Through this project we develop a device that uses sensors to sense the incoming & outgoing values and detect healthy and faulty condition. And, the system will be integrated with IoT mechanism, to intimate the responsible people real time with the location information. Moreover technical losses occur naturally and are caused because of power dissipation in transmission lines, transformers, and other equipments. The system prevents the illegal usage of electricity.

Keywords : IOT, Relay, Node MCU, Cloud server

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I. INTRODUCTION

Any distribution network is probably going to induce faults, and on and off nature in power availability creates loss for the supplier moreover as user. Majorly, a route are often suffering from conditions of overvoltage over-current, under-voltage condition. To overcome this problem, IOT based system is developed which will detect the short in phase faults

online. It is known that when a fault occurs in an overhead conductor system then instantaneous changes in voltage and current at the purpose of fault generate high frequency. The fault impedance is low. The facility flow is diverted towards the fault and provide to the neighbouring zone is affected. It's important to detect the fault to earliest. The electrical power infrastructure is more vulnerable for many natural and malicious physical events which directly

affect the soundness of the grid there will be some parameter which are affected. With this, there is an approaching must to equip the old transmission line infrastructure with a high performance digital communication network that supports future operational requirements like real time record and control necessary for smart grid integration .The fault indicator technology has provided a versatile means to locate permanent faults, the technical crew and patrol teams still need to physically patrol and inspect the devices for gaint duration to detect faulty sections of their transmission lines. Wireless sensor based monitoring of transmission lines provides a solution for several of those issues like real time structural awareness, faster fault localization, accurate fault diagnosis by identification and difference of electrical faults from the mechanical faults, cost reduction, etc

II. LITERATURRE SUVERY

In India, plug load devices in building sectors are consuming close to 40 percent of the total electricity consumption. Though the share of plug load in building energy is increasing, very few studies exist on the plug level energy usage and consumption. In order to address the growing energy use of miscellaneous and electronic load (e.g. water heater), some measures need to be taken. Hence identifying needs, this project focuses on designing the devices that have built-in capability to measure and report the energy use or receive control input over the network. This study will help in creating energy awareness devices.

The design is based on a low-cost PZEM-004T, using non-invasive CT sensors,SD3004 electric energy measurement chip and ESP8266 Wemos D1 mini microcontroller for retrieving data from sensor nodes and sending data to server via internet. The experimental results showed that the developed energy monitoring system can successfully record the

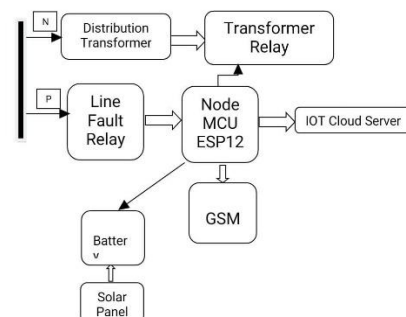
voltage, current, active power and accumulative power consumption.

The main constraints are accurate metering, energy monitoring and implementation of visual data for consumer load profile. This Project is intended in designing a system at home which monitors the energy consumption of each device, along with the smart energy meter, which is designed to calculate the total energy consumption of the home. All the data calculations will be handled by the Arduino energy meter for the accurate readings.

III. METHODOLOGY

The propsed methodology desires to inculcate the property of fault detection with precise location detected over the tremendously growing electrical network with the help of nodemcups-12 which is connected through relay and continuously receiving signals of healthy or faulty conditions of line, cloud server for sending alerts to registered GSM.

The 1 phases we connect fault switched which are use to short the phase, We can detect Phase to Neutral and Phase to Ground fault, Also we use fire sensor if any fire occur near distribution transformer we can detect it, As soon as any one phase shorted the signal goes to NodeMCU and SMS sent to concern person via Cloud.Also we can see the status of each phase online using IP address on the web browser. As shown in the diagram, NodeMCU is ESP12 controller having inbuilt wifi to connect internet.



