International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878, Volume-8 Issue-4, November 2019

Inferno Combative Robot with Blue Collar

N. Nithya Rani, B. Puviyarasi, T. Tamilselvi, K. Srividya

Abstract- In this article, the reader will learn about the' Safety& Ergonomics' framework. Human negligence is still one of the most common causes of ecological disasters and catastrophes. The context is that the monitoring systems only reflect on the condition of processes in which a human connection to the overall functioning of the system is left unattended. As the fields of robotics and automation are more advanced, a human control operator becomes a passive machine observer, leading to exhaustion and lack of attention. It is necessary but hazardous to take up the fight against flames. A firefighter must be able to extinguish the fire quickly and safely to prevent further damage and minimize death. Engineering has finally connected the opening between firefighting and equipment to make the firefighting process more effective and useful. Robots are built to cross the fire area, so that they can operate one day with fire-fighters, minimizing dramatically the risk of damage to victims and protecting rescue workers, before they rage out of the way. This project involves the design of a fire-fixing robot. This paper deals with the software interface, the interface between the device and various parts of the technology.

Keywords - Safety, Fire Fighting, Robot.

I. INTRODUCTION

The robot is described as a mechanical design capable of fulfilling human tasks or of performing human activities in a humane way. This includes building systems and installing, motors, solenoids, and cables. In reality, flaming or fire fighting is the most difficult and challenging job where tactics change in changing scenarios. Firemen are cardinal in that, depending on time and field conditions, they perceive and carry out tasks differently. When they're doing, their lives are at stake. Our ultimate objective is to safely unplug the flames. Our plan is a leap towards creating a smart network that can replace fire brigades on the field. The innovations are still disappointing, although they have crossed the divide between fire-fighting and the robot. We built a model to hamper this. A main aim of this project is "to give the robot community an incentive to develop the practical application of a robot in the real world." While a real-world scenario is essentially modeled, this involves realistic methods for developing functional prototypes for engineers. The project provides an example of what robots can do on a larger scale.

II. MODEL DESCRIPTION

The idea is to create a robot that will prevent a fire in extremely fire-prone server rooms. A flame is used by a candle light and the robot has to locate the fire and then put it out. This is why the flame is not observed by a light sensor. As part of its design, the robot should be able to analyze the ambient light. Through means of a fire detector, the robots must recognize this flame. It will have a remote camera on the head that shows the exact position of the fire through the wireless transmission on your laptop/ computer. Now the entire operation will be manually conducted from afar, which saves human lives and improves efficiency. The gas leakage may also be used to detect mines. Therefore, both small areas and field areas were implemented.

