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Smart Electric Line Breaking Alarm System

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Abstract: Due to worse climatic conditions such as Heavy rain, Storm, etc. there is a chance of breaking of electric lines which may cause several dangerous situations. So in order to avoid this, we usually call to KSEB and often they won't attend the call or they can't sketch the location.
Most of the people experience such a situation of losing electric current frequently cause the death of living beings and irresponsible actions of KSEB.
This current scenario motivated us to come up with a solution to this problem. Whenever there is obstruction causing to the failure of electricity or the electric post, this device act as a circuit breaker by the continuity test. We take subsequently 4 posts to implement this idea.
Let the first post act as receiver and fourth post be the transmitter. When there is a hindrance to the current flow between these posts, the transmitter will send a message to the receiver then the receiver will turn off the connection using a relay. The project was implemented by using 2 Arduino,2 NRF modules and relay. After this device transmits an information signal to the KSEB office by giving the details about the location and automatically registers the complaint. Our product opens a way to a solution where the customer difficulties are reduced and also reduces accidents due to electrocutions.
Keywords: Transmitter, breaking system, adruino, electrocutions.

I. INTRODUCTION

A developing country mainly needs a power transmission to its growth economically. Especially India, Sri Lanka, and other developed countries are transmitting a power line throughout wires.

A power source is the basic requirements for human life to do their own activity. People directly depend on power resources. Somehow, power sources cause human beings indirectly. The power transmission is occurred due to natural disasters or manmade mistakes and other many conditions.

To avoid such accidents, prevention is better. These unexpected happening may affect the ordinary person and other living things. Such that, to detect these type of faults and make awareness to all citizens. A power line breaking is a fault to detect and make prevention as soon as possible. Otherwise, it may cause others. Different kinds of systems of fault position and locate the accurate places are available.

Most of the systems are used to prevent accidents. But this project mainly focuses to save human beings anywhere, anytime. In addition to groups, these fault position of the accurate spot is transmitting to an authorized person by the way of SMS and calls. Recently different kinds of fault position systems are suggesting like traveling wave based system, voltage based systems, knowledge-based methods, and impedance-based systems. Smart electric line breaking system uses Arduino, nRF transceiver, a Global system modulation, and relay.

From using these essential components to discover a defect position, examine and categories these types of defects and then auto tripping where the fault occurs.

The collections of information are transmitting to control person.

This system mainly focuses on human careless makes an accident. The main component used here is GSM. GSM facility is widely used in mobile phones.

GSM modem is a device in which a SIM is inserted so that the device can communicate using GPRS, SMS or phone call with other machines like servers or humans.

A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. If the control person not properly acts, the accident will occur. So that using a relay to shut down the whole units before sending a set of details to control person and this can save human beings from unnecessary accidents.

II. LITERATURE REVIEW

People face a lot of problems due to the present system of electric transmission lines. Within one year, it is about 450 living beings died due to electrocutions in Kerala. As value from 2009 to 2018, the number of death remains almost the same, still, the technology is advancing [10].

Electrical Accident Statistics In Kerala

YEAR	NUMBER OF ELECTRICAL ACCIDENTS				TOTAL
	HUMAN		ANIMAL		
	FATAL	NON-FATAL	FATAL	NON-FATAL	
2009-2010	251	200	37	0	488
2010-2011	285	175	67	0	527
2011-2012	277	230	57	0	564
2012-2013	226	192	40	0	458
2013-2014	241	168	32	0	441
2014-2015	309	206	56	0	571
2015-2016	287	153	53	1	494
2016-2017	208	186	69	0	463
2017-2018	242	152	56	0	450

Figure 1: Electrical statistics in Kerala [10]

While taking a survey among the KSEB workers as well as common people, we could understand that people find difficulty in locating the failure of transmission lines [4]. By this reason, fast repairing is not possible. So these are the main drawbacks for the existing system. To overcome this, our invention is to protect humans in every critical situation. The system is very cost effective and better efficiency. The system requires only lees installation time. It provides an auto tripping mechanism when the fault occurs and also inform the authorities for fast repair with the exact location of failure [5]. These are the main functions included in this project to save the people from the difficulties of electric line failure. Electricity has become an important part of homes & industries. Almost whole the devices at homes, businesses and industries are running because of electricity. [7]Since the protection for the electric system is must and it should also reduce the accidents caused by the improper installation of electric lines. This was the main inspiration behind the idea and implementation of this project [6]. We must know how to control the accidents caused by unresponsive activities and other sources of issues. Power transmission is occurred due to natural disasters, man-made mistakes and many other conditions those outcomes will affect human beings. To avoid such accidents, prevention is better [9]. Different kinds of problems from different areas are proof that a system of protection or prevention is needed against the improper flow of electricity. This will also control the amount of wasted electric energy and also protect the energy.[8]

