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ijircce@gmail.com



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# Gas/Smoke Detection Using Arduino

Mr. Megharaj Patil<sup>1</sup>, Shivani Chupche<sup>2</sup>, Sonali Jadhav<sup>2</sup>, Aishwarya Kale<sup>2</sup>

Lecturer, Department Computer Engineering, JSPM's RajarshiShahu College of Engineering, Polytechnic, Tathawade,  
Pune, India<sup>1</sup>

Student, Department Computer Engineering, JSPM's RajarshiShahu College of Engineering, Polytechnic, Tathawade,  
Pune, India<sup>2</sup>

**ABSTRACT** - Most of the traditional fire evacuation systems present today are designed on the assumption that the people present in the building have prior knowledge about the nearest safety exits, but this assumption is not true in many cases and has also resulted in the loss of life in several instances. The Fire Evacuation and Detection System is an embedded system which will effectively guide the fire brigade to victim. A network of oxygen and smoke detector sensors placed strategically collects and delivers accurate information about the surroundings to the system. The yolo algorithm is used to calculate the person or human count in the room where fire is there. Based on the count of the person in the room, evacuation app will send notification to fire brigade the team which will contain the count of person in room which will help to evacuate them.

**KEY WORDS:** INTERNET OF THING (IOT), Yolo, evacuation, sensors

## I. INTRODUCTION

Development is occurring in each of the field today. As every sector is utilizing newly developed technologies the need to keep them safe and secure is more important. If there is no security measures available accidents will arise and ends in a big tragedy. Fire accidents is among one of them, as systems are there to control the spread of fire in each sector but it doesn't give a dynamic evacuation path. Countries like Australia, Canada, New Zealand, USA have provided a specialist group for unified, better conceptualized approach to fire safety engineering[1]. In some places mining is an occupation for most of the people, but deeper the mining occurs the chance of workers in protecting from fire disasters become less. So there developed a system that uses sensors, IoT, smartphones, detectors addition with two-way communication and 3D visualization for fire safety[2]. Another problem for increasing fire accidents are lack of knowledge on fire safety. In America 75percent have a home evacuation plan. For this they developed a mobile evacuation having a fire safety plan informing them of the dangers of house fires[3]. In most of the cases there lack a good dynamic path.

We developed an App which will send count of the person to fire brigade team once the smoke sensor have detected the fire.

## II. LITERATURE SURVEY

KhyrinaAirinFariza Abu Samah, BurairahHussin and AbdSamad Hasan Basari [1] developed an algorithm for finding the shortest and safest path during emergency evacuation by modifying the existing Dijkstra algorithm for an intelligent autonomous evacuation system. The methodology states the following changes: (1) modification of nodes direction: the nodes direction is restricted to one-way only so that people don't go near the fire affected and to direct them towards the exit nodes only and (2) modification of Dijkstra's algorithm: the blocking of the related nodes affected by the fire thus, rendering those unusable for exit route. This systems results presented that Dijkstras algorithm can be used as an effective navigation solution in emergency situations. Nor AmalinaMohdSabri, AbdSamad Hasan Basari, BurairahHusin and KhyrinaAirinFariza Abu Samah [2] details about a simulation method using Dijkstras algorithm for evacuation in high rise

buildings. The program was developed on MATLAB and the programs methodology consisted of inputting matrix data, source and destination nodes, removal of affected nodes and the path will be blocked, finally generating a safe exit route. The simulation program attempts to validate the Dijkstra algorithm for generating the safest and shortest path for various different matrix input. Md Saifudaullah Bin Bahrudin and Rosni Abu Kassim [3] developed a fire alarm system with the help of a small single board computer Raspberry Pi and a microcontroller board, the Arduino Uno as a master-slave configuration. The system proposes to alert the user whenever a fire breaks out and ask permission from the user whether to report to the firefighters. The system uses an image captured from the home surveillance camera and sends the image to the user to check the validity of the alert. It was developed on Python and the captured image was displayed on a PHP page. This system demonstrated the use of a cheap and effective solution for detection and alerting users with the help of Raspberry Pi and Arduino Uno.

### III. PROBLEM DEFINITION

The consideration about the exact location where humans are stuck in emergency evacuation of large smart buildings is taken into account. The building evacuation time is crucial in saving lives in emergency situations caused by imminent natural or man-made threats and disasters. We propose to make hybrid model for image recognition to identify victim stuck in building and hardware model to detect the fire.

### IV. PROPOSED SYSTEM

We propose an image recognition system which will help to identify humans which are stuck in fire. Once fire is detected with the help of sensors it will send notification to rescue team and alarm will be ring. If someone is stuck camera will take pic and will pass data to server. Server will process the image and will send notification to rescue team about the location of humans. This will help rescue team to quickly identify the location which will led to less death and quick rescue.

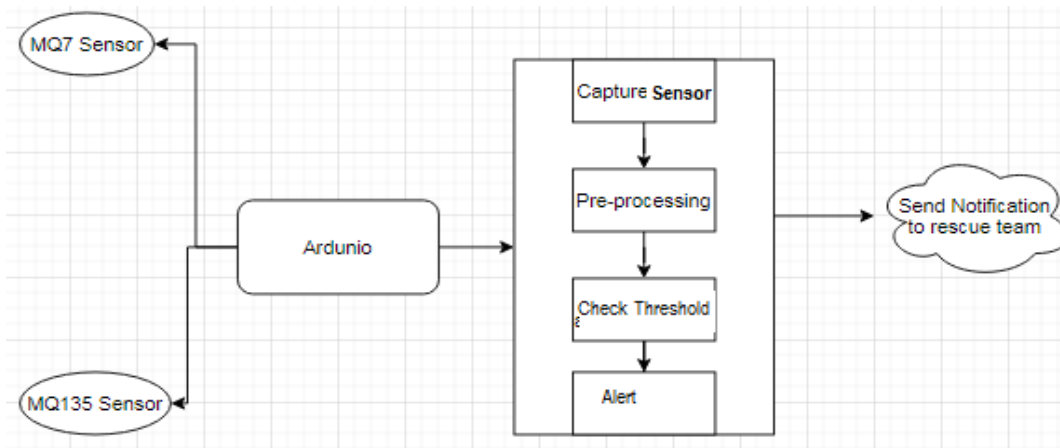


Fig 1. Architecture Diagram

### V. HARDWARE DESCRIPTION

#### MQ7 Sensor:

The MQ-7 smoke sensor is sensitive to smoke and to the following flammable gases:

1. LPG
2. Butane
3. Propane

4. Methane
5. Alcohol
6. Hydrogen

The resistance of the sensor is different depending on the type of the gas.

The smoke sensor has a built-in potentiometer that allows you to adjust the sensor sensitivity according to how accurate you want to detect gas

#### **Working of Hardware:**

The voltage that the sensor outputs changes accordingly to the smoke/gas level that exists in the atmosphere. The sensor outputs a voltage that is proportional to the concentration of smoke/gas.

In other words, the relationship between voltage and gas concentration is the following:

- The greater the gas concentration, the greater the output voltage
- The lower the gas concentration, the lower the output voltage

## **VI. CONCLUSIONS**

The system deals with the finding of dynamic human count using yolo algorithm. It focuses on the finding of humans with less difficulty. According to the project, whenever fire breaks out, sensors will suddenly detect the spread of gases. Thereby giving alerts to the fire brigade team along the interphase to exit victims from the building safely.

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