A.BLOCK DIAGRAM

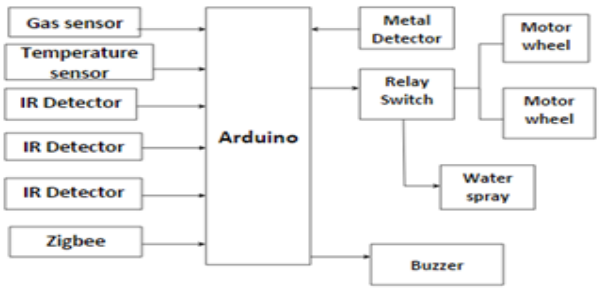

Fig 1: Block Diagram of Inferno Rescuer

B. CIRCUIT DIAGRAM

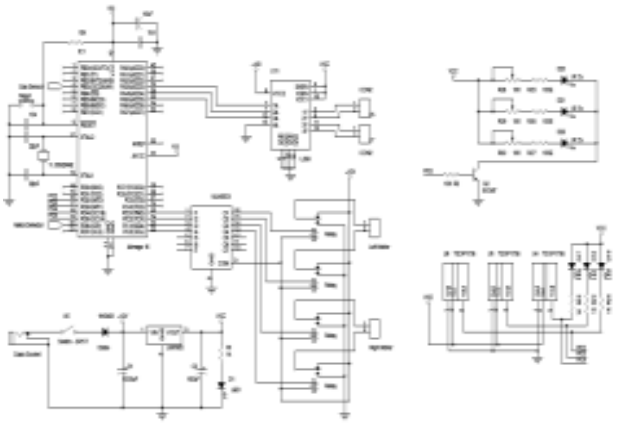

Fig 2: Circuit Diagram of ATMEGA328

C. FLOW CHART

Manuscript published on November 30, 2019.
* Correspondence Author
N. Nithya Rani*, Assistant professor, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, Tamilnadu, India. (Email: nithyarani.ei@sairam.edu.in)
B. Puviyarasi, Assistant professor, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, Tamilnadu, India. (Email: puviyarasi.ei@sairam.edu.in)
T. Tamilselvi, Assistant professor, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, Tamilnadu, India. (Email: tamilselvi.ei@sairam.edu.in)
K. Srividya, Assistant professor, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, Tamilnadu, India. (Email: srividya.ei@sairam.edu.in)

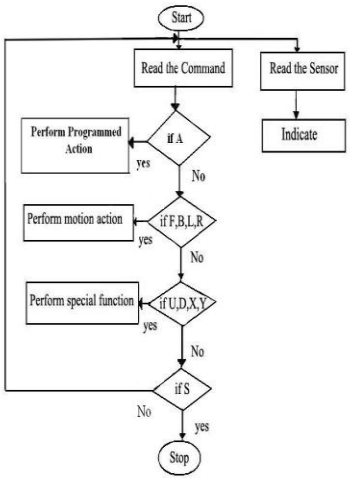

Fig 3: Flow chart of Inferno Rescuer

Symbol Explanation
F – Move Forward
B – Move Backward
L – Turn Left
R – Turn Right
U – Camera Up
D – Camera Down
X – Pump On
Y – Pump Off
A – Switch to Automatic Mode
S – Stop the Robot

D. FIRE DETECTION SCHEME

We use the LM35 detector for detecting the flames. The explanation why this sensor is chosen is that its output Voltage is linearly proportionate to the temperature of Celsius (Centigrade). The LM35 overcomes the inconvenience of linear temperature sensors tuned into ° Kelvin.

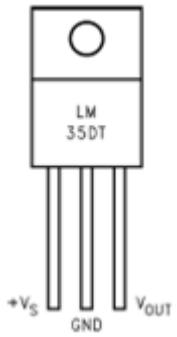

Fig 4: Temperature Sensor Module

The detector's signal will be expanded. The robot must reach the flame by coming closer and put it out when the fire is seen in the scope of this detector. The same applies to my identification because it is identified manually.

E. GAS DETECTION

To detect leakage of gas, we use Fuel Sensor MQ-6. These are used in family and industrial gas leakage equipment for LPG, Iso-butane, propane, LNG detection and avoid the noise of alcohol, cooking fumes and cigarette smoke.

Fig 5: Gas Sensor Module

The MQ-6 gas sensor detection material is SnO2, which is clean air less conductive when the combustible gas target occurs. The conductivity of the sensor is greater than the increase of the gas concentration. The MQ-6 has 6 pins, 4 of them are used for signal processing, and another 2 are used for heating. The intensity level of MQ-6 depends on other gasses and sensors. Sensitivity adaptation is very important when using this component. The calibration of the detector in the air for 1000 ppm and the load resistance (RL) value for approximately 20 K lbs (10K lbs to 40K lbs) was suggested. The gas detector tests precisely and gives an appropriate warning time after consideration of the effect on temperature and humidity

F. OBSTACLE REVEALER

The TSOP1738 is an infrared remote system receiver. When the lead frame is mounted, a pin diode and pre-amplifier are added, the IR filters are constructed from epoxy packets, and the whole circuit is used as an Obstacle Detector.

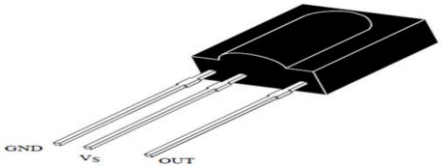

Fig 6: Obstacle Detector

A microprocessor can decode the demodulated output signal in a straight line. The generic IR remote controller set, which supports all major transmission codes, is TSOP1738.

With various carrier frequencies, these modules are available from 32 kHz to 42 kHz. With the assistance of an IC555 centralized at 38 kHz, a proximity sensor can generate a continuous square wave signal and drive an IR led. Thus the receiver can detect and adjust its performance when this signal remediates the obstacles. The TSOP 1738 module is active-low, its output signals are typically high and low when the signal (obstacle) is detected.

