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# Fire Extinguishing System using LabView

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**Abstract:- As we know today a lot of fire accidents are occurring around us and there is a huge loss of lives due to these fire accidents. Therefore we have developed a solution to this problem by using sensors and embedded system software. With the help of these sensors we will be able to detect if the fire has occurred and the required extinguishing action will be taken accordingly. The extinguishing action consists of alerting the passengers in the train about the accordance of fire with the help of a buzzer and a exhaust fan is switched on. The next action would be sprinkling of water all around the compartment in order to reduce the flames. The further action includes compartment separation so that the fire would not spread to any other compartments. By all these measures the fire accidents will be reduced and also the loss of lives and property would be minimized.**

***Keywords****: - Compartment seperator , Fire sensor, LabView, myRIO , Smoke sensor.*

## I. INTRODUCTION

In a highly populated developing country like India, train journey is most preferred by most of the people because it is economical, comfortable and large number of people can travel large distances. The precautionary messages and warnings given by the Indian railways are not strictly implemented and hence it gives rise to fire accidents and there is a huge loss of lives as well as loss of private and government property due to these accidents. Hence strict and fast measures must be taken in order to reduce such accidents. This can be achieved by implementing an automatic monitoring, controlling and extinguishing system in the compartments of the trains which includes a buzzer, fan, compartment separator and water sprinkler so that the fire accidents will be reduced. We have used My Rio hardware and LAB VIEW software to implement this. This system will automatically monitor the sensors in every compartment. The data from these sensors will be taken and compared with the preset values to check if there is an emergency and necessary actions will take place accordingly thereby reducing the effect of fire accidents.

## II. LITERATURE SURVEY

### *A. Existing System*

The current day Indian railway systems doesn't have a fire rescue monitoring system in the train which is very necessary in case of outbreak of fire and also the separation of the two compartments is done manually by people which is time consuming in case of emergencies and without the separation of compartments it's very difficult to help spreading of fire.

### *B. Drawback of Existing System*

Since the current Indian railway systems doesn't have a fire rescue monitoring system in the train it is very difficult to monitor the fire in the compartment and prevent the spread of the fire to other compartments and also the separation of the two compartments is done manually, which is not at all a better way as it is time consuming and in situation where fire accidents occur each and every minute becomes important, hence it is difficult to obtain a fast response to the problem in currently existing system.

### *C. Proposed system*

In our proposed model whenever there is an outbreak of the fire it can be easily monitored with the help of data from the sensors in the compartment where necessary actions will take place accordingly and also the separation between two compartments takes place mechanically and is automated which in turn becomes a fast response to situations where fire accidents occur and hence reduce the spread of fire to other compartments.

### *D. Abbreviations and Acronyms*

LAB (Laboratory)
VIEW (Virtual Instrumentation Engineering Workbench)

## III. METHODOLOGY

In the proposed model, whenever there is an outbreak of fire, it can immediately be detected with the help of smoke and fire sensors which are present in the compartment of the train. Here we are using 2 sensors in the compartment. The fire sensors are addressable and by Using Lab View we are able to read the inputs from the fire and smoke sensors. The train loco pilot can monitor the status of fire in each compartment. We are defining two levels of fire, whenever the fire is in initial stage, the input from the temperature sensor will be read if that temperature is greater than the first prefixed temperature it is as shown in the table below in Table 1

| Level of the fire | Actions Taken |
|---|---|
| Small | Alarm as well as Fan is turned on inside the compartment |
| Huge | Alarm, Fan on, water sprinkler on, Compartment separation |

Table 1. Status of fire

*A. Hardware Implementation*

We have installed temperature and smoke sensors in the compartment. LM35 and MQ-2 have been used for this purpose .The data from these sensors are read through myRIO by using the Lab View Software. Here myRIO is the heart of the proposed system and it is the hardware used. It can connect to the wireless network easily which helps in fast response and also the range of connectivity is more hence it has been used for this purpose. The implementation of the sensors inside the compartment can be seen in Fig 1 and Fig 2 below. The front view of the proposed system can be seen in Fig 3.


