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Password Based Circuit Breaker

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Abstract: Now a days, electrical accidents to the line man are increasing, while repairing the electrical lines dua to the lack of communication between the electrical substation and maintenance staff. This project gives a solution to this problem to ensure line man safety. In this proposed system the control (ON/OFF) of the electrical lines lies with line man. This project is arranged in such a way that maintenance staff or line man has to enter the password ON/OFF the electrical line.
Now if there is any fault in electrical line then line man will switch off the power supply to the line by entering password and comfortably repair the electrical line, and after coming to the substation line man switch on the supply to the particular line by entering the password.
Keywords: Line man; Arduino; Keypad; circuit breaker; Relay; LCD; Plywood; Jumper wires;

I. INTRODUCTION

Nowadays, electrical accidents to the line man are increasing, while repairing the electrical lines due to the lack of communication between the electrical substation and maintenance staff.
This project gives a solution to this problem to ensure line man safety. In this proposed system the control (ON/OFF) of the electrical lines lies with line man. This project is arranged in such a way that maintenance staff or line man has to enter the password to ON/OFF the electrical line.
Now if there is any fault in electrical line then line man will switch off the power supply to the line by entering password and comfortably repair the electrical line, and after coming to the substation line man switch on the supply to the particular line by entering the password.
The entered password is compared with the password store in the ROM of the microcontroller. If the entered password is correct, then only the line can be turn ON/OFF. Activation or deactivation of the circuit breaker is indicated by a lamp (ON/OFF). This project is designed to operate the system by only authorized person to avoid such accidents.
Electricity transmitted through power lines destined for commercial, industrial and residential use can involve hundreds of thousands of volts and high currents. Inevitably, there is an element of danger in measuring the voltage on a transmission line because of the need controlling the electrical line with help of a password. Now a days electrical accidents to the line men are increasing while repairing the electrical lines. This is due to the lack of proper communication between the electrical sub-station and the maintenance staff. This project gives a solution to this problem to ensure the safety of the line man. In this proposed project work, the control (ON/OFF) of the electrical line lies with the line man. The concept is designed such that maintenance staff or the line man has to enter the password to switch ON/OFF the electrical line.

1) Save the life of line man.
2) User friendly operation of main line.
3) Easy to install and operate. Cost effective.
4) Easy to maintain and repair

II. LITERATURE REVIEW

A. Problem Identified

Nowadays, the current power system deals with huge power network as well as associated power network as well as associated electrical equipment. During the electrical fault or short circuit, the power network will suffer from a high stress of fault current in them which may harm the equipment permanently.
For conserving the power networks and equipment, the fault current should be very cleared from the system as fast as possible. Now a days electrical accidents to the line men are increasing while repairing the electrical lines. This is due to the lack of proper communication between the electrical sub-station and the maintenance staff. This project gives a solution to this problem to ensure the safety of the line man.

B. Proposed System

This project gives a solution to this problem to ensure the safety of the line man. In this proposed project work, the control (ON/OFF) of the electrical line lies with the line man. The concept is designed such that maintenance staff or the line man has to enter the password to switch ON/OFF the electrical line.

III. SYSTEM DESIGN

A. Hardware Description

1) Arduino UNO Board

The Arduino Uno is one kind of microcontroller board based on ATmega328, and Uno is an Italian term which means one. This board includes digital I/O pins-14, a power jack, analog I/ps-6, ceramic resonator-A16 MHz, a USB connection, an RST button, and an ICSP header. All these can support the microcontroller for further operation by connecting this board to the computer. The power supply of this board can be done with the help of an AC to DC adapter, a USB cable, otherwise a battery.

2) Relay

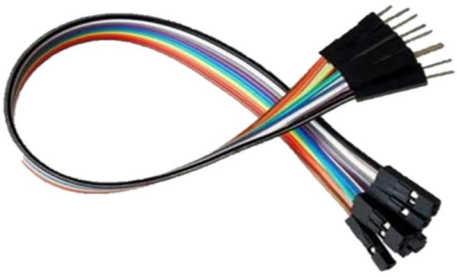
A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal.

3) Keypad

A keypad is a set of buttons arranged in a block or "pad" which bear digits, symbols or alphabetical letters. Pads mostly containing numbers are called a numeric keypad.