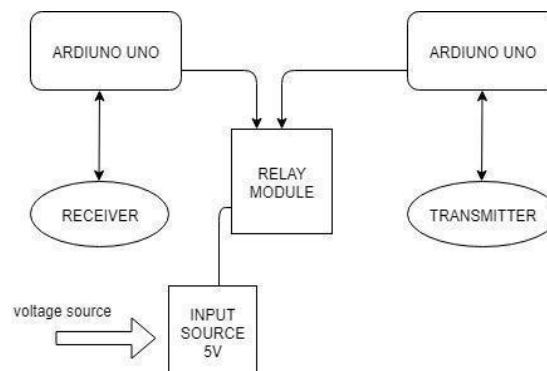## III. SYSTEM DESIGN

A.   Hardware

Figure2: Block diagram

The system explains how to provide protection to the electric supply lines. The system is quite a simple functioning of collection of data from the power lines. The design is very simple for a common mode of man to understand since it is designed with a fully automated system of controlling interface. In this design, we have used Arduino chipset, relay module, GSM module, and NRF transmitter. The Arduino works as a microcontroller since it acts as a collector of the data's from the surroundings and the transmission takes quickly. The transmission takes place for the two communication devices. The communication makes the auto switching of the power supply makes the working of the system.

Figure 3: Arduino Chip

1) *Arduino Chip:* The Arduino board is finished with sets of digital and analog input/output (I/O) pins that may be interfaced to various extensions sensors and other circuits. It is the heart of the project; it collects the data from the other chips for the auto tripping of the electric supply. The chip connects the other Hardware modules to the board, it connects the nRF module between two chips.
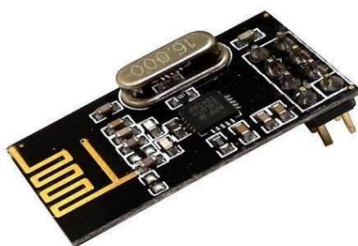

Figure 4: NRF module

2) *NRF Module:* It is a communicating device which transfers a set of collected data from one module to the other module.NRF module is a very cheap device used for simple communication setup among the chipboards.
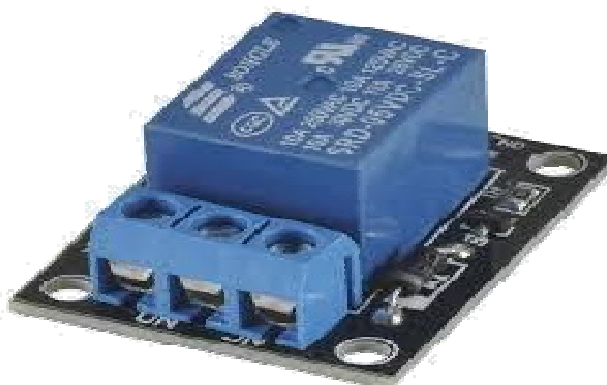

Figure 5: Relay

3) *Relay Module:* We know what common function of a relay is, the same function is used here. the relay switches the power supply on or off state. It switches from the data collected from the nRF modules. It changes the state power on when the collected data is high and off when the data collected is low. The design setup and a program code also made for the problem firstly the program is designed a quite simple way to switch the cases.

The program is a complete solution for the error rising in power transmission. The circuit also includes an auto-switching feature.