IV. WORKING

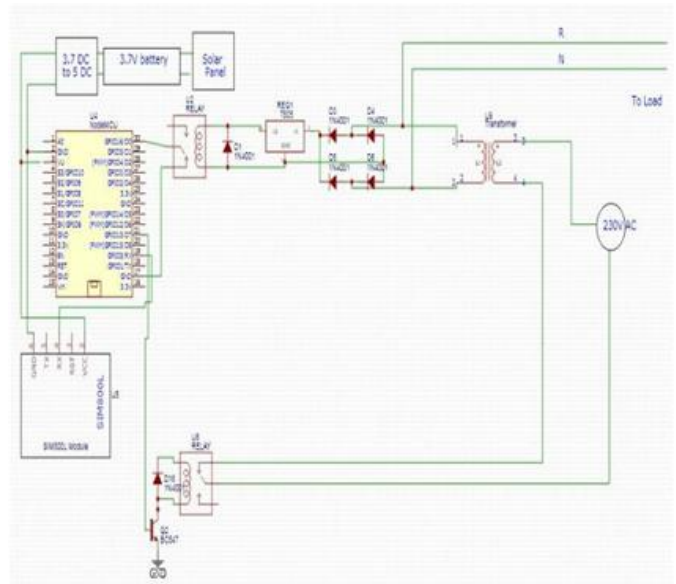
First of all ensure the Wi-Fi connectivity with the nodemcu Battery is required for the operation of nodemcu and so this battery will be recharged with the help of solar panel distribution transformer.

Is always energize with the electrical power supply that step down transformer of 230 volt/12 volt step down transformer will be required for the operation of the relay. Whenever the short-circuit or the line to ground fault occurs this activates the line fault sensing relay.

It gives signal to the nodemcu. then the nodemcu activates transformer relay which is connected in the series with transformer to disconnect.

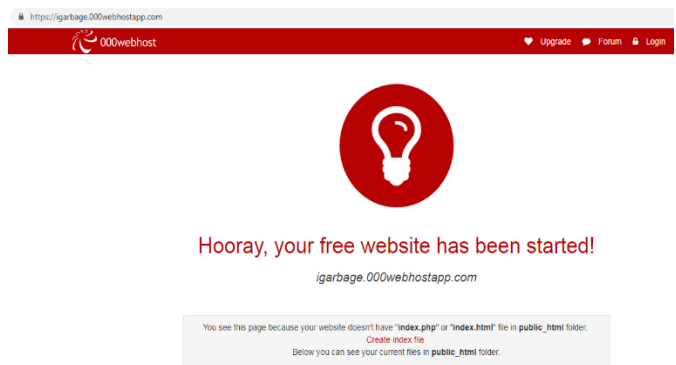
The transformer from the grid protection at the same time the alert that the fault has been occurred is transmitted through cloud server and this will give SMS to all the register system and authorised person will notified that the fault has been occurred.

In case if the error occurred in the cloud server due to any reason then we have a backup that is GSM this GSM is same as cloud server this will give the alert SMS to all the registered system the data of when the fall occurs where the fault occurred with its precise date time and location will be recorded in the website of cloud server and the authorised person can access it. As node and disconnect the distribution transformer from electric power magnitude of for and equipments is reduced.

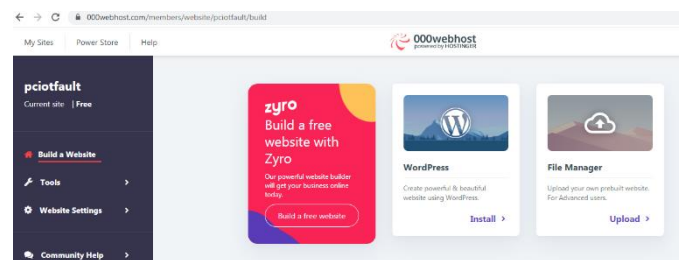


V. SOFTWARE

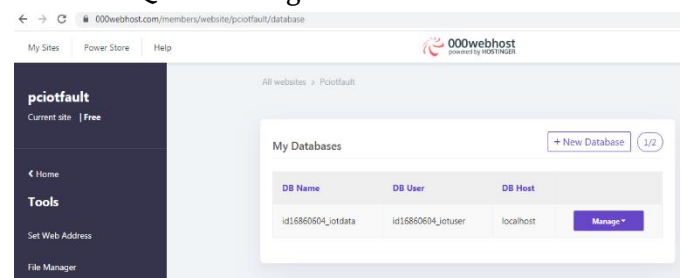
For this system we will be using online the cloud server **000webhost.com**