4) Connecting Wires

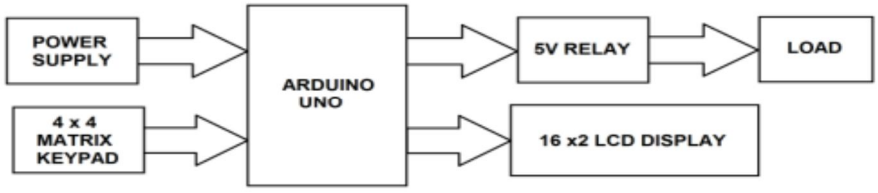
- A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"),
- which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.



5) Lamp

- Used in electrical substation to ensure line man safety.
- This system is used in buildings and house.
- Used in hotels and shopping malls to save the power.

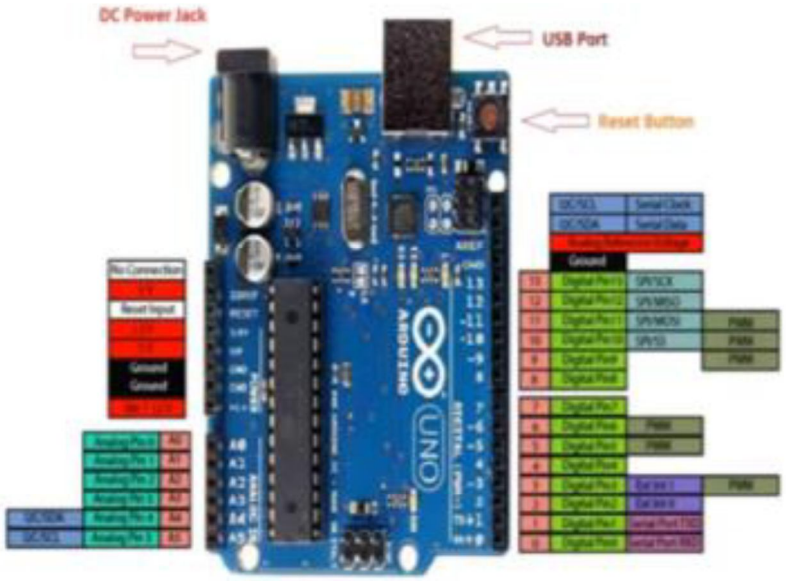
IV. BLOCK DIAGRAM



V. EXPECTED OUTPUT

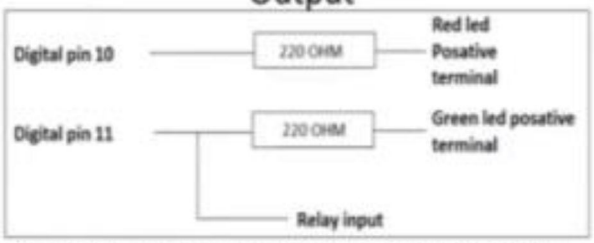
Connections

Row 1---- Digital pin 1
Row 2---- Digital pin 2
Row 3---- Digital pin 3
Row 4---- Digital pin 4
column 4---- Digital pin 5
column 3---- Digital pin 6
column 2---- Digital pin 7
column 1---- Digital pin 8



Arduino Uno Pinout

Output



Red , Green and Relay nagative terminal connected with Ground (GND)

