

DEVELOPMENT OF PASSWORD BASED CIRCUIT BREAKER USING WEB FOR LINEMAN SAFETY

Pranesh.G. Narasapur¹, Raghavendra.P.Kalasappagol², Satish.K.Rathod³, Sushant.S.Badiger⁴, Prof. Mallikajun Bhagawati⁵

^{1,2,3,4}students, Dept of Electrical and Electronics Engineering. SGBIT Belagavi, Karnataka, India

⁵Assistant Professor, Dept of Electrical and Electronics Engineering. SGBIT Belagavi, Karnataka, India

ABSTRACT

Today, electrical hazards on the lineman are increasing, while repairing power lines due to a lack of communication between the power station and repair workers. This project is designed in such a way that the repair staff or lineman must enter a password (one-time password) on / off the circuit breaker using the web. After repairing the faulty line enter the one time password in web by a one staff worker, after another location fault cleared by another staff he can enter another OTP, than line will get charged, unless an until it will not charge. Both location persons should enter the OTP.

Keywords: Node MCU (ESP8266), ACS712 Current Sensor, HTML, GSM RS232, Relay 5V, LCD Display 16*2.

I. INTRODUCTION

In a recent survey, apart from the gears of safety and leading to the deaths of hundreds of people who die every year in India. Security is a major concern in our daily lives. Everyone needs to protect as much as possible. The electronic lineman security system is designed to control the password of the circuit breaker (one time password) using the web for lineman security. Now if an faults occurs in the power line, the circuit breaker isolate, then it will be trip. At that time GSM sent OTP to repair staff. Lineman can properly configure the power line, and after clearing the fault, the line man enter OTP on the server (WEB page). Then the relay will be switch and the supply is ON to a specific line

II. COMPONENTS

1. Node Mcu-ESP8266

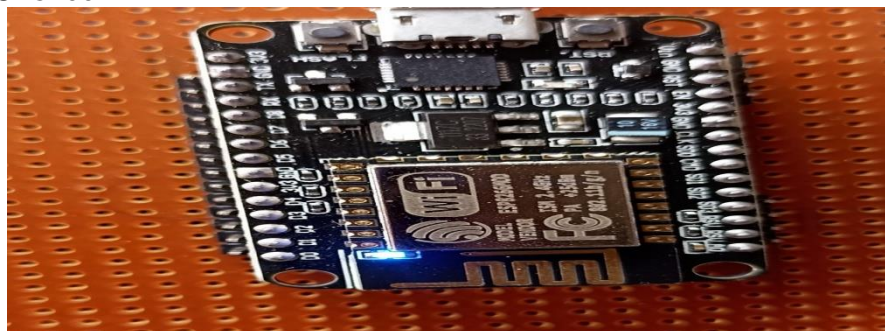


Fig.1: ESP8266 Wi-Fi

ESP8266 is a less expensive Wi-Fi module. Has 4MB flash memory, power: 3.3 V DC. It is the heart of our project used to collect data from Sensor and GSM, the Wi-Fi module comes with 64 KB boot ROM, 80 KB user data, and 32 KB command RAM. The processor of this module is based on Ten silica Xtensa Diamond Standard 106 micro and operates easily at 80 MHz The ESP8266 Wi-Fi acts as a microcontroller host, and can be used as a Wi-Fi adapter on any small controller.

2. ACS712 Current Sensor

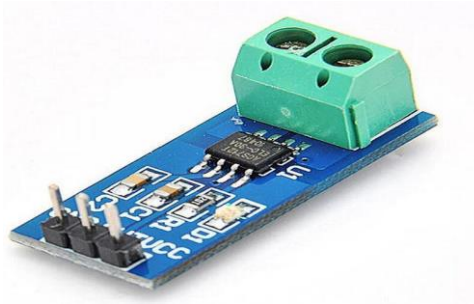


Fig.2: ACS712 Sensor

Current sensors provide an accurate and stable current rating of up to 120A or 31mT respectively. We provide sensors with integrated current low frequency rail and current current medium to high frequency rail.

3. GSM –RS232 Module



Fig.3: GSM module

The GSM Module is a device that uses mobile technology to provide a wireless data link to a network. In this project it helps to send a one-time password to the repair staff after a circuit breaker trip.

4 . Relay 5v



Fig.4 relay 5v

Relay Module is a simple board that can be used to control high voltage, high current load such as motor, solenoid valves, lamps and AC load. power supply: 3.5V to 5.5V. In this project the relay acts as a switch (Crcuit breaker).

5. LCD DISPLAY 16*2

16x2 LCD means it can produce 16 characters per line and there are 2 such lines. On this LCD each character is displayed on a matrix of 5x7 pixels.



