

# Real Time Protection for Power Line using OTP

UG Student  
P.Priyadharshini

UG Student  
P.Swetha

UG Student  
S.Yageshwaran

Asst. Prof.  
B.Dhinesh

Department of EEE, Knowledge Institute of Technology, Salem.

**Abstract** – Safety is one of the primary objective of every human life. In order to enhance the safety measure of the line man this project i.e, Real time Protection for Power line using OTP provide solution. It save the life of line man who is working on the power line during repair. Real-time power line protection uses finger print verification and OTP based password generation. In normal, the power line is turned ON/OFF by using the lever, the updated version of this project is password based system. The password can be misused by some unauthorized person knowingly or unknowingly. In order to verify the accessing person, the fingerprint of that person is scanned using fingerprint scanner which provides the solution.

**Keywords** – Safety measure, OTP, Raspberry pi, Password, fingerprint scanner, GSM module.

## I. INTRODUCTION

In our developing world, to save the life of human being is an essential one. The technology has improved a lot, but a small unseen and careless electrical faults may leads to the loss of valuable human life. To avoid this kind of electrical hazards, this project provides a solution. Due to these kind of small careless Mistake, we are supposed to lack a life of human being. The real time powerline protection makes sure that the person who is working on the line is in safe, and it totally avoids the misscommunication, Unauthorised access. Almost everything has comes under digitalization. In order to make power line protection, a digital one, the real time powerline protection project uses finger print scanner and OTP based password generation. These OTP based password generation is highly encrypted and it could not be misused by unauthorized person. In normal system, the fixed password may be misused by others but OTP verification avoid such kind of unauthorized access. Nowadays passwords can be misused, but Finger print which is biometric scanning can never be misused. in order to make the power line system, a highly securable and reliable one, this project. i.e, Real-time protection for power line using OTP provides a standard solution for the safety of line man.

## II. LITERATURE SURVEY

**M.Sanmugapriya** et al proposed this system is an automatic control of circuit breaker with a biometric authentication technology i.e., fingerprint scanner so anyone can makes use of digital content in a full secured manner. This module is serially connected to the pre-programmed open source software.

Since every person has a unique fingerprint only the person who has an authority can access the system in addition to this RFID tag is also used to gain access.

**Olalekan Oyebola** has described a article named Password based electrical load switchgear to carry out the safety maintenance process for lineman. According to this article the switch gear which is a combination on fuse, circuit breaker etc. can act as auto-change over using password. It is a main task that provide new approach to the lineman.

**Mallikarjun G Hudedmani** proposed the system that demonstrates the lineman and electrical equipment security by changing the status of circuit breaker or specified control panels during overload condition. The password is send from control room based on the request of particular area operator. The Arduino UNO is interfaced with GSM, keypad, and stepper motor and operates based on the program implemented in microcontroller. This system provides greater assurance for human resources.

**N.Mathavan** and his team have described the system that ensures the safety of working lineman during rectification process using QR code based password with the help of android app .It check and send the password to the controller via Bluetooth. So the system is secured due to two verification process cannot be misused by unknown person.

**M.Mane Kirti** has described that the accidental disaster that might carried out due to overload or short circuit is prevented before causing the major issue with the help of circuit breaker. This circuit breaker can be miss leded by the unauthorized person.so through their project they brought a solution with a fixed password based circuit breaker so the operator is sheltered.

**MD Wasiq Raza** et al described that due to communication lack and coordination quandary there may be an electrical accident which causes deep trouble to the lineman. This proposed system provide a solution that can ensures the safety of worker.It consistsof a password that can be randomly changed by the user.If the person enters

the wrong password alert system is also provisioned which is indicated by the lamp. So the entire process is controllable only by the user i.e., lineman.

**Vaibhav Kamble et al** proposed this system that describes one of the lineman safety methods. In this system the password can be entered through the keypad that is fixed in a digital locking system or can be entered through the keypad in registered number of android mobile phones in microcontroller via GSM mode. The operation can also be automated with the help of SCADA in order to extend the safety measure.

