

An Enhanced Crack Detection System for Railway Track

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Abstract— In this project we introduced the integration of railway track surveying system. In our proposed system it is used to detect the railway crack. This project consists of IR sensor & fire sensor. The IR sensor is used to detect the crack and as well as distances, fire sensors used to detect the fire accidents. To communicate the received information, we make use of a GSM modem. The GSM module is being used to send the current latitude and longitude data to the relevant authority as an SMS. The importance of this project is applicable both day & night time detection process applicable both day & night time detection process.

Keywords— IR sharp sensor, relay, pic-microcontroller, alarm, DC motor, GSM modem

I. INTRODUCTION

The project relates to the location of singular points in the automatic control of railway tracks. According to a possible embodiment, the railway carriage carrying the control equipments is provided with sensor orientated to detect the crack and fire sensor used to detect the fire. Ultrasonic sensor is used to detect the crack as well as distance. This project pertains to a process for monitoring the condition of rail on train tracks and more specifically has the object of the identification of defects detected by monitoring equipment on the tracks to be checked to allow maintenance crews to subsequently find these defects. When we give the supply to the device, the DC motor gets start through relay driver circuit. Two IR sensors are fixed in front of the train is used to find out the crack on the rail. Each sensor will produce the signal related position with the rail. If the track is normal on its position both the sensor gives the constant sensed output. If anyone misses their output condition to fail then there is defect on that side. It will inform this by giving alarm and also fire sensor are used to detect the fire. If the fire is detected automatically spread the water over a fire detected Surface. Ultrasonic sensor is also used to measure the distance of crack.

II. LITERATURE SURVEY

In base station between two signals any track are broken, cut the track, and any fault means signal is transmitted to signal engineer, because 5volt power will be passing to track This technique used only for base station.

They are Using technique are:

A. Microcontroller: ATmega162

The ATmega162 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega162 achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.

B. GPS

The GPS is used to receive the position data from the vehicles and display on a digital map. It too will have the interface to the communication link. Enhanced features include video features, trace mode, history track, vehicle database, network support.



Fig.1. Railway crack diagram

Oral communication through telephonic and telegraphic conversations. IR sensors are also used to identify the crack in the railway. LASER, proximity sensor and detectors are, use to satellite communication. No combined solution for collisions avoidance, derailment and railway gate control. In this process is high cost, difficult, time wastage.

III. PROPOSED METHOD

This technique is used for outside of base station. Measuring distance between two rail tracks IR sensors are used to detect the crack in the track. If anyone pursuing on the track means they stop the surveying work IR sensors used to detect the crack in railway track. Two IR sensors are fixed in front of the train is used to find out the crack on the rail. Each sensor will produce the signal related position with the rail. Infrared (IR) transmitter is one type of LED which emits

infrared rays generally called as IR transmitter. Similarly IR Receiver is used to receive the IR rays transmitted both IR transmitter. One important point is both IR transmitter and receiver should be placed straight line to each other. If the track is normal on its position both the sensor gives the constant Sensed output.

BLOCK DIAGRAM

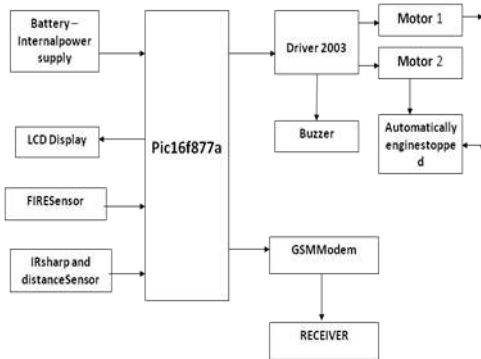


Fig.2. Block diagram

If anyone misses their output condition to fail then there is defect on that side. It will inform this by giving alarm and also fire sensor are used to detect the fire. If the fire is detected automatically spread the water over a fire detected surface.

The GSM module is being used to send the current latitude and longitude data to the relevant authority as an SMS. The importance of this project is applicable both day & night time detection process.

A. IR Sharp Sensor

An IR sharp sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. IR sensors are also capable of measuring the heat being emitted by an object and detecting motion.



Fig.3. IR sharp sensor module

Infrared waves are not visible to the human eye. In the electromagnetic spectrum, infrared radiation can be found between the visible and microwave regions. The infrared wave's typically have wavelengths between 0.75 and 1000µm.

