Automatic Voice Pronouncement Based Robot Fire Psychoanalytic System

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Abstract— **The main goal of this project is to develop a robotic vehicle which is used to detect and fight fire through IOT application in an event of any major fire hazard particularly in industries. The field of firefighting has long been a dangerous one, and there have been numerous and devastating losses because of a lack in technological advancement. Major fire accidents do occur in industries like nuclear power plants, petroleum refineries, gas tanks, chemical factories and other large-scale fire industries resulting in quite serious consequences. Thousands of people have lost their lives in such mishaps. Therefore, this project is enhanced to control fire through a robotic vehicle with the advancement in the field of Robotics, human intervention is becoming less and robots are used widely for purpose of safety. In our day to day life fire accidents are very common and sometime it becomes very difficult for fireman to save human life. In such case firefighting Robot comes in picture.**

Keywords: Flame sensor, Audio playback, IR sensor, Speaker, Water pumping motor.

I.INTRODUCTION

The main goal of this project is to design a fire fighting robot by using IOT technology for operation. This robot is loaded with a water tanker and a pump controlled through wireless communication to sprinkle water. At the transmitter end, push buttons are used to send commands to the receiver end to control the robotic movement, either in forward, backward, right or left direction. GSM control that has the benefit of adequate send the message to a concern person, while the decoder decode before feeding it to another microcontroller to drive DC motors via motor driver IC for necessary work.

A water tank pump is placed on the robot body and its operation is carried out from the microcontroller o/p through the proper signal from the transmitting end. The entire operation is controlled by a PIC microcontroller. A motor driver IC is interfaced to the microcontroller through which the controller drives the motor. In future, this project can be developed by interfacing it with a wireless camera so that the person can view the controlling operation of the robot remotely on a display. GSM modems have developed public utility products for mass communication. This GSM based fire fighting robot is used to prevent fire in houses, offices and shops. This robot moves in suffocated fire area in our house, offices, shopping malls, etc. This robot is capable of sensing fire using through IR sensors and then putting it off even in the absence of anyone. It immediately sends the message to a concern person.

This project is made efficient by incorporating SIMs so that an SMS can be sent to a number of devices and boards in the locality by using techniques of time division multiple accesses. These robots can be used at different areas like factories, houses, office, etc. By using this GSM based fire fighting robot, it is possible to control everything automatically through embedded systems. The use of embedded system in communication has given rise to many interesting application that ensure safety and comfort.

II. LITERATURE SURVEY

We are interested in the problem of adaptive learning in the context of automatic speech recognition (ASR). In this paper, we propose an active learning algorithm for ASR. Automatic speech recognition systems are trained using human supervision to provide transcriptions of speech utterances. The goal of Active Learning is to minimize the human supervision for training acoustic and language models and to maximize the performance given the transcribed and transcribed data. Active learning aims at reducing the number of training examples to be labeled by automatically processing the unlabeled examples and then selecting the most informative ones with respect to a given cost function for a human to label. In this paper we describe how to estimate the confidence score for each utterance through an on-line algorithm using the lattice output of a speech recognizer. The utterance scores are filtered through the in formativeness function and an optimal subset of training samples is selected. The active learning algorithm has been applied to both batch and on-line learning scheme and we have experimented with different selective sampling algorithms. Our experiments show that by using active learning the amount of labeled data needed for a given word accuracy can be reduced by more than 60% with respect to random sampling[1].

While most current speech recognizers give acceptable recognition accuracy for clean speech, their performance degrades when they are subjected to noise present in practical environments. For example it has been observed that additive white noise severely degrades the performance of Mel-cepstra based recognition systems. This performance degradation is attributed primarily to unavoidable mismatch between training and recognition conditions. To reduce the effect of mismatch several techniques have been proposed in the literature, which can be broadly categorized as: Noise estimation and filtering that reconditions the speech signal based on noise characteristics. On-line model adaptation to

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reduce the effect of mismatch in training and test environments Extraction of speech features robust to noise, including features based on human auditory modelling [2].

This paper proposes a novel feature extraction mechanism for speech signal representation,in the computer-aided analysis of nonlinear circuits with periodic inputs and a stable periodic response the steady-state periodic response is found for a given initial state by simply integrating the system equations until the response becomes periodic. In lightly damped systems this integration could extend over many periods making the computation costly. In this paper a Newton algorithm is defined which converges to the steady-state response rapidly. The algorithm is applied to several nonlinear circuits. The results show a considerable reduction in the amount of time necessary to compute the steady-state response. In addition, the initial iterates give information on the transient response of the system [3].