**Yas pal gautam** describes that this system can be used in electrical substations to ensure the maintenance staff safety. It is smaller than a fuse in size. The specialized part of this system is the GSM module which sends the SMS about the current scenario of the line or transformer. Its main concept is to reduce cost and time so that it can be implemented all over the nation.

**C. Pearlina kamalini et al** describes the system that reduces electrical-based accidents along with this load sharing concept is also furnished. To overcome the load sharing problem, it mainly focuses on rural areas and city areas. So the required voltage is transferred between both areas vice versa to reduce the electrical load demand.

### III. BLOCK DIAGRAM

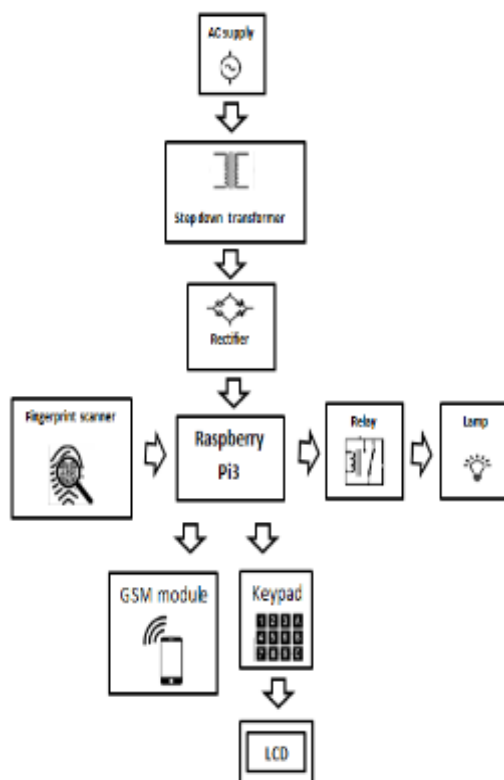


Fig.3.1. Block Diagram.

### IV. DESCRIPTION OF PROPOSED METHOD

In this proposed system the incoming AC supply voltage is stepped down from 230V to 12V with a stepdown transformer and converted into pulsating DC with four diodes forming a bridge rectifier. There should be no common connection between AC and DC. Now both the supply is turned ON so the power is supplied to the entire device connected in the system. Initially the fingerprint scanner scans the fingerprint of the operator; if it matches the registered one, the operator can turn OFF the supply by pressing the "\*" button in the given 4\*4 keypad, and the notification about the working process, location is sent to the registered mobile number i.e., to the higher official and operator through the GSM module. If the fingerprint is unmatched or an unknown person tries to operate the system, the notification is sent as unwanted access. After this, the operator can undergo the working process with full security. After completing the working process, the user presses the ON button, so the OTP is generated in the android phone that generated a four-pin code, which is again entered in the keypad. This password is compared with the generated password; if it is correct, then with the help of the relay, the lamp i.e., single phase or three phase transformer is turned ON successfully. The main concept of this project is OTP because it generates a random password every time. Since this proposed system has two verification processes, the operation is highly secured.

#### 4.1 Stepdown transformer :

In our day-to-day life, every electrical and electronics that we use will require power supply. Generally, we use AC supply of 230V 50 Hz and have to be changed based on our requirements. The step-down transformer converts the incoming 230V supply on the primary side to 12V on the secondary side, which acts as a supply. This is frequently used for developing many embedded systems' based projects and kits used in real-time applications.

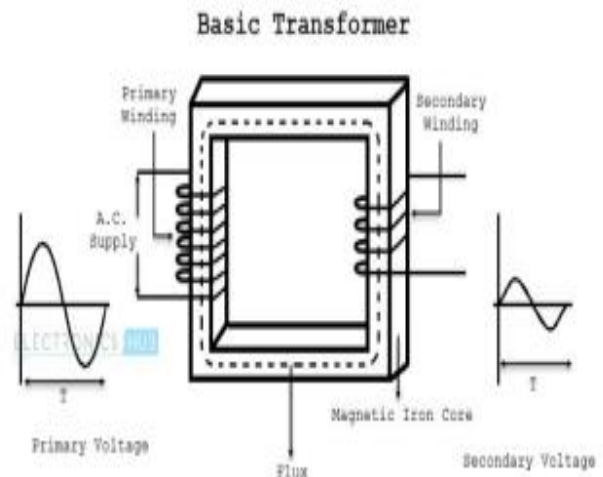


Fig.4.1. Transformer.

