

Iot Based Pole Safety Management

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Abstract - Most of the times in TV, Newspapers

we read and hear that someone died in electrical pole accidents and it may be a child, student, farmers, animals etc. Thus we need a solution to avoid accidents due to electric broken lines. Also many times in rainy seasons voltage on street light pole is comes in contact with metal pole and this pole is now very harmful because if someone touches that pole then due to high current this parson becomes died.

Key Words: ESP-38 microcotroller, Voltage sensor and voice module and current sensor, LCD display.

1.INTRODUCTION

Now days, street lights are the most important aspect of the city as it leads to most of accident due to low light. Lightning creates large amount of load when used it office and large complexes. The energy saving prospective is often ignored. According to a study about 440MW of power is spent in India on street lightning. Therefore, the street lamps are relatively but with the development of urbanization, the numbers of streets increasing rapidly with high traffic density, to detect the faults in lamps at remote location. To obtain a sizable reduction of the energy intake in lights and contribute to the supportable improvement. It will also make a large contribution to the safety and security of the metropolis roads via presenting pole inclination detection where if the pole beyond a fixed threshold value due to any environmental impact or human involvement then it will without delay intimate the concerned officials. Also, an over current situation may cause short circuiting which may leads to incurable misfortunes. Thus, sensors are used to detect the current flow in order to avoid any disasters.

2. LITERATURE REVIEW

In this system, a modification to existing power distribution system with remote telemetry unit for wire break detection and a power supply breaking mechanism. The circuit breaker with shunt trip mechanism breaks the supply and avoids damages from electrical accidents due to overhead transmission lines conductor breakage problems which will operate on open circuit principle rather than short circuit. Integration of supervisory control and data acquit ion (SCADA) based distributed monitoring and control system with Remote Telemetry Unit (RTU) with open circuit detection technique they used[1]

In this paper, they introduce new technique to detect the faults on EHV electrical lines up to and above 800 KV up to now PLCC and SCADA used for distance protection of EHV lines. Now, they used GPS (Global Positioning System) for detecting the EHV faults. GPS plays important role in electric power system, the inter connection of AC Grid through AC tie line[2]

The OTP based lineman security system introduce with the use of GSM and microcontroller to generate and store one time password. Like in mobile communication, GSM module helps to communicate lineman with the power station to control the lines. When the user put a request, the system generates passwords and a relay switches to turn ON or OFF the circuit breaker. OTP plays a major role in this system. The one-time passwords mean the generated passwords are different at each time and also the activation or deactivation of the circuit breaker is indicating by a lamp (ON/OFF).[3]

3. SYSTEM DETAILS

While developing pole safety mangment system

1. Deciding system specifications i.e. Block diagram
2. Selection of system components
3. Power supply arragment
4. Simulation of circuit
5. Design of PCB layout
6. Manufacturing of PCB layout
7. Introduction of list of compont
8. Testing and troubleshooting of hardware

4. BlockDiagram

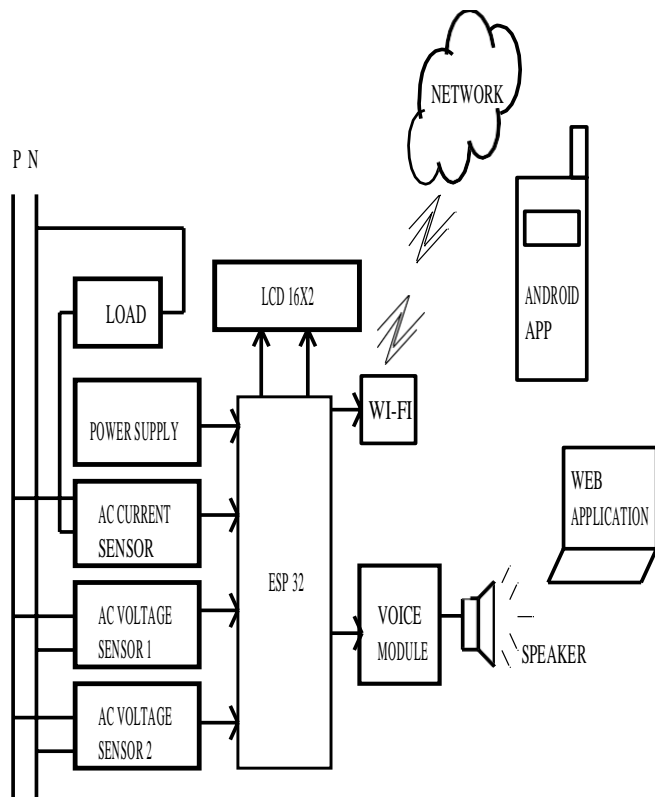


Fig .1 BlockDiagram

In our system, we will manually switch the line will be shorted with the pole and at a time our pole will become faulty so that we will see the output that the pole is faulty on our LCD display and as well as on MSEB server via application or web server. If the voltage rate or current rate gets high then through voice module, administrator or lineman get announcement in their native language and

they will take action accordingly. The following content will explain of block diag.