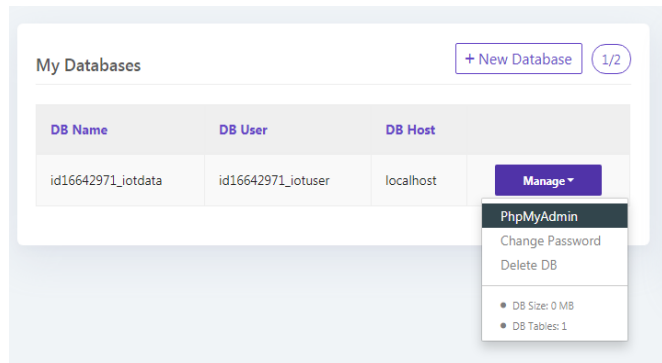
Login dashboard



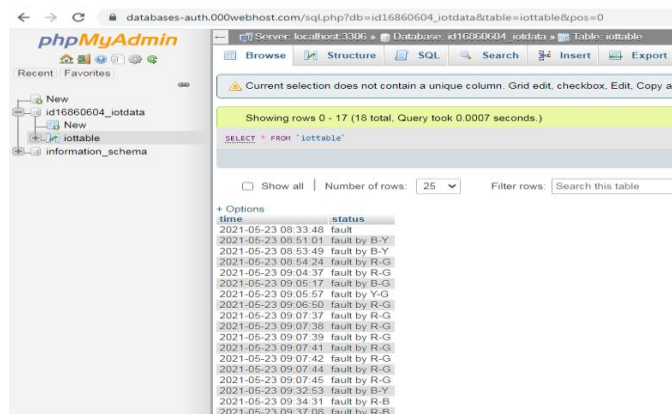
The MYSQL database generator



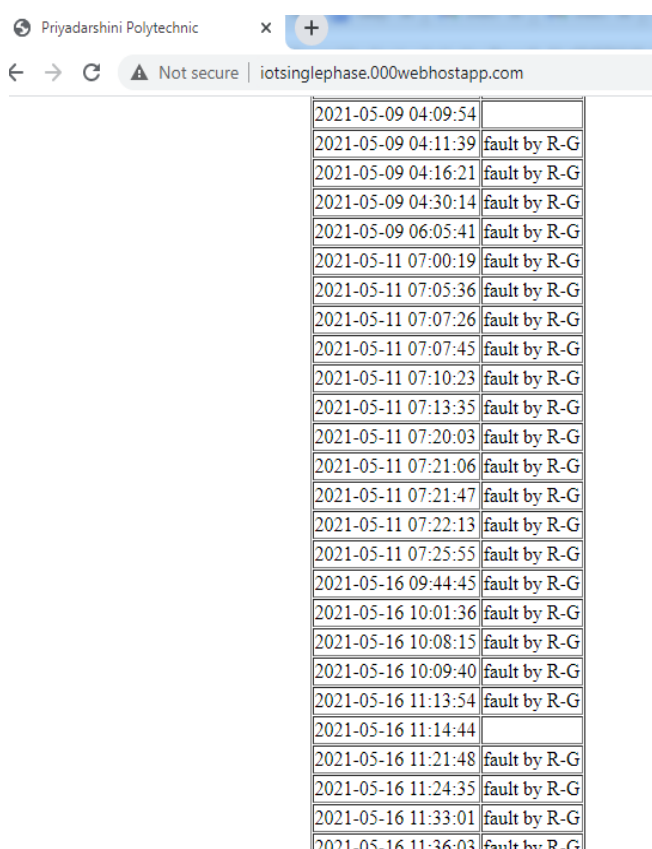
Go to Php My Admin



To create fields: time & Status and table in database



Cloud server output on website



VI. ADVANTAGE

- System is wireless
- Coverage Area can be increased
- Reliability of the system is more compares to the existing system
- Efficiency of the system is more compares to the existing system
- Economical to use

VII.APPLICATION

- To maintain the record
- In textile industries
- In Food industries
- Underground cable
- Transmission and distribution lines

VIII. CONCLUSION

The system is effective in the sense that a complete online supervision of the distribution transformer is accomplished through this system. The use of GSM modem helps in effective message signaling to the required receiver. It decides that the GSM technology used for the fault detection of three phase lines through calls and messages is given to the In-charges of that location, by the means of communication protection layouts. By using this system to get the exact faulty phase under abnormal conditions has happened. No other person can reclose the breaker before they finish their work. It is effective in providing safety to the working staff. It is money saving. It can be easily installed as an IoT based system so it can be monitored online.

IX. FUTURE SCOPE

- Under ground line faults detection.
- Data Loggndiing.
- In next some years GSM service can be added in this system to know Consumer, when fault occurred.

- The fault is automatically detected but by extending this we can automatically clear the fault in future.
- In Future any fault occurs can be auto corrected. So accident occurs due to wire fault can be reduces.

X. PROPOSED SYSTEM

The proposed system aims to utilize the cloud server website with the transmission lines so that the precise fault location can be detected. This method is economic friendly and also efficient method to restore electric connection in the premises. As this method is based on programming the efficiency and accuracy of this system automatically increases.

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