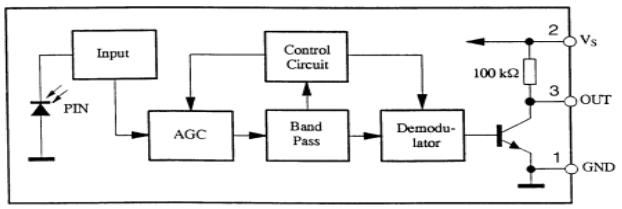

Fig 7: Block Diagram of Obstacle Detector

Features

- Continuous data transmission (up to 2400 bps)
- High immunity against ambient light
- Photo detector and preamplifier in one package
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Active low output
- Low power consumption

G. MINE DECIPHER

A land mine is an explosives device that is hidden under or on the ground and intended to destroy or disable the enemy targets by walking over or by the unit. To show its flexible function, a metal detector circuit with a buzzer is attached to the device. When the robot senses a mine, it sends a message to the computer, and it also warns the nearby men.

H. DESCRIPTION OF WIFI CAMERA AND TUNER

WIFI security cameras are CCTV cameras streaming video and audio signals throughout a radio band to a mobile receiver. Most wireless security cameras need at least one cable or wire for control; Wireless "means for video / audio transmission. However, battery power is used for some wireless security cameras, which make cameras, wireless throughout the world."

The TV tuner transforms audio-or video signals for a digital TV transmission or an analog radio frequency TV, which can be used for a greater cycle of sound and picture formation. The newly created tuners include PAL, NTSC, ATSC, SECAM, DVBC, DVB-T, ISDB, T-dumb, open cable. Also, analog signals can be tuned by analog tuners. An ATSC tuner is a digital tuner with digital signals and analog bypasses in some electronic tuners.

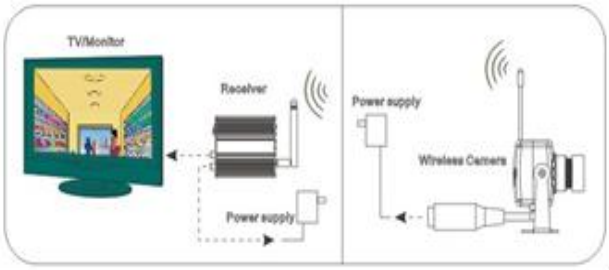

Fig 8: Wi-Fi Camera and Tuner Setup

PAL is a color encoding method for comparable use on broadcast television networks, the abbreviation for Phase alternative Line. In addition to the normal configuration of 525-line/60Hz (480i), the term "PAL" is commonly used simply and also inexactly to refer to a standard 625 line/50 Hz (576i) TV device.

III. WORKING

We engineered the prototype to operate in two modes (MANUAL and AUTOMATIC). In manual mode, the robot is remotely controlled via a specialist system based on the camera input attached to the A Gas Sensor chassis is added to detect gas leaks and to alert us. The mines using a Mine detector can also be detected by this design. The robot has a double-degree overhead tank and nozzle that is capable of spraying water.

The robot is designed to change to Automatic mode and shut down the Fire by using the temperature sensor in the event that the camera fails or a malfunction occurs. The robot is automatically able to flatten fire and can re-emerge with the Obstacle detector in safe mode. This robot is the result of different module's combined operation. The modules are as follows:

- The Transmitter module
- The Receiver module
- Sensor modules
- Display module

The unit to transmit and receive is a control device. It makes it possible for the transmitter and the receiver to guide the robot through the areas and helps to reach fire-affected areas. The RF module makes it possible to communicate from approximately 40-60 meters in our project between two modules.

In order to increase its performance, we used four sensor modules in the project: heat sensing, mine detection module, gas sensing module and obstacle sensing module. The heat sensing unit detects the heat in the control rooms, the buildings and so on where the fire occurs. We did this work by using the LM35 temperature sensor. The heat detectors are of various kinds. To detect landmines present in their path, the mine detector module is attached. The MQ6 device for detection in the arena of gas leakage (LPG) is used. The TSOP 1738 obstacle detector is used for automated robot monitoring. Eventually, the screen system is achieved using the IP camera and laptop module. To be on a computer, an android app called an IP camera must be used and its laptop settings configured. This app sends the video signals from your phone to the laptop which senses the exact screen.