#### 4.2 Rectifier:

The 12v AC from a transformer is given to the rectifier. It acts as a Alternating Current (AC) to Direct Current (DC) converter that rectifies mains AC input to DC output. It provide necessary DC voltage for the electronic components or devices. They are constructed with four or more diodes or with some controlled solid state switches. Depending on load current requirements and other consideration such as rating, temperature, specifications etc. are also taken into account. The out coming 12v dc supply is given to the raspberry pi3.

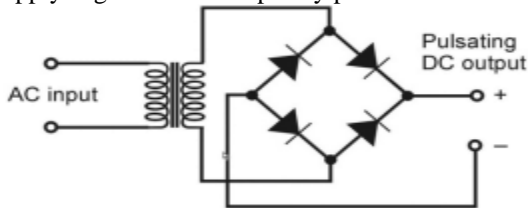


Fig. 4.2. Rectifier.

#### 4.3 Raspberry pi:

Here we use the latest version raspberry pi3 which is small in size that might be used inside the PC or laptop instead of CPU. Once all the cable is plugged in it becomes the easiest way for user to run after down loading the NOOBS (New-Out-Of-Box Software) installer. After downloading it also guide or instruct how to install the OS on the pi. The quad-core Raspberry Pi 3 is both faster and more capable than Raspberry Pi 2. This board can also booted directly from a USB connected hard drive or pen drive, other than this it can also support booting from network attached file system, with PXE, that is useful for updating and for sharing an OS image between multiple machines.



Figure 4.3:Raspberry pi3

#### 4.4 GSM module:

GSM(Global System for Mobile communication) is a mobile communication modem and it is an open ,digital cellular technology for transmitting mobile voice and data services at 850MHZ,900MHZ,1200MHZ ect., frequency bands. In this we use the sim8001 module that supports quad band GSM network. This cellular chip act as a heart of the module and the operating voltage may vary from 3.4v to 4.4v .

The module consists of external antenna to link a network. Through this we can establish communication between a mobile device and computing machine i.e.

sending and receiving of SMS message. It is interfaced with raspberry pi3 and work based on the command or program installed in raspberry chipboard. Other than this it also has an in-built level translation. It is a dedicated modem device along with serial port, USB or Bluetooth connection.



Fig.4.3. GSM module 8001.

#### 4.5 Relay:

It is an electrically operated switch and consists of any number of contacts in multiple contact forms i.e. make contacts, break contacts etc., Relay is an independent low power signal to control a circuit. The traditional relay uses electromagnet in order to open and closes the contact and the solid state relay uses semiconductor properties without moving parts. It automatically cut or connects the supply part to the transformer.



Fig.4.5. Relay.

#### 4.6 LCD:

It is a flat panel display that uses the properties of liquid crystal with polarizers. Based on the condition implemented in the raspberry pi the content will be displayed in the screen such as about working status.



Fig.4.6. LCD.

#### 4.7 Keypad:

In this proposed system we use 4\*4 matrix keypad. The 4 pin password generated via GSM is entered. This keypad is interfaced to the raspberry pi so the entered password is compared with generated password.



Fig.4.7. Keypad.

