INFERNO COMBATIVE ROBOT WITH BLUE COLLAR

N.NithyaRani¹, C.Monica², M.Mummudi Murasu³, M.Janaranjani⁴, M.sangeetha⁵

¹Assistant professor, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, India. ²UG Scholar, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, India.
³UG Scholar, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, India. ⁴UG Scholar, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, India. ⁵UG Scholar, Department of Electronics and Instrumentation, Sri Sairam Engineering College, Chennai, India.

Abstract- This paper is designed to establish the reader to the concept of “Safety & Ergonomics”. Human error is still one of the most frequent root of catastrophe and ecological disasters. The foremost reason is that the monitoring systems revolve only around the state of the processes where as human contribution to the overall performance of the system is left unsupervised. Since the control instruments are automated to a larger extent, a human operator becomes a passive observer of the said system, which results in weariness and vigilance drop. Fire-fighting is a significant but dangerous occupation. A fire-fighter must be able to get to a fire swiftly and safely extinguish the fire preventing further damage and reduce fatalities. Technology has finally bridged the gap between fire-fighting and machines allowing for a more efficient and effective method of fire-fighting. Robots are sketched to find the arena of fire, before it rages out of control, can one day work with fire-fighters greatly reducing the risk of injury to victim’s as well as safe guarding the rescuers. This project involves designing a robot which can locate and extinguish a fire. This paper is about the hardware, software, benefits and interconnection of various parts involved in this very technology.

Keywords - Safety, Fire Fighting, Robot.

II. MODEL DESCRIPTION

The concept is to build a robot, which will extinguish a fire in the server’s rooms which are highly prone to fire. A candle will represent the fire, which has started in the home and which the robot must find and then extinguish. For this reason, a light sensor cannot be used to detect the fire. In order words, the robot must be able to make ambient light reading as part of its design complementation. The robot will sense that flame by the help of fire sensor. It will be having a wireless camera on its head that will show the exact location of the fire on laptop or desktop via wireless transmission. Now the whole operation will be handled manually from the distance, which will save human life risk and will increase efficiency. It can also be utilized for the detection of mines, gas leakages. Thus, it is applied in both small areas and field areas.

A. BLOCK DIAGRAM

![Fig 1: Block Diagram of Inferno Rescuer](image-url)
B. CIRCUIT DIAGRAM

Fig 2: Circuit Diagram of ATMEGA328

C. FLOW CHART

Fig 3: Flowchart 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

To detect the flame we use LM35 Temperature sensor. The explanation for picking this sensor is that, its output voltage is proportional to the Celsius (Centigrade) temperature linearly. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin.

Fig 4: Temperature Sensor Module

Signal spread of the detector. When the flame is spotted in the range of this detector, the robot will come in to the position of the flame, come closer, and put it out. Same is the case with mine detection as it will detect it via manual controlling.

E. GAS DETECTION

To detect Gas leakage we use MQ-6 type Gas Sensor. They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, isobutane, propane, LNG, and avoid the noises of alcohol and cooking fumes and cigarette smoke.

Fig 5: Gas Sensor Module

Sensing material of MQ-6 gas sensor is SnO2, which with lower conductivity in clean air, when the target combustible gas exists, the sensor’s conductivity is higher along with the gas concentration rising. The enveloped MQ-6 has 6 pin, 4 of them are used to get signals, and other 2 are used for giving heating current. Resistance value of MQ-6 is difference to various kinds and various concentration gases. So, when using this component, sensitivity adjustment is very necessary. We recommend that you calibrate the detector for 1000ppm of LPG concentration in air and use value of Load resistance (RL) about 20KΩ (10KΩ to 47KΩ). When accurately measuring, the proper alarm point for the gas detector should be finalized after considering the temperature and humidity influence.

F. OBSTACLE REVEALER

The TSOP1738 are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter and this whole circuit acts as Obstacle Detector.
However, some wifi security cameras are battery powered, making the cameras truly wireless on the whole.

A television tuner converts a radio frequency analog television or digital television transmission into audio and video signals which can be further processed to produce sound and a picture. Different tuners are used for different television standards such as PAL, NTSC, ATSC, SECAM, DVBC, DVB-T, ISDB, T-DMB, open cable. Analog tuners can tune only analog signals. An ATSC tuner is a digital tuner that tunes digital signals only and yet some digital tuners have analog bypasses.

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### G. MINE DECIPHER

A land mine is an explosive device, concealed under or on the ground and designed to destroy or disable enemy targets as they pass over or near the device. A metal detector circuit with buzzer is added to the robot to prove its versatility mechanism. When the robot detects any mine it will send a warning message to the laptop and also the buzzer will beep to alarm the people standing nearby.

### H. DESCRIPTION OF WIFI CAMERA AND TUNER

WIFI security cameras are closed-circuit television (CCTV) cameras that transmit a video and audio signal to a wireless receiver through a radio band. Many wireless security cameras require at least one cable or wire for power; “wireless” means to the transmission of video/audio.

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The mine detector module is added to detect land mine present in its way. The gas sensing module MQ6 is used to detect the gas leakage in the arena (LPG). The obstacle detector TSOP 1738 is used to find the way for the robot in automatic mode. Last is the display module, which is done by the help of IP camera module and laptop. For the display to be on the laptop it is necessary that we use an android app called IP camera and configure its settings in the laptop. Through this app the video signals from camera is sent to laptop on which the exact display is detected.

On basis of this display, we can maneuver the robot by controlling unit and will extinguish the fire by the help of the water which is pumped out from the container present over the robot’s base.

**IV. FUTURE SCOPE**

The project has been motivated by the desire to design a system that can detect fires and take appropriate action, without any human intervention. The development of sensor networks and the maturity of robotics suggest that we can use mobile agents for tasks that involve perception of an external stimulus and reacting to the stimulus, even when the reaction involves a significant amount of mechanical actions. This provides us the opportunity to pass on to robots tasks that traditionally humans had to do but was inherently life threatening.

Fire-fighting is an obvious candidate for such automation. Given the number of lives lost regularly in firefighting, the system we envision is crying for adoption. Our experience suggests that designing a fire-fighting system with sensors and robots is within the reach of the current sensor network and mobile agent technologies. Moreover, we believe that the techniques advanced in this work will carry over to other areas involving sensing and reacting to stimulus, where we desire to replace the human with an automated mobile agent.

Of course, this project has only scratched the surface. As in the design is planned in a simplified manner and the implementation constraints suggest that our project is very much a proof-of-concept. In particular, a practical autonomous fire-fighting system must include a collection of robots, communicating and cooperating in the mission; furthermore, such a system requires facilities for going through obstacles in the presence of fire. All such concerns were outside the scope of this project. However, there has been research on many of these pieces in different contexts, e.g., coordination among mobile agents, techniques for overriding the obstacles. It will be both fascinating and challenging to put all this together into a practical, autonomous fire-extinguishing service.

**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.
firefighter in any scenario. Benefited from this technology, since the expense of activating other types of fire extinguishers may outweigh that of a robot, where product stock could be damaged by imprecise fire control methods.

VI. REFERENCES

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