Fig: 16*2 LCD display

6. HTML

It is the heart of the project. HTML is a common language for creating web pages. Declaring `<!DOCTYPE html>` states that this document is an HTML5 document, The `<html>` section is the root of the HTML page. The element `<text>` specifies the text message of the HTML page, the `<h1>` element defines the main heading, the `<p>` element defines the category.

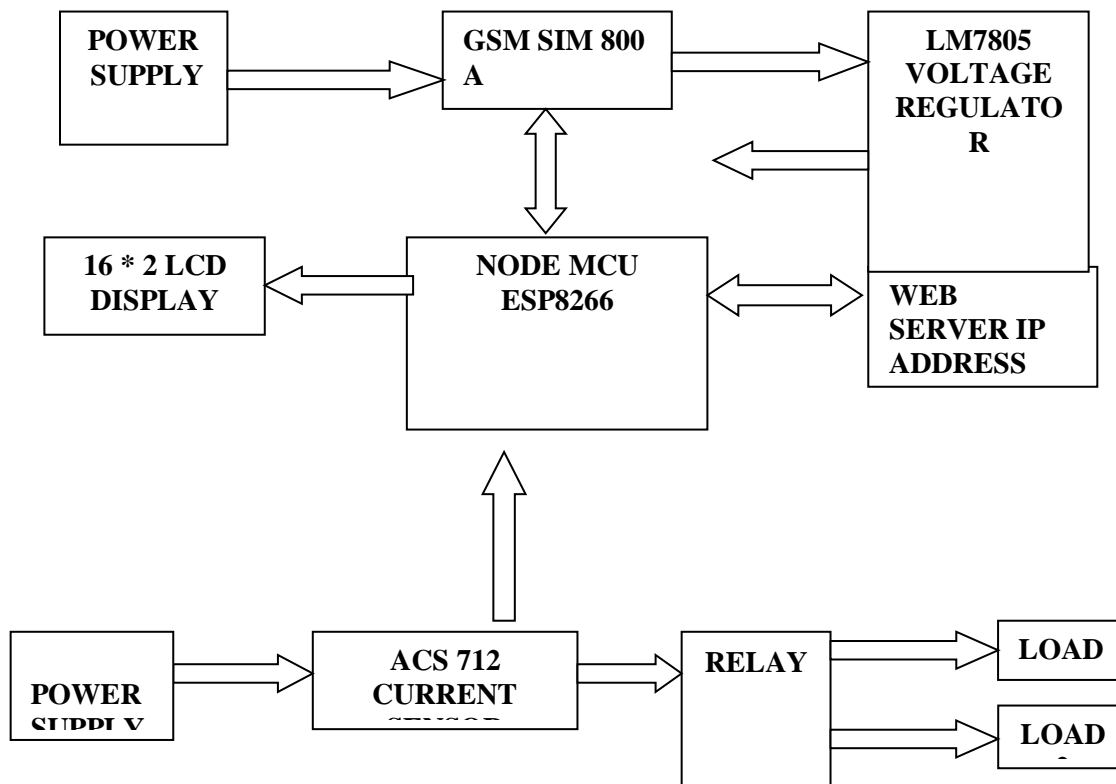
7. VOLTAGE REGULATOR (LM7805)



Fig.7 LM7805

Regulator 7805 is a 5v power controller that limits the output voltage to 5v output at a wide range of input power. It works as an excellent component against electrical input variables in circuits and adds extra space to the circuit.

III. METHODOLOGY



When system ON in stable condition, it will be shown in display as “system stable” & message will send to the respective login mobile numbers as “Substation online” by GSM. Current sensor ACS712 & relay are connected in series. In normal condition current will be read by sensor. When fault occurs in line if it exceeds the current sensor setting value it will be read by microcontroller. After reading value the microcontroller will high the one pin it makes the normal close to normal open (relay will be high). The transistor will ON the relay, at the same time OTP (password) will send to the line man through the GSM. After fault clearing, respective line man is login to the IP server & submits the OTP. The microcontroller will compare the submitted OTP and stored OTP’s. If both OTP’s are same then relay will switch. If some time after the closing of relay the fault will not cleared then relay will open & again sending the different OTP to the line man.

IV. RESULT

This function may be to ensure the safety of repair workers, e.g. Line man. The line can only close the line. This application provides an application that OTP is required for using the circuit breaker. The line man can adjust it correctly, and then close the line by installing OTP. As it has OTP access.

