Speech Security System for Electrical Line Man

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Abstract: In the last decade various speech technologies like automatic speech recognition (ASR), Voice response systems and another similar system have considerably matured. These systems rely on the security of lineman working with power lines. At transmitter end the software asks the user to enter the password to confirm the person's credibility. If found to be correct it prompts the user either to turn 'ON' or 'OFF' the power system. In case if the system is now turned 'ON' then microcontroller first sends a warning signal using the RF wireless transmitter. A voice recognition module is interfaced to the microcontroller to enter the password. If the password entered is correct, then only the line can be turned ON/OFF. The main aim of this paper is to design and develop a life line saving security system for the line man who works on high voltage lines. In this project we are designing and developing a wireless security system using the speech processor in the real time environment.

Keywords: Speech recognition, Line man security, wireless transmitter, wireless security system.

I. INTRODUCTION

Safety is a part of the life. Security for linemen and electric system workers is the key to success, increased reliability, and sustainability for electric utilities. All employees working for an electric utility should be able to recognize hazards in the office and in the field.
Speech is a natural medium of communication for humans. In speech security system, the task is to use a speech sample to identity whether the lineman is working with power lines.

Speech is one of the natural forms of communication. Recent development has made it possible to use this in the security system and controlling the devices. In speech security system, the task is to use a speech sample to identity whether the lineman is working with power lines.

Speech is a natural medium of communication for humans, and in the last decade various speech technologies like automatic speech recognition (ASR), Voice response systems and another similar system have considerably matured. The above systems rely on the security of lineman working with power lines. The key focus of the project is on the effectiveness of ASR.

The main aim of this paper is to design and develop a life line saving security system for the line man who works on high voltage lines. In this project we are designing and developing a wireless security system using the speech processor in the real time environment.

II. HARDWARE DESIGN

The basic block diagram for speech security system for electrical lineman is as shown in Fig. 1 and Fig. 2.It consists of two modules they are transmitter section and the receiver section.
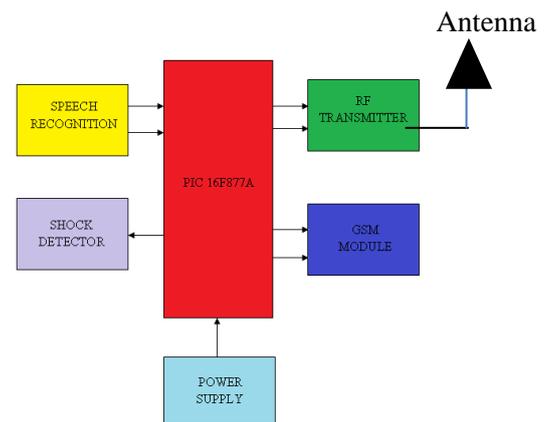

Fig. 1 Block diagram of transmitter section.

The transmitter section consists of microcontroller, speech recognition module, shock detector module, GSM module, RF transmitter and power supply. The microcontroller used is PIC 16F877A.The receiver section consists of RF receiver and line feeder module.
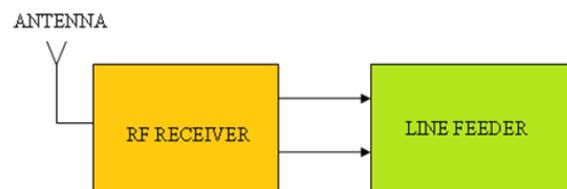

Fig. 2 Block diagram of receiver section.

A. Methodology used
The system is fully controlled by a microcontroller from PIC family. A speech recognition circuit is interfaced to the microcontroller. The speech is compared with the speech stored in the ROM of the microcontroller. If the speech is matched correctly, then only the line can be

turned ON/OFF. Activation / deactivation of the circuit breaker are indicated by a lamp (ON/OFF).

Further the project can be enhanced by using an EEPROM for user to change the password for a more secured system. It can also be interfaced with a GSM modem for remotely controlling the electronic circuit breaker via SMS.