The wavelength region which ranges from 0.75 to 3µm is known as the near infrared regions. The region between 3 and 6µm is known as the mid-infrared and infrared radiation which has a wavelength greater than 6µm is known as far infrared.

APPLICATIONS

- ❖ Night vision
- ❖ Gas detectors
- ❖ Water analysis
- ❖ Petroleum exploration
- ❖ Rail safety

B. Fire sensor

The fire sensor is used to detect the fire in the inside of train they will be temperature is increased buzzer is ON so alert the all passenger. And motor is on so they will be water is spread over the fire the Signal is passed to controller. Flame detectors respond to the production of one or a combination of ultra-violet or infrared spectrums of electromagnetic radiation. These detectors are often used in situations where there is a potential for the rapid development of fire such as flammable liquids. These detectors comprise an electronic circuit with an electromagnetic radiation receiver. Flame detectors are actuated when they receive electromagnetic radiation from one or more defined wave lengths are received according to their design in the ultra-violet or infrared spectrum.

IV. SOFTWARE DETAILS

A. MP LAB IDE

MP lab is a microchip process and IDE is the international development environment

B. Correct Errors

If an error occurs you will get a Build fails message. If you double click on the error Message you will be taken to the Line with the error so that you can correct it.

C. Test on board

Pressing the button should cause one of the LEDs to go on or off.



Fig.4. Testing circuit

D. Emulator

If you go to the debug menu, and select the simulator tool then you can simulate the running of your program using an emulator. This enables you to single step through your program.

E. Running in Simulation mode

The current line being executed is indicated by an arrow in the source window

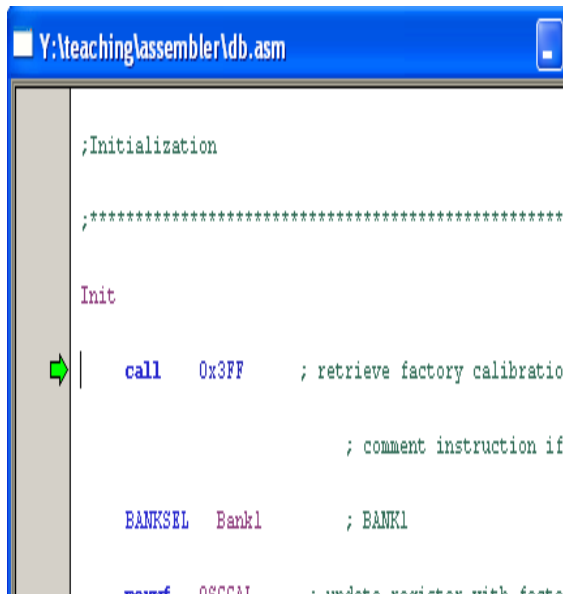


Fig.5. Simulate instruction

V. RESULT AND DISCUSSION

The sensors sense the crack and send the information to the microcontroller, where it responds give the command to the particular component with predefined algorithm, the time parameters are crucial which can be easily changed and modified using microcontrollers. Thus, this device would help to reduce the train collisions.



Fig.5.kit diagram

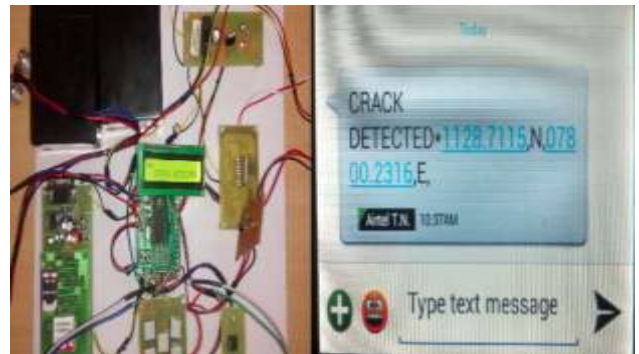


Fig.6. Output of crack detected



Fig.7. Output of track distance

VI. CONCLUSION

The various types of sensors are used in this paper .The ultrasonic sensor is to measure the crack and track distances. And it's have the high efficiency and it has been done using proteus electronic simulation package. Therefore Train collisions, derauling rail track accidents are avoided. Flame detectors respond to the production of one or a combination of ultra-violet or infrared spectrums of electromagnetic radiation. Infrared waves are not visible to the human eye. It detects the crack in the track. Hence it is expected that, major train mishaps can be prevented and human life saved if this system is implemented.

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