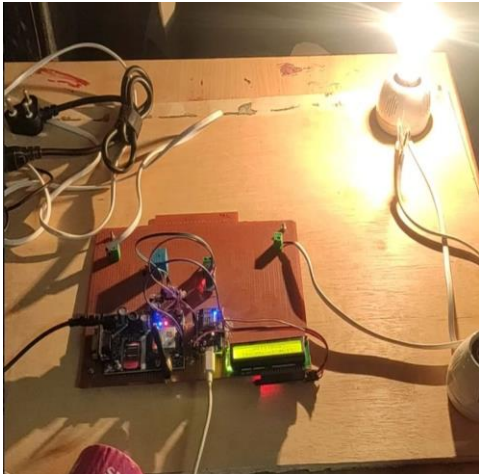


Fig: At normal condition



Fig: when abnormal condition

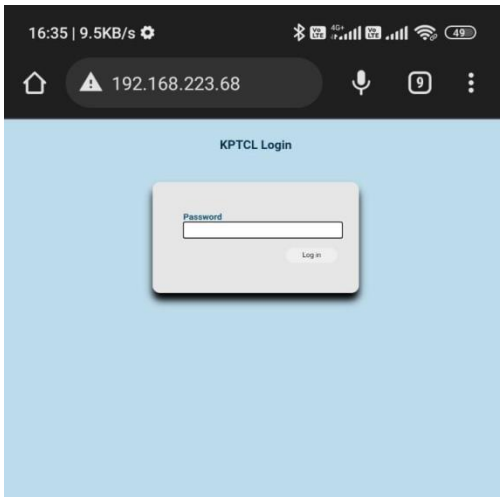


Fig: Login to the web page

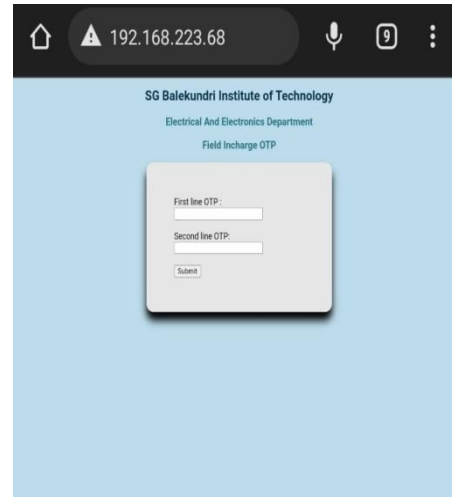


Fig: Entering OTP on the fault location

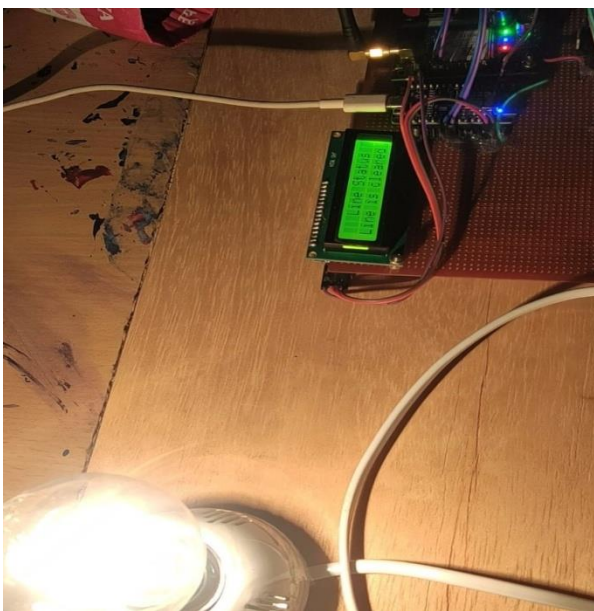


Fig: After clearing fault



V. CONCLUSION

It completely eliminates the miscommunication between substation staff and maintenance staff. When fault occurs in lines directly trips the relay. The message and OTP send to the lineman through GSM. After clearing the fault lineman login to the web page and submit the OTP. If the both OTP's are correct then relay will be switching otherwise, in web page it will be shown as OTP is wrong.

VII. FUTURE SCOPE

This paper can be extended for many electrical lines can be controlled using corresponding area line man. The power usage in these electrical lines all together can be uploaded in single server for monitoring purpose. The ON/OFF Time information about the particular electrical line can be sent through SMS to the corresponding users mobile.

REFERENCES

1. Shubam J “OTP circuit breaker for line man safety and maintenance”,-ISSN 2018
2. Gautam et.al “Password –Based Distribution Panel and Circuit Breaker with GSM module”.-ISSN 2016
3. J Veena, G Srivani “Electric lineman protection changeable password base breaker”.-SREC
4. “Electric Line man safety using micro controller”-IJSRD 2016.
5. MR Tarun N “password based circuit braker”. – IJIR2017.