III.SOFTWARE DESIGN
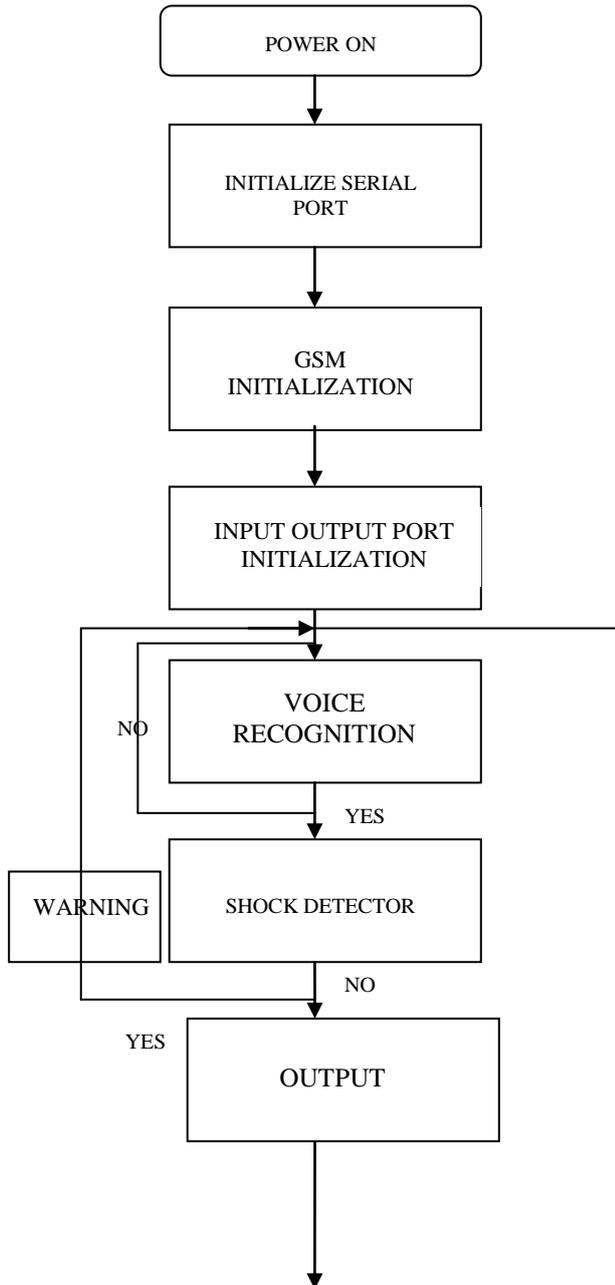
transmitter and shock detection also the pic controller, the pic controller is main controller of this module and it is an 8 bit controller. Powersupply provides 12V power to the module but the regulator IC convert the power into 5v which is required for the operation of current device.
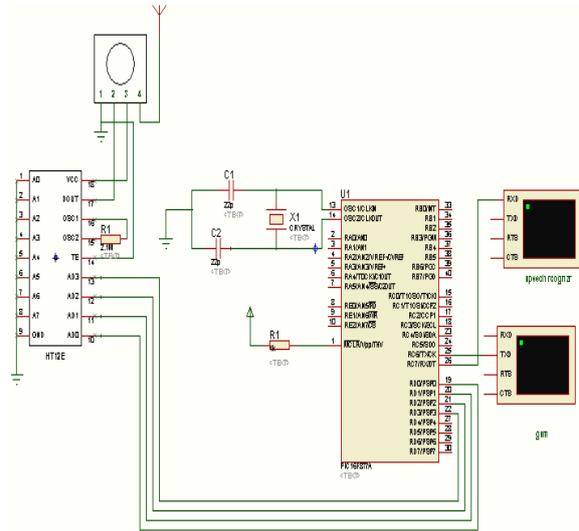

Fig. 3 Transmitter section

The given instruction that given by the line man that is ON/OFF through the microphone is processed by the voice recognition module is forwarded to the pic controller to the respective pin. These pins are required to do some specific operation. This signal then passed to GSM module, and shock detection circuit. The GSMmodule sends the current status of the signal to the near substation. Thus the employees can get an idea about which line feeder is under the working. then ICRS 232 used to send the signal to the GSM module .even though the line still conducting electricity if it so the shock detection circuit detect the line and indicate by a Led.so the lineman can go the alternative solution for the disconnecting of respective line feeder.

