

# Robust Railway Crack Detection Scheme Using IR and Ultrasonic Sensors

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**ABSTRACT:** The project relates to the location of singular points in the automatic control of railway tracks. According to a possible representation, the railway carriage carrying the control equipment's is provided with ultrasonic sensor to detect the crack and IR Sensor is used to detect the object. And send the message to the railway office. Accidents prevent system for railways using global positioning system, which means every train has individual GPS module for communicate the message with head office. Also the head office contains one GPS module for communication with trains. Generally, each train transmits the present traveling location to head office. Therefore, head office monitors the all train locations.

**KEYWORDS:** Ultrasonic sensor, IR Sensor, GPS, GSM.

## I.INTRODUCTION

Present industry is increasingly shifting towards automation. Two principle components of today's industrial automations are programmable controllers and robots. In order to aid the tedious work and to serve the mankind, today there is a general tendency to develop an intelligent operation. The proposed system "ROBUST RAILWAY CRACK DETECTION SCHEME USING IR AND ULTRASONIC SENSORS" is designed and developed to accomplish the various tasks in an adverse environment of an industry. The intelligent using Atmega162 microcontroller, Gsm modem. This project is an own to the technical advancement. This prototype system can be applied effectively and efficiently in an expanded dimension to fit for the requirement of industrial, research and commercial applications. Microcontroller is the heart of the device which handles all the sub devices connected across it. We have used as microcontroller. It has flash type reprogrammable memory. It has some peripheral devices to play this project perform. It also provides sufficient power to inbuilt peripheral devices. We need not give individually to all devices. The peripheral devices also activates as low power operation mode. These are the advantages are appear here.

## II.RELATED WORK

Every train transmits the ongoing locations to head office through GPS module. So the head office monitors the locations of each train. If any crack if detected by ultrasonic it stop the train and send alert to authority of railway office. We are using the GPS for receiving function and GSM for transmission function. The all over devices can control by Atmega162 controller. LCD is used for display the messages train coming from anywhere. It is the efficient system for railways at all times for prevent accidents. The project consists of Microcontroller, IR sensor, SCU, Alarm, Relay and DC motor. 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.

### III.HARDWARE DESCRIPTION

#### A.ATMEGA

The high performance, low power microchip 8-bit AVR RISC-based microcontroller combines 16kb of programmable flash memory, 1kb SRAM, 512B EEPROM, and a JTAG interface for on-chip debugging. The device supports throughput of 16MIPS at 16MHz and operates between 2.7-5.5 volts.

#### B.LCD DISPLAY

Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal

#### C.GPS

The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites. It is maintained by the United States government and is freely accessible by anyone with a GPS receiver.

#### D.GSM

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.

#### E.ULTRASONIC SENSOR

Ultrasonic sensors (also known as **transceivers** when they both send and receive) work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object.

#### F.IR SENSOR

An **Infrared sensor (IR sensor)** is an electronic device that measures infrared (IR) light radiating from objects in its field of view. Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall.

### IV. EXPERIMENTAL RESULTS

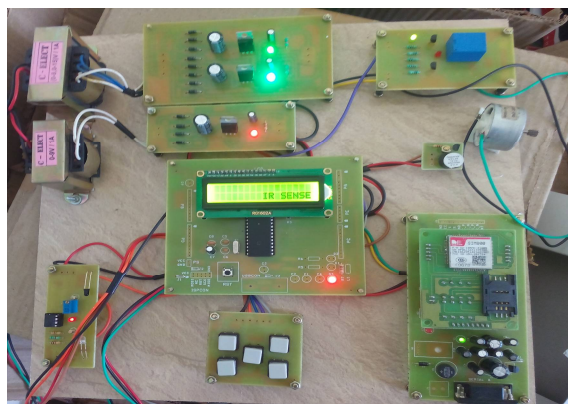
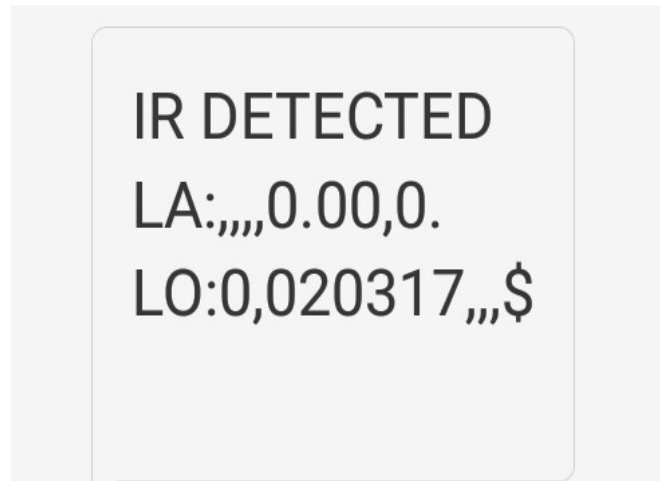


Figure 1. Output



**Figure 2. Values of Latitude and Longitude**

## V. CONCLUSION

The progress in science & technology is a non-stop process. New things and new technology are being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place.

The proposed system based on Atmega microcontroller is found to be more compact, user friendly and less complex, which can readily be used in order to perform. Several tedious and repetitive tasks. Though it is designed keeping in mind about the need for industry, it can extended for other purposes such as commercial & research applications. Due to the probability of high technology (Atmega microcontroller) used this” **ROBUST RAILWAY CRACK DETECTION SCHEME USING IR AND ULTRASONIC SENSORS**” is fully software controlled with less hardware circuit. The feature makes this system is the base for future systems. The principle of the development of science is that “nothing is impossible”. So we shall look forward to a bright & sophisticated world.

## REFERENCES

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