The increasing demand for low-cost mobile communication systems has greatly expanded the need for simulation algorithms that are both efficient and accurate when applied to RF communication circuits. These circuits are a special challenge to simulate because they process signals that consist of a high frequency carrier and a low frequency modulation. Typically the carrier frequency ranges from 1-5 GHz and the modulation from 10 kHz to 1 MHz Often the actual modulated carrier signals are modelled for the purposes of simulation by simpler quasi periodic signals, where a quasi periodic signal is periodic carrier modulated with one or more periodic signals. Quasi periodic signals result when a nonlinear circuit is driven with two or more periodic signals at unrelated frequencies. Currently, harmonic balance is the most commonly used method for computing the quasi periodic response of a circuit; however it suffers from accuracy and efficiency problems when signals contain abrupt transitions. Unfortunately, this is the case with most communication circuits [4].

III. METHODOLOGY

The project consists of temperature sensor, flame sensor, Water pump and geared motor. The robot continuously monitors variation of the surrounding area using these sensors. Robotic vehicle moves through the disaster area as per the instruction from PIC microcontroller. Whenever the temperature exceed a limit value and flame detected MCU identifies that there is presence of fire and operate water pump. MCU operates the relay through the relay interface. Motor is an electromechanical drive, which converter electrical energy to rotation/ mechanical energy. Dc geared motor is used to drive the robotic vehicle. Takes or read data from the sensors and controls all the functions of the whole system by manipulating these data. Control the movement of robot. If the sensor outputs are found higher than preset value it indicates presence of fire and MCU operates the water pump mechanism.
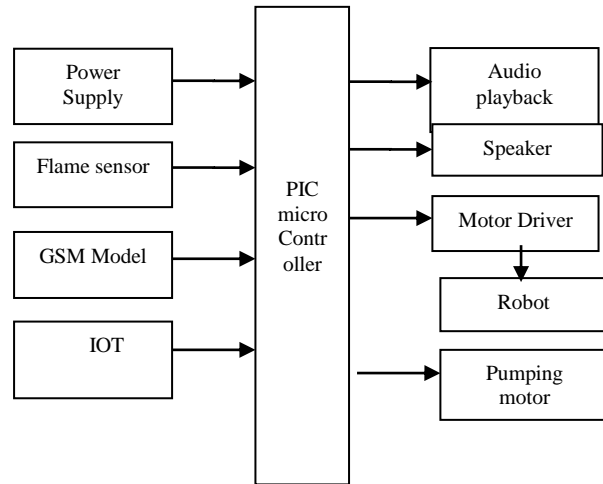

Figure 1 Block diagram of circuit

A Flame detector is a sensor designed to detect and response to the presence of a flame or fire. Smoke is a colloid and comprises a collection of airborne solid and liquid particulates and gases emitted when a material undergoes combustion. It is commonly an unwanted by product of fires. The smoke sensor detects smoke and provides output to the MCU. Temperature uses for the measurement of temperature at the site of disaster. Give electrical output to the existing temperature. Output voltage is proportional to the Celsius temperature.This project is made efficient by incorporating SIMs so that an SMS can be sent to a number of devices and boards in the locality by using techniques of time division multiple accesses. These robots can be used at different areas like factories, houses, office, etc. By using this GSM based fire fighting robot, it is possible to control everything automatically through embedded systems. The use of embedded system in communication has given rise to many interesting application that ensure safety and comfort.GSM control that has the benefit of adequate send the message to a concern person, while the decoder decode before feeding it to another microcontroller to drive DC motors via motor driver IC for necessary work.
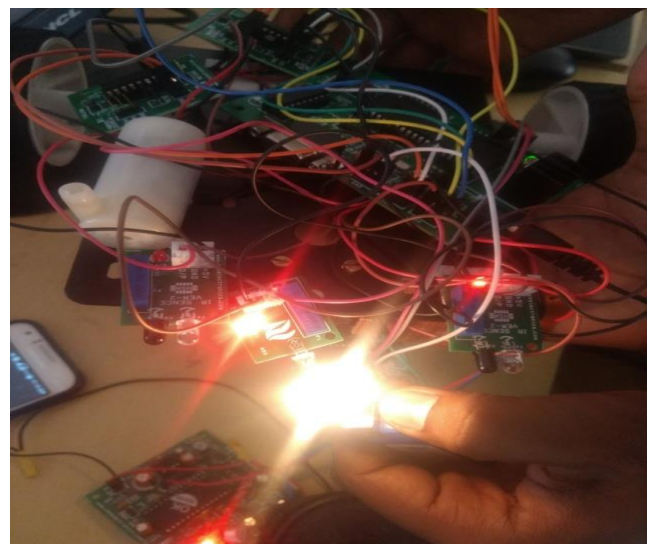
III. RESULT & DISCUSSION

