

Automatic Crack and Fire Detection in Train with Disaster Management using IOT

Yashwanth K¹, Harish Gowda K T², Akash H P³, Mukesh K⁴, Rumana Anjum⁵

^{1,2,3,4}Department of Computer Science and Engineering, Vidya Vikas Institute of Engineering and Technology Mysore, India

⁵Asst. Professor, Department of Computer Science and Engineering, Vidya Vikas Institute of Engineering and Technology Mysore, India

Abstract- —Railway is the biggest network where it covers a very large distance for transportation up to that distance railway track was constructed to travel the train on the railway track. The transportation may include goods or passengers. The railway track must be in very good condition if the fault present in the track then it leads to accident and large number of passengers may lose their life or they get injured in the accident. To avoid these types of accidents before the train moves it is necessary to check the track conditioned. So we are using an automated system to analyze the track condition by infrared (IR) sensors this automated system initially detects any fault is there in the track if present then it gets the location of the fault through GPS module and monitors the location to the authority by using GSM module. A fire detection system is also placed in the train to detect the fire if any fire attacks to the train unfortunately.

1. INTRODUCTION

In railways, to transport any train track plays a major role the crack detection is an type of vehicle which controls using microcontroller, obstacle Sensors setup. This model identifies crack along the track. The train also monitors the location of crack by using Global Positioning System(GPS) module and it by using Global System for Mobile(GSM) module. The controlling functions are performed using microcontroller. The vehicle is powered through a Solar panel or Power supply. The train travel on the track and IR sensors are placed on the train front end is used to identify the crack along the track. By using the Global Positioning System module and Global System for Mobile modules is used to send location by using short message service(SMS) to Predefined mobile number.

When the supply is given to device, the DC motor that is direct current motor which converts direct electrical energy into mechanical energy that starts through circuit. Infrared sensors are placed to automatic crack detection vehicle to find out the crack in track. If track is finite state the infrared sensor replies constant output to the sensors. Sensor will sense the defect by alarm and the fire detection sensors are used identify the fire in the train. If in case fire caught suddenly, water is sprinkled on fire identified surface hence the passengers life are saved.

The main advantages are

- To reach Quick Response
- To diminish man power
- To increase system efficiency
- To lessen the work load
- Greater accuracy is achieved
- To lessen time of operation
- To decrease fatigue of workers
- Maintenance is less

2. LITERATURE SURVEY

The main problem in railway system analysis is cracks in railway tracks. If the damaged in crack is not identified at initial stages due to person carelessness or inaccuracy these may lead to huge accidents. In earlier cases a person is send by walking and the person should check dialy whether is track is in good condition or any crack is found in track these is time consuming and very hectic job .In earlier cases the DC motors are placed in train wheels and if crack is found in track the

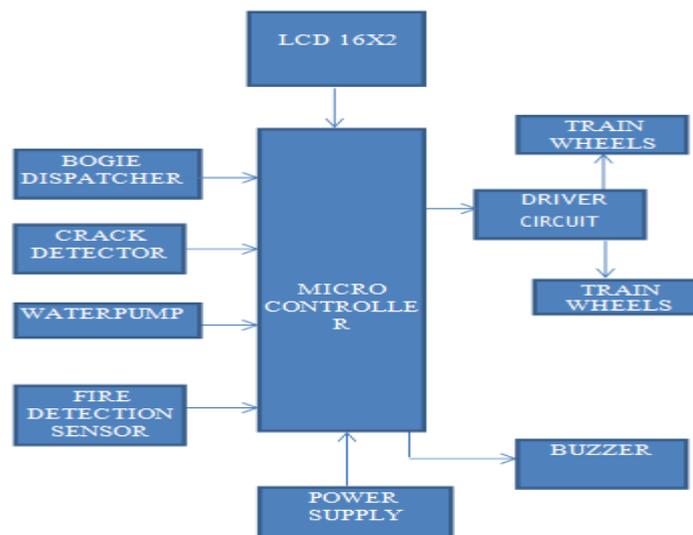
train may not be able to stop due to high speed of train it may not be able to stop and these may lead to huge accidents. The lasers are placed in the train track to identify the crack these are not so efficient because while crossing the train the laser ray may not be able to find the crack detection these may lead to very huge accidents. The main problem is security is very less. In earlier cases the usage of global positioning system and global system for mobile which is used to send and receive location advantages is not in existence if any crack or fire caused in the railway system authority.