VI. RESULTS

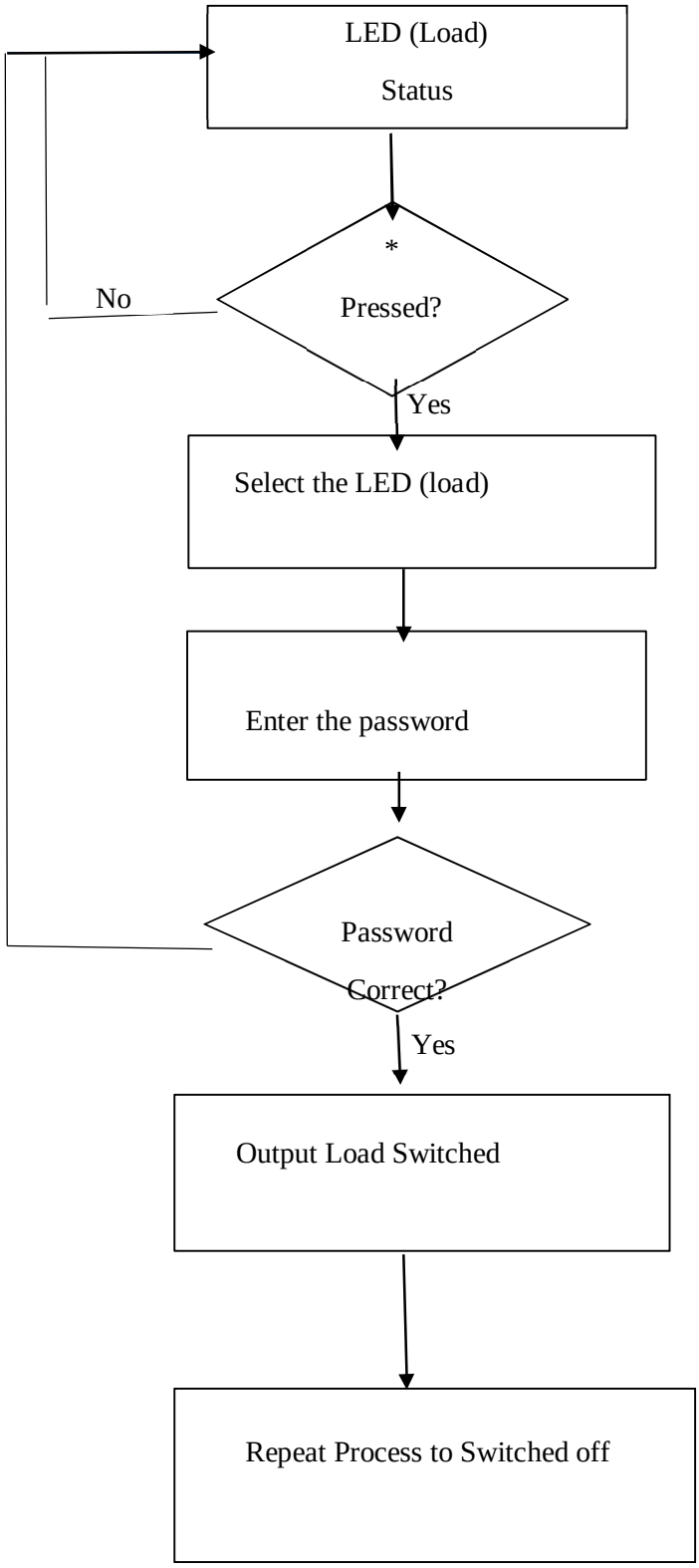
The password based electric line man safety system is designed to control a circuit breaker by using a password for the safety of electric man, the line man can enter the password using a keyboard. There are many critical electrical accidents are rises during the electric line repair.

These accidents are happen due to lack of communication and co-ordination between the maintenance staff and electric substation staff. In this proposed system the security of the line man is its own hand. The control to turn on or off the line will be maintained by the line man .The system is fully controlled by a microcontroller from ATMEL 89C52. A matrix keypad and GSM is interfaced to the microcontroller to enter the password. The entered password through keyboard is compared with the password stored in the memory. If the entered password is correct then only then the line can be turned ON/OFF.

In order to identify whether the line is functioning or not, a light with some group of LED 's is connected in each line and a light sensor LDR is connected exactly below the light. This LDR is connected to a trigger circuit that is designed using a 555 timer chip. This trigger circuit will provide a signal to the controller whether the line is functioning or not. Depending on this information, if the line isn't working, automatically a message in the form of SMS will be sent to the line man mobile by which the person will know that the line is faulty.

To repair the line, he enters the password and disconnects the supply to that particular line and works comfortably. After repairing the line, he himself can restore the line.

Flowchart


LED (Load)
Status
*
Pressed?
No
Yes
Select the LED (load)
Enter the password
Password
Correct?
Yes
Output Load Switched
Repeat Process to Switched off

VII. FUTURE SCOPE

1) In future we can send an SMS to switch on the power circuit.
2) We can place sensors for each and every line to detect the fault and automatic send fault SMS to lineman for repair of line.
3) In the near future we can use mobile apps and various wireless system for the increase in efficiency of the project.
4) We can use QR code scanner or eye and face scanner instead of passwords.