B.   Software
1)   Code For Receiver

```
#include <SPI.h>
#include <nRF24L01.h>
#include <RF24.h>
#define Signal A0
RF24 radio(7, 8); // CE, CSN
const byte address[6] = "00001";
void setup() {
Serial.begin(38400);
radio.begin();
Serial.println("radio initialised");
radio.openWritingPipe(address);
radio.setPALevel(RF24_PA_MAX);
radio.stopListening();
}
void loop() {
String text="1oseee"; Serial.println("loping"); if(digitalRead(Signal)==HIGH) { text="voltage_present"; }
else if(digitalRead(Signal)==LOW) { text="voltage_absent";
}
radio.write(&text, sizeof(text));
Serial.println(text);
delay(1000);
}
```

2)   Code For Transmitter

```
#define relay 5
#define Signal A0
#define interval 1000
#include <SPI.h>
#include <nRF24L01.h>
#include <RF24.h>
RF24 radio(7, 8); // CE, CSN
const byte address[6] = "00001";
void setup() {
pinMode(relay, OUTPUT);
pinMode(13, OUTPUT);
Serial.begin(38400);
radio.begin();
radio.openReadingPipe(0, address);
radio.setPALevel(RF24_PA_MAX);
radio.stopListening();
radio.startListening();}
void loop(){ if (radio.available()) {String text;
radio.read(&text, sizeof(text));
```

```
Serial.println("connected");
//Serial.println(text);
if(text=="voltage_present") {
digitalWrite(relay,HIGH);
Serial.println("voltage present");
digitalWrite(13,HIGH);
delay(3000); }
else if(text=="voltage_absent") { digitalWrite(relay,LOW); Serial.println("voltage absent") }} else { Serial.println("no
connection"); }}
```

III. RESULT AND DISCUSSION

Whenever there is an obstruction in the electric line, due to worse climatic conditions such as heavy rain, storm, etc., and this device act as a circuit breaker by the continuity test. We take subsequently 4 posts to implement this idea. Let the first post act as receiver and fourth post be the transmitter. When there is a hindrance to the current flow between these posts, the transmitter will send a message to the receiver then the receiver will turn off the connection using a relay.

Transmitter (NRF module and Arduino) is the one which detects the fault and it sends a feedback signal to the receiver. The receiver and transmitter are controlled using a program that checks the continuity of electricity. The system blocks the electric current when any fault detected by the Arduino UNO as a transmitter by using a voltage comparison method. This makes the relay to turn off and stops the current flow, an auto tripping mechanism is implemented here. After this, using a GSM module the system transmits an information signal to the KSEB office by giving the details about the location and automatically registers the complaint. Our product opens a way to a solution where the customer difficulties are reduced and also reduces accidents due to electrocutions. As a result of this system, we could reduce the efforts of KSEB workers as it locates the correct spot of fault. We could successfully implement the same in a prototype.
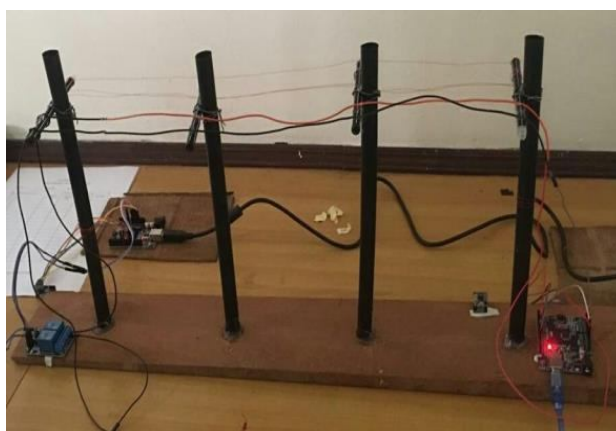

Figure 6: Result obtained when implemented in a prototype

IV. CONCLUSION & FUTURE SCOPE

In our project, we studied a GSM-based transmission line fault detection system which sends information to KSEB. In our country, an electrical power distribution defect is due to natural disasters and artificial. It is very difficult to identify an accurate spot and not repairs as soon as possible. By applying this system, we can avoid an accident and thus our project can protect human beings from power line breaking. A GSM wireless network is used in our project for communication. The main objectives of our project work were achieved as the system designed was able to detect transmission fault. The occurrences of faults were detected and the message was sent through the GSM network. Many solutions have been found out for fault detection but this is one of the simplest ways. This concept successfully analyses the faults which occur in the power line. Implement a system to detect energy theft. Implement a system which automatically reads the energy consumed by each house and provide electric bill without any help of KSEB employees In this system having more number of units, together with between separate post and main units. In the future, the connection between that makes a sequence or series. This may decrease the complexity connection.

V. ACKNOWLEDGMENT

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