Fig 1:- Smoke sensors installed inside the compartment

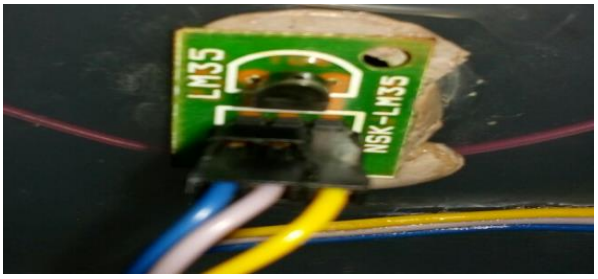


Fig 2:- Temperature Sensors installed inside the compartment


Fig 3:- Front view of Proposed System

The further working of system will be explained in the Software implementation.

*B. Software Implementation*

The Software which we have used here is the NI Lab View. It is a graphical programming language designed by National Instrumentations where we can use a graphical design approach to design prototype and embedded systems. The reasons for choosing LAB VIEW is that since it's a graphical programming language designing of the block diagram is easy and no need to write lines of code and waste time on the compilation it's easy to implement a block diagram instead as in case of this software. The software implementation is as follows, the myRIO continuously monitors the sensors and the data from the sensor is sent to it where the value of sensor is compared with the different conditions implemented in the software and necessary actions are taken place according to it. The flowchart showing the software implementation is shown in Fig 2 below.

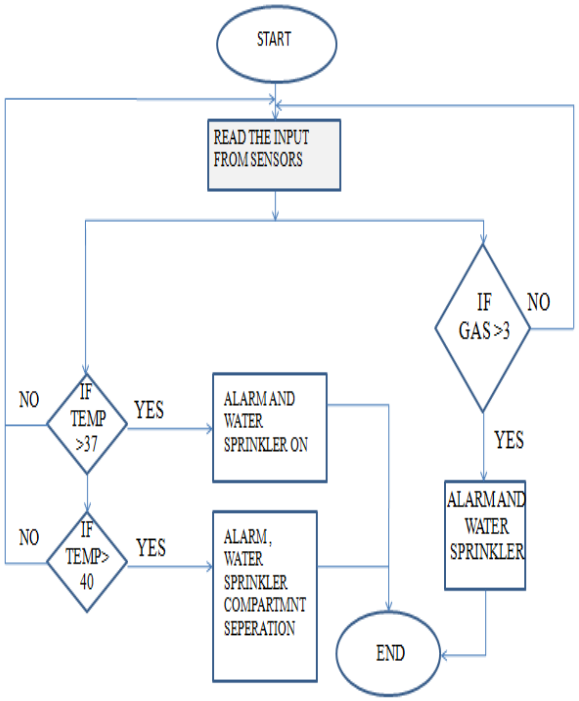


Fig 4: - Flow chart of Software Implementation

We are defining two levels of fire, whenever the fire is in initial stage, the input from the temperature sensor will be read if that temperature is greater than the first prefixed temperature i.e. Temperature > 37 (C), then a small alarm will be given in the compartment as well as a fan will be turned on which will help in extinguishing the fire. If the fire is huge i.e. if the input from the fire sensor is greater than the second prefixed temperature i.e. Temperature > 40 (C), then the above actions along with water sprinkler is activated and the compartment separation takes place through a mechanical action thereby reducing the further spread of fire to other compartment

## IV. RESULTS

The automated fire rescuing system is capable of detecting fire and extinguishing the fire source successfully. The myRIO controls the alarm, water sprinkler and DC

motor for taking necessary actions during emergency. It can detect fire during emergency conditions and is better suited for extinguishing fire inside a Train.

## V. ACKNOWLEDGMENT

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## VI. CONCLUSION

This proposed system is based on wireless network technology. This will be useful for reducing the accidents by detecting fire at initial stage itself, alarming the passengers, alerting the loco pilot to take immediate actions in order to avoid spreading of fire. Hence the system is more secured. Fire on a running train is dangerous since wind helps spread the fire to other coaches thus by implementing the above we provide a solution for fire accident.

## VII. FUTURE WORK

More number of sensors can be mounted on the compartment in order to achieve a better performance and we can also reduce the reaction time detecting the fire source. myRIO is expensive any other hardware which is less expensive and provides the same range of wireless connection can be used. IR sensors can be mounted in the compartment which can help in keeping a count of number of people who are present in compartment which can help in rescue operation during fire accidents.

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