LINE MAN SAFETY USING FINGERPRINT BASED CIRCUIT BREAKER

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Abstract – A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to detect a fault condition and interrupt current flow. When operated manually we see fatal electrical accidents to the line man are increasing during the electric line repair due to the lack of communication and coordination between the maintenance staff and the electric substation staff. In order to avoid such accidents, the breaker can be so designed such that only authorized person can operate it with a Fingerprint. This ensures security of the worker because no one can turn on the line without his biometric validation.Key Words: Fingerprint, circuit breaker, RFID tag, Arduino UNO, Wi-fi module.

1. INTRODUCTION

Electricity is now become a part of our daily life, they play the many roles in their field. The main objective of this project is to save line man by making such a protective system controlled through fingerprint scanner , in this proposed system if there is any fault in line, the line man senses his finger and he reads the RFID tag due to which main line is switched off. The finger print based electric line man safety system is designed to control a circuit breaker by using a RFID and Fingerprint sensor for the safety of electric man. . This project gives a solution to this problem to ensure electric line man safety. It very simple to maintain so it is very useful for the line man. The parts which is required for our model is easily available in the market. The main concept of our project is to save the life of line man. The main component of our project is the Fingerprint scanner which is required to sense the finger.

Literature Survey

[1] PASSWORD BASED CIRCUIT BREAKER

Proposed by:- Jay Kumar, Surya Kumar, Vivek Yadav Praveen Kr Tyagi

In this method Microcontroller are used which controls all the operations in regarding the password system. For this process we require the components like microcontroller control circuitry, power supply and key pad. These keypads are used for entering password for operating different load which are connected to the controller. If suppose password is wrong, then load will not be switched to the controller and then the controller checks for the precaution instruction which is provided by the developer.

[2] ELECTRIC LINEMAN PROTECTION USING USER CHANGEABLE PASSWORD BASED CIRCUIT BREAKERFDHNBV

Proposed by:- J. Veena, G. Srivani, Afreen, M. Sunil Kumar, J. Santhosh, K. B. V. S. R. Subrahmanyam in 2015

A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to detect a fault condition and interrupt current flow. Unlike a fuse, which operates once and then must be replaced, a circuit breaker can be reset (either manually or automatically) to resume normal operation.

1.3 OBJECTIVE

Now days, 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 of the electrical lines lies with man. The main objective of this project is to provide security thereby saving life of the lineman. The previous techniques produce manual errors. With the help of finger print scanner, the proposed system provides solution that ensures safety of lineman

2. METHODOLOGY

The below figure is an overall block diagram of MCU based electronic circuit breaker which consists of finger print scanner. In the below block diagram, finger print is enrolled by a lineman

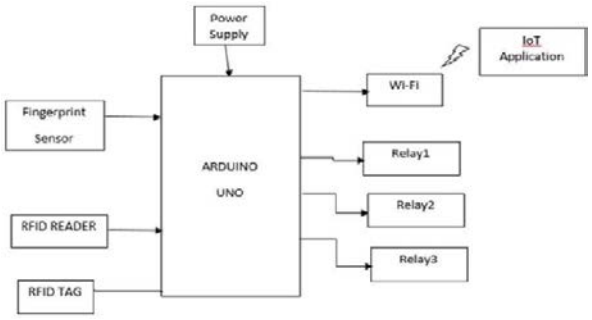

Fig -1:Block diagram of proposed system

This module is connected to the MCU. If the finger print stored in the scanner is matched with the authenticated finger print, MCU is turned on . This makes on or off the relay which helps to control the electric line. After the completion of the work, above process is repeated in the same manner by the lineman. When a person's finger physically changed, finger print scanner does not take this into consideration. In such cases, person can have the difficulty to identify themselves and gaining access. In such cases, RFID tag is used.

RFID uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. These tags collect energy from a nearby RFID reader's interrogating waves. Active tags contain battery and it operate hundreds of meters from the RFID reader. The tag need not be within light of sight of the reader. RFID is used for security purpose. It consists of microchip and coil. To recognize the identity of RFID tag, RFID tag sends the signal to reader, the signal is received by coil and unique ID is identified by chip. The RFID is present on the Shoes, Gloves and Hands. If the lineman wears all these things then it will allow for the further process.

3. COMPONENTS

ARDUINO

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable.

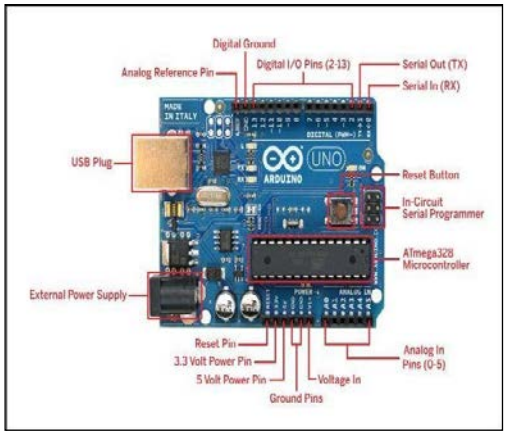

Fig -3.1: ARDUINO UNO ATMEGA (328P)

FINGER PRINT SENSOR

The fingerprint sensor is one kind of sensor which is used in a fingerprint detection device. These devices are mainly inbuilt in the fingerprint detection module and it is used for computer safety. The main features of this device mainly include accuracy, better performance, robustness based on exclusive fingerprint biometric technology.

Fig 3.2 Fingerprint sensor

LCD

This is the first interfacing example for the Parallel Port. We will start with something simple. This example doesn't use the Bi-directional feature found on newer ports, thus it should work with most, if not all Parallel Ports

Fig 3.3 LCD333

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 contacts

Fig 3.4: RELAY

ESP8266 WiFi Module

ESP8266 is Wi-Fi enabled system on chip (SoC) module developed by Espressif system. It is mostly used for development of IoT (Internet of Things) embedded applications.

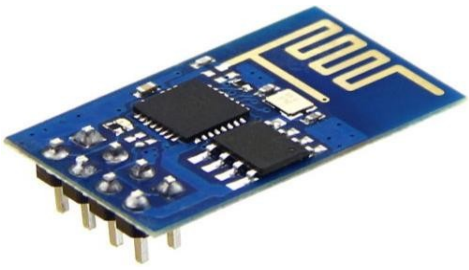

Fig 3.5 WiFi Module

RFID Reader

The RFID reader is also known as an interrogator, it provides the connection between the tag data and the software that needs the information. [4] The image below is showing an RFID reader.

Fig 3.6 RFID READER

3. CONCLUSION

The proposed safety system is successfully designed. It provides a new approach to the security of the lineman and completely eliminates the fatal electrical accidents to the lineman due to electric shock during the power line repair. It has been developed by integrated features of all the hardware components used. It provides a new approach to the security of the lineman and it completely eliminates the electrical accidents to the lineman during the electric line repair. In order to note the power usage in a particular are in a timely manner, this power usage is uploaded in the internet.

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