On the strength of this showing, we can monitor the robot and extinguish the fire from the container over the robot's base using water that is pumped out of it.

IV. FUTURE SCOPE

The design of a promising system to detect and take appropriate actions, excluding any human operator, was initiated. The growth of sensor networks and the sophistication of robotics suggest that, although the response needs a considerable amount of automated behavior we can use mobile agents for work involving the perception of external stimulus and reaction to stimulus. It gives us the chance to move on to robots what people traditionally did, but which ultimately endangered lives.

A physically strong candidate is needed for such automation is fire-fighting. Given that life figures sometimes disappeared in the war against flames, our mechanism of acceptance weeps. Our experience suggests that the firefighting system is within the scope of the current sensor network and mobile agent technologies, including the sensors and robots. Therefore, we believe that higher technology can delay sensing to other areas where we want to replace the human with an Auto Mobile Agent where we are communicating sensing and reacting to stimulus.

The ground was dented by this design. The model is viewed in a fundamental way and the limitations on accomplishment indicate that the plan is a proof of concept. Sensitive autonomous firefighters, in general, must consist of a series of robots, interact and collaborate in the mission and allow facilities to deal with obstacles in the midst of the fire. Such issues were not addressed by this venture. Nevertheless, many of these items have been studied in various contexts such as collaboration between mobile agencies and strategies to overcome obstacles. The combined challenge of this is a realistic, autonomous fire-extinguishing system will be both interesting and challenging.

V. RESULTS AND DISCUSSIONS

Final setup of the Inferno Rescuer is obtained. The front view of the hardware module is shown in the fig 9. The top view of the hardware module is shown in the fig 10.

Fig 9: Hardware Module Front view

Fig 10: Hardware Module Top view

VI.CONCLUSION

This paper presents a unique view of the methods used in this particular field. This aims to promote new knowledge and technology so that the instrument mix achieves a clear and well-organized start. This latest equipment should help to increase controls, system and creation softness with a typical digitalization stage; allow embedded intelligence to actually promote the instrument's silence; and finally improve efficiency, reliability and expediency to the user.

The ‘90s saw the enhanced relationship of the Quantum Leap Border schema. This software ensures that life is streamlined by providing additional lightweight and user-friendly facilities in the machining strategy. Now that the method has been established, the next step is to upgrade the hardware.

It will be strengthened to use smaller and less intrusive systems as an option for the use of loud modules to collect user information. It is not long before this information and engineering will take you home and make you more stupid.

This paper covers the key functions and features of a set of principles that can be applied in detail in a number of categories in this field. At this early stage the entire thing within the proposed framework and concept cannot be understood, further work and development attempts are to be made entirely via a combined effort by a number of entities. In every case, this autonomous robot executes the role of a bomber productively.

The expenses of triggering additional types of fire extinguishers, taken from this technology and knowledge, may ignore that of a robot, which may ruin consumer inventory by incorrect fire control processes.

REFERENCES

1. Anand Mohan Misra, Mohd. MaroofSiddiqui, Priya Gupta, Pameer Singh, "Application of Mechatronics Alpha I (Fire Fighter Robot)" [IJESAT] International journal of engineering science & Advanced technology colume-2, issue-4, 831-835, ISSN: 2250-3676.
2. Bradshaw, "The UK Security and Fire Fighting Advanced Robot Project," IEEE colloquium on Advanced Robotics Initiatives in the UK,1991,pp. 1/1-1/4.
3. Jaganathan.P , "ROBOTICS" pp.1.2-2.225 and 4.1-4.75.
4. Mikell P Grover, Mitchel Weiss, Roger N Nagel, Nicholas G Odrey, AshishDutta, "Industrial Robotics" pp.187-340.
5. http://ieeexplore.ieee.org/document/965638/ Design and construction of a fully autonomous firefighting robot.
6. http://ieeexplore.ieee.org/document/4381341/?arnumber=4381341 Design and Construction of an Autonomous Fire Fighting Robot.
7. http://www.ijettcs.org/Volume2Issue4/IJETTCS-2013-08-13-084.pdf.