In the rare case chances of getting injured cannot be deplete if it so the GSM module already give an information about the location of working area which make possible the others to help the working person by means of either Off the line feeder or by giving a rescue crew. The GSMmodule usesasim (subscriber identifying module).in the proposed system we are using sim 900.

RF transmitter used to transmit the RF signal to the near substation. For encoding the data it is use anHT12Eencoder. For GSM interfacing the system uses UART protocol.

IV.RESULTS AND DISCUSSION

A. Transmitter
At the transmitter end it consist of many devices such as power supply, GSM module, voice recognition device, RF

B. Receiver
As the receiver end consist of a transmitterit connected to power supply from ac input and it provide power to the system at 12v but the RF receiver only need of 5v supply so the bridge rectifier convert it into 5v.the Hd12d is a decoder that we are using in the receiver also using a relay

this relay should need 12v so the supply to the relay is does not converting into 5v the input is directly connected to the relay basically the output of relay is zero. The bit from the transmitter is interfaced with relay if the particular pin in the transmitter is given as 0 the feeder is ON and vice versa.
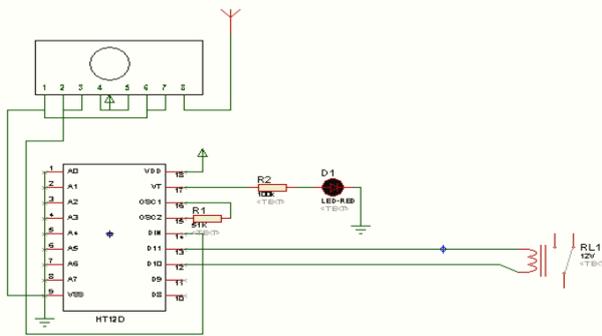

Fig. 4. Receiver section

The line feeder is directly connected to the relay, which containing a socket for the line connection. If the signal is 0 bit then the relay turned ON the line feeder and the transmitted bit is 1 then the relay turned OFF the line feeder. The receiver part placed at the substation for the further processing after getting the current status of the line feeder.

V. ADVANTAGES

1. Prevents the life of the line man.
2. Works as a safety device.
3. Easy to construct and install.
4. Speech provides better interaction to the user.
5. By hearing, he could act accordingly when he is on the poles, towers Etc.
6. Activation and deactivation of the circuit breaker is indicated by a lamp (ON/OFF).
7. Controlling the device via SMS.
8. Provide co-ordination between the maintenance staff and the electric substation staff.
9. Speech is a very natural way to interact, and it is not necessary to sit at a keyboard or work with a remote control.
10. No training required for users

VI. APPLICATIONS

1. Employees an electric utility should be able to recognize hazards in the office and in the field.
2. Automatic speech recognition (ASR).
3. A keypad is connected to the project to enter the password that make user to interferer easily.
4. Easy detection of line which contain power still after the commands used by user.
5. Ensure the safety of the maintenance staff.
6. Password is required to operate the circuit breaker (ON/OFF).

7. Safe handling of powered line.
8. The system is interfaced with a GSM modem for remote controlling.
9. Modern speech recognition systems use various combinations of a number of standard techniques in order to improve results.

VII. CONCLUSION

This proposed system is widely used in the organization working on high voltages. This is also used in the research and development organization, mining industries and laying of power cables. This system ensures safety and security of electrical line man who works in installing towers of very high voltage lines. This proposed system provides a solution, which can ensure the safety of the maintenance staff e.g. line man. The control to turn ON/OFF the line lies with the line man only. This system has an arrangement such that a password is required to operate the circuit breaker (ON/OFF). Line man can turn off the supply and comfortably repair it, and return to the substation, then turn on the line by entering the correct password.

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