Electric Pole under monitoring Voltage sensor1 to detect where pole isdefected or not Voltage Sensor2 is used to measure the voltageacross a line

Current Sensor is used to measure the Currentacross a line

Microcontroller to control all the process ofsystem

LCD Display to display the status of electric pole

Voice module to announce the emergency message to alert the people

IOT module to send the message of pole faultwith location

5. SYSTEM DESIGN

Microcontroller

ESP32 Development board is based on the ESP WROOM32 WIFI + BLE Module. This is the latest generation of ESP32 IoT development module. This development board breaks out all ESP32 modules pins into 0.1" header and also provides a 3.3 Volt power regulator, Reset and programming button and an onboard CP2102 USB to TTL converter for programming directly via USB port. At the core of this module is the ESP32 chip, which is designed to be scalable and adaptive. ESP32 integrates a rich set of peripherals, ranging from capacitive touch sensors, Hall sensors, low- noise sense amplifiers, SD card interface, Ethernet, high-speed SDIO/SPI, UART, and I²C.

sensors, Hall sensors, low-noise sense amplifiers, SD card interface, Ethernet, high- speed SDIO/SPI, UART, and I²C.Using Bluetooth, users can connect to their phone or broadcast low energy beacons for its detection. The use of Wi-Fi enables a large physical range, as well as a direct connection to the internet via a Wi-Fi router. Perfect for wearable electronic or battery powered applications, the ESP32 chip uses less than 5μA.



Fig.2 ESP – 32 Microcontrollers

ESP32 is created by **Espressif Systems** with a series of SoC (System on a Chip) and modules which are low cost with low power consumption. This new ESP32 is the successor to the well-known ESP8266 (became very popular with its inbuilt WiFi). ESP32 not only has Built in **WiFi** but also has **Bluetooth** and **Bluetooth Low Energy**. In other words we can define ESP32 as “ESP8266 on Steroids”. ESP32 chip **ESP32-D0WDQ6** is based on a **Tensilica Xtensa LX6 dual core** microprocessor with an operating frequency of up to 240 MHz. The small ESP32 package has a high level of integrations such as:

6 RESULTS

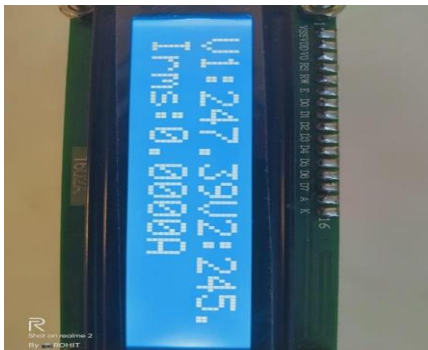


Fig. 3 LCD display Result



Fig.4 hardware result full safety management

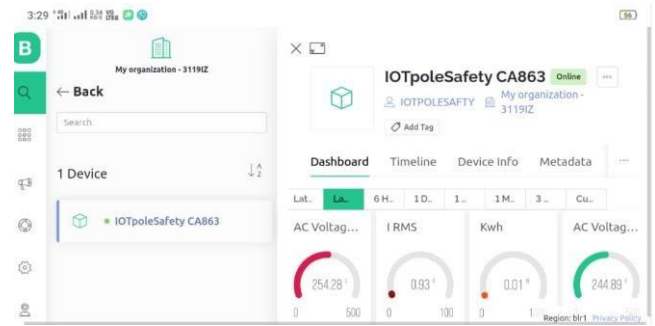


Fig.5 Webpage Result



Blink IOT result

7 Advantages

It reduced pole accidents.

Due to voice announcement illiterate people can also aware from the faulty pole.

LCD provides the real time current and voltage ratings.

Easy to set up.

Manpower dependency is less.

In case line break quickly detect it.

7. CONCLUSION

The automatic detection of broken electrical lines of the electrical pole and also automatic power supply disconnection is very useful to avoid electrical shock hazards. Also, it is very easy to detect the location where the electrical lines are broken through a local network using Wi-Fi technology and also the wireless communication technology issued for the detection of broken electrical lines that can be used over years and years without any maintenance. If any malfunction occurs in the system and if automatic power supply disconnection is failed then we can use a password based electrical line disconnection system which is localized i.e., only authorized lineman who knows the password can disconnect the electrical line locally for certain number of poles without affecting the main station power supply.

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