3. PROPOSED SYSTEM

Railway is the biggest network which is used for transportation purpose. The microcontroller consists of many blocks that is we are using crack detection and fire detection sensors these two sensors play a major role. Initially a robot is sent to find any crack is present along the track, the train track and robot both consist of crack detection sensors called as infrared sensors and in case any crack is found in the track the robot will send a message to the engine by the zigbee transmitter that is type of transmitter which is two way communication between robot and engine if crack is not found train will move and if crack found robot will send a message to the engine and the crack detected place that is location is sent to nearest railway authority by using Global System for Mobile(GSM) to the required number. Hence the life of passengers are saved. While travelling in the train suddenly fire is caught by any of the compartment then we had place a fire detection sensors and boggies are dispatched from the train and boggies which are not caught by fire will move further and the boggies which are caught by fire for those compartment the fire detection sensor are immediately activated to save the passengers. we placed a water pump that is water sprinkler is turned on and what is blown to the compartment the buzzer is turned on and it will produce a beep sound the message is passed through global system for mobile to the nearest railway authority and the authority will take further actions to save the passengers.

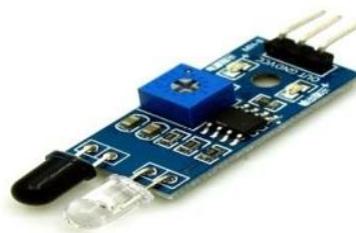
4. SYSTEM STRUCTURE

4.1 BLOCK DIAGRAM:



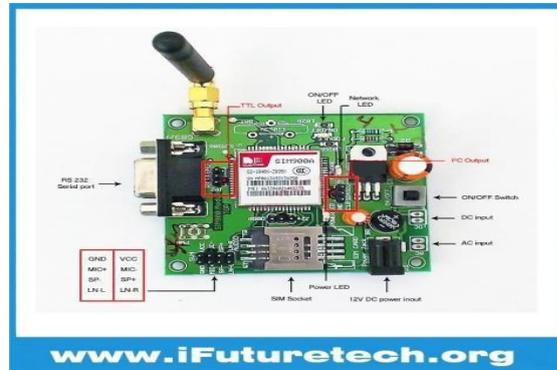
4.2 IR SENSOR:

Infrared sensor is a device, that sense some aspects of the surroundings. An IR sensor is used to identify the crack in the track of the railway system it is placed to the robot module and the engine module.



4.3 GSM MODULE:

The SIM card mounted **GSM modem** upon receiving digit command by SMS from any cell phone send that data to the MC through serial communication. These are used to send and receive the message if any accidents happen at the track location to the nearest railway authority.



4.4 FIRE DETECTION SENSOR:

A fire sensor used to identify and respond to the presence of fire. If fire caught accidentally then fire sensor immediately activated by the compartment where it caught by fire.

RobotDyrn



4.5 BOGIE DISPATCHER

The bogie dispatcher is used when the compartment of the train is caught by fire then immediately the bogie of the train will dispatched.

4.6 POWER SUPPLY

The power supply is used after the fire is caught by the compartment by avoid the fire water sprinkler is turned on to save passengers to turn on sprinkler power supply is used.

CONCLUSION

As railway network is one of the important transport in India by which most of the commercial transport is carried out, the safety of the whole system is equally important and must be taken care efficiently. Accidents in the railway transportation authority systems price an highest range of lives. Many people die and several others get physically or mentally injured. This paper presents an efficient way to detect the crack in track by IR sensor, fire in train by fire detection sensor and monitors about the location of the crack to the railway authority using GPS and GSM modules also it ensures a reliable transportation for passengers.

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