VIII. CONCLUSION

From the above information finally, we can conclude that this system provides a solution which can ensure that only the lineman can control the system and thus no possibility of someone else interfering the system. The lineman can simply work the loads from the major centre rather than come to every circuit breaker source. Thus, it is an extremely useful, inexpensive and safe way of using circuit breakers. The project work is designed and developed successfully. For the demonstration purpose, a prototype module is constructed; and the results are found to be satisfactory. The major and critical task is preparing the software for performing the tasks depending on the inputs. The performance of the machine purely depends on the software (code) we define in the controller. The technology utilized here is for developing the prototype module only; it has to be enhanced to develop it into a real working system.

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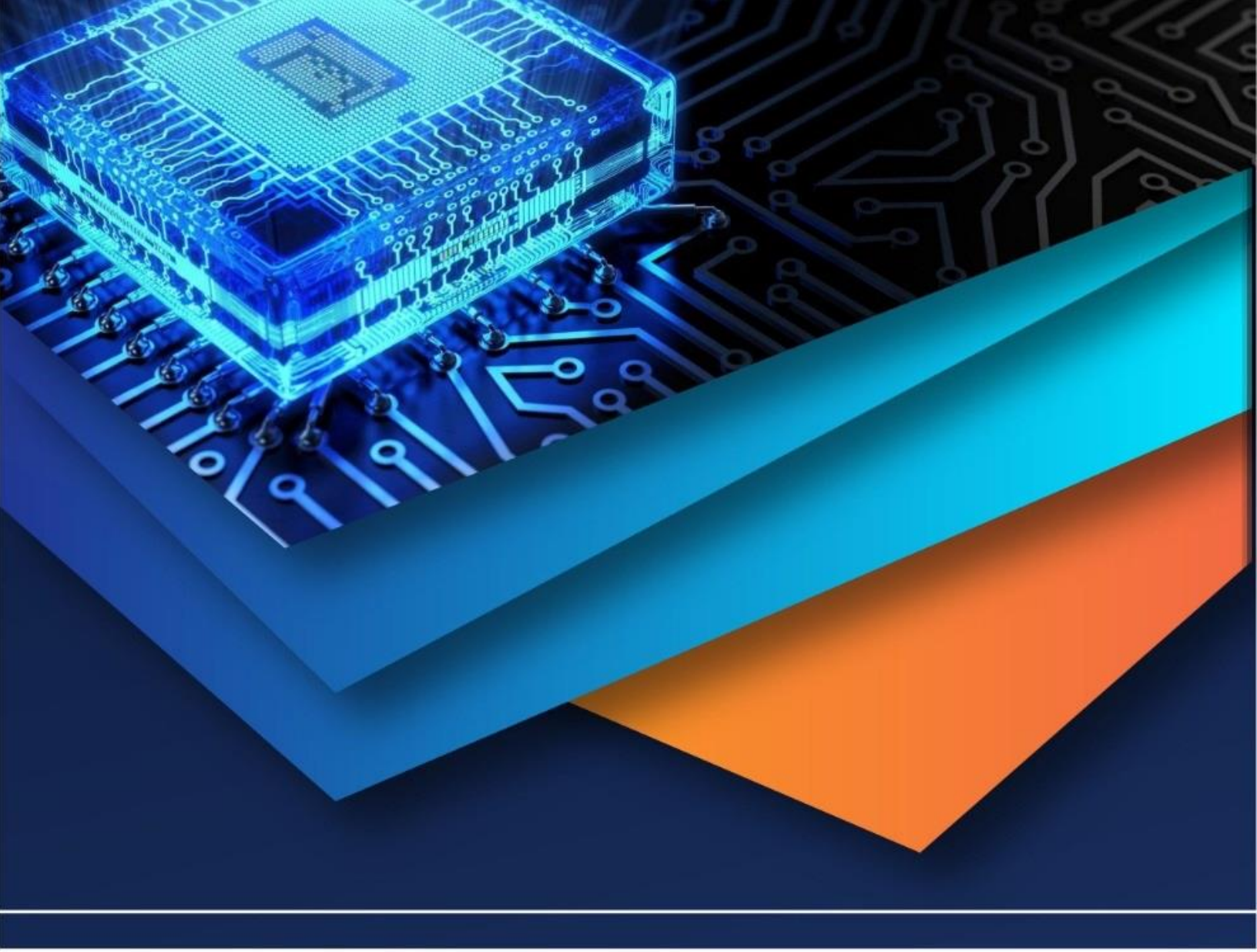

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