Figure 2 Fire detected by Robot

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When robot detects the fire it stops moving. If it is of small amount it tries to extinguish the fire by using pumping motor. Otherwise it calls another robot and informs to the nearest station.
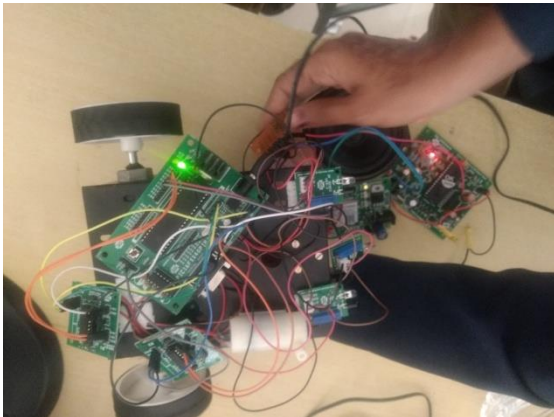

Figure 3 Robot in forward motion

Initially the robot is in rest position, by providing external power supply to PIC microcontroller the robot starts moving in forward direction.
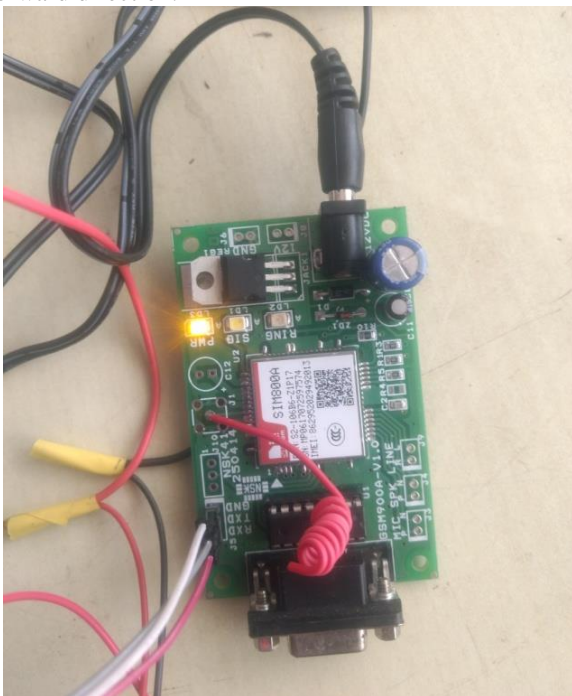

Figure 4 GSM model

As we embedded GSM on PIC microcontroller, it sends messages to the authorized people and nearest fire station automatically.
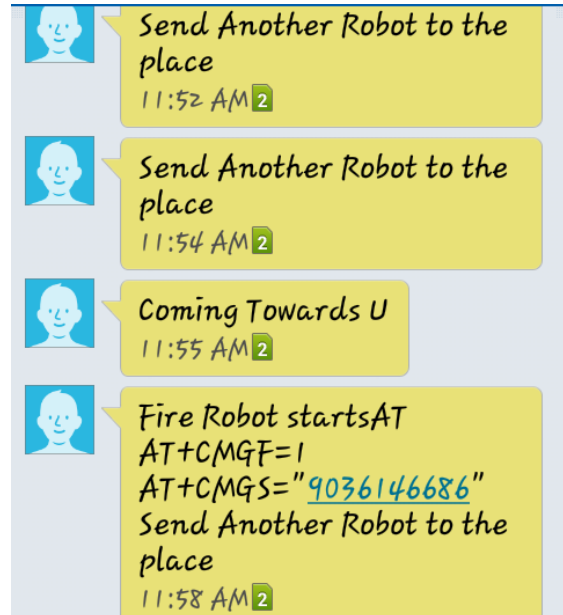

Figure 5 screenshot of result

As shown in the above figure 5, after the fire detection message is sent to the client through GSM. The messages are shown above.

A. ADVANTAGES

- Capability of sensing accurately with increased flexibility.
- No line of Sight not blocked by common materials.
- It can passes through solids longer range.
- Not sensitive to light.
- Not sensitive to weather conditions.

B. APPLICATIONS

Industries are using RF solutions**:**
- Barcode reading devices
- Monitoring and controlling

Consumer products**:**
- Home security
- Fire and Safety system

IV. CONCLUSION

Through this we can conclude that a robot can be used in place of human reducing the risk of life of the fire fighters. We can use them in our homes, labs, offices etc. They provide us greater efficiency to detect the flame and it can be extinguish before it become uncontrollable and threat to life. Hence, this robot can play a crucial role. The movement of this vehicle is controlled by PIC microcontroller as per the program. In this paper we have gone over the implementation of an autonomous firefighting robot. The hardware components of the robot were a body, infrared and ultrasonic sensors for navigation, flame sensor for fire detection and a fan for fire extinguishing. There was also a live feed and map representation provided to allow the journey of extinguishing fire to be visible to humans and not just for the robot, in case any abnormalities occur.

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