## V. FLOWCHART

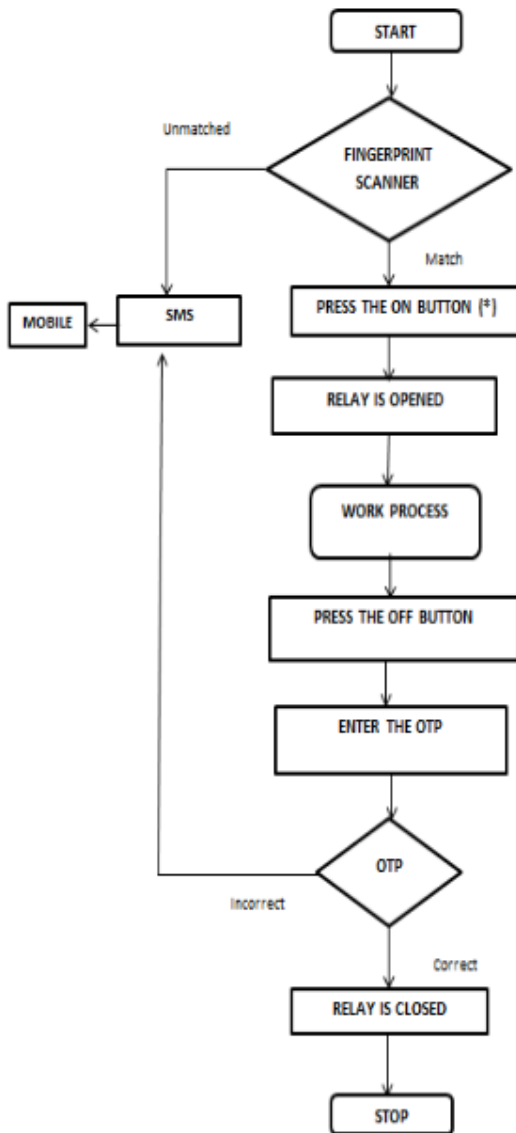


Fig.5.1. Process in flowchart.

## VI. ALGORITHM

- STEP 1: Start the program.  
 STEP 2: Check the finger print of the authorized person if it is matched go to step 4. If it is not matched go to step 3.  
 STEP 3: Send the notification SMS to authorized person.  
 STEP 4: Press the star button “\*” in the keypad in order to turn OFF the supply by opening the relay.  
 STEP 5: Undergo working process.  
 STEP 6: Press the ON button to turn ON the supply  
 STEP 7: Enter the OTP in the keypad. If the password is correct relay is closed. Else to step 8  
 STEP 8: Send SMS to the registered number via GSM.

## VII. OUTPUT

We proposed a system that ensures the safety measure of line operator with digital lock system. Finger print scanner senses the operator finger print and conform. By pressing the STAR button the supply is clipped and after entering the four pin password again the supply is fixed.

## VIII. CONCLUSION

This proposed system gives a solution that ensures the safety of the lineman/maintenance staff. The full process control (ON/OFF) lies on the operator hand only so he can turn off the supply and work or repair comfortably. It is designed to control a relay automatically with the help OTP password. Since it has two verification process this approach is new and can be implemented in public area which is safe secure with minimum cost.

## REFERENCE

- [1]. Electronic Circuit breaker for lineman safety using finger print scanner-Asian Journal of Applied Science and Technology(AJAST)/Volume 2, Issue 2, Pages 686-691, April-June 2018.
- [2]. Password Based Electric Load Switching Gear for the Safety of Lineman-International Journal of Engineering Science Technology /Volume.1(1), ISSN-2456-8651, January 2017.
- [3]. Password Based Distribution Panel and Circuit Breaker Operation for the Safety of Lineman during Maintenance Work-Advanced Journal of Graduate Research/Volume 1, Issue 1, pp.35-39, ISSN:2456-7108, January 2017.
- [4]. Electric Line Man Safety using Android based Circuit Breaker-International Journal of Recent Trends in Engineering and Research/ISSN:2455-1457, 2019.
- [5]. Password Based Circuit Breaker With GSM Module-International Journal of Advance Research, Ideas and Innovation in Technology/Volume 3, Issue 3, ISSN:2454-132X, 2017.
- [6]. Electric Lineman Protection Using User Changeable Password Based Circuit Breaker-International Journal of Current Engineering and Scientific Research/Volume 2, Issue 5, ISSN:2393-8374, 2015.
- [7]. Electric Lineman Protection Using Keypad and GSM Based Circuit Breaker-International Journal of Innovations in Engineering Research and Technology (IJIERT)/Volume 5, Issue 4, ISSN:2394-3696, April 2018.