



A REVIEW ON AUTOMATIC CRACK IN TRACK AND OBSTACLE DETECTION IN RAILWAY.

¹Kurhe Pooja P., ²Kurhe Sakshi P., ³Dabhade Vrushali D.

¹UG Scholar Dept. Of Electrical Engineering S.N.D.C.O.E.&R.C.Yeola– Nashik, Maharashtra

²UG Scholar Dept. Of Electrical Engineering S.N.D.C.O.E.&R.C.Yeola– Nashik, Maharashtra

³UG Scholar Dept. Of Electrical Engineering S.N.D.C.O.E.&R.C.Yeola– Nashik, Maharashtra

poojakurhe2001@gmail.com

ABSTRACT:–The Indian Railway consists one of the largest railway networks in the whole world, covering more than 1,15,000 km in distance, all over India. Anyway, as to unwavering quality, reliability and traveler wellbeing of Indian Railway doesn't depend on the worldwide principles. Among different variables, the breaks are created on the rail line tracks because of nonappearance of the wasteful ideal location.

Our work includes a venture that points of planning a rail route break identification framework (RCDS) utilizing ultrasonic sensor, The GSM (Global system for mobile communications), GPS (Global Positioning System) and Arduino based module whose implementation is an efficient method of detecting the cracks which is present in the tracks and thus avoiding derailment of the trains.

Keywords :- GSM, GPS, Efficient, Detection, Derailment.

I. INTRODUCTION

Transport is a key necessity for specialization that allows production and consumption of products to occur at different locations. Transport has through out his to been as per to expansion as better transport prompts more trade. Economic thriving has forever been reliant upon expanding the limit and judiciousness of transport. Be that as it may, the infrastructure and activity of transport incredibly affects the land and is the biggest drainer of energy, making transport supportability and safety a significant issue. In India, We find that rail transport possesses a noticeable situation in giving the fundamental vehicle framework to maintain and extinguish the always prospering necessities of a quickly developing economy. The Indian Railway organization to day has a track length of 113,617 kilometers (70,598mi) over out of 63,974 kilometers (39,752mi) and 7,083 stations. It is the fourth largest railway network in the world exceeded only by those of the United States, Russia and China. The rail network traverses every length and breadth of India and is known carry over 30 million passengers and 2.8 million to eight daily.

II. EXISTING SYSTEM

India has one of the largest railway networks, which utilizing the task of manual inspection and detecting a crack on these railway tracks is very tedious process. The

existing work involved in railway tracks crack detection is an autonomous vehicle using an PIC Microcontroller , obstacle sensors assembly setup. This model detects the cracks along its path . The vehicle is also capable of monitoring the location of the crack by using the GPS module and alerts using GSM module . The controlling functions are performed using PIC microcontroller . The vehicle is powered through a solar panel and Lead Acid Battery assembly . The vehicle moves along the path of railway track and IR obstacle sensors mounted on the vehicle front end is used to inspect the crack along the path . When any crack or deformation is detected on the track the vehicle stops and the location of the crack is identified and the latitude , longitude Co – ordinates are traced using the GPS module and GSM module is used to send these location co – ordination in the form of Short Messages Service (SMS) to the predefined number .

III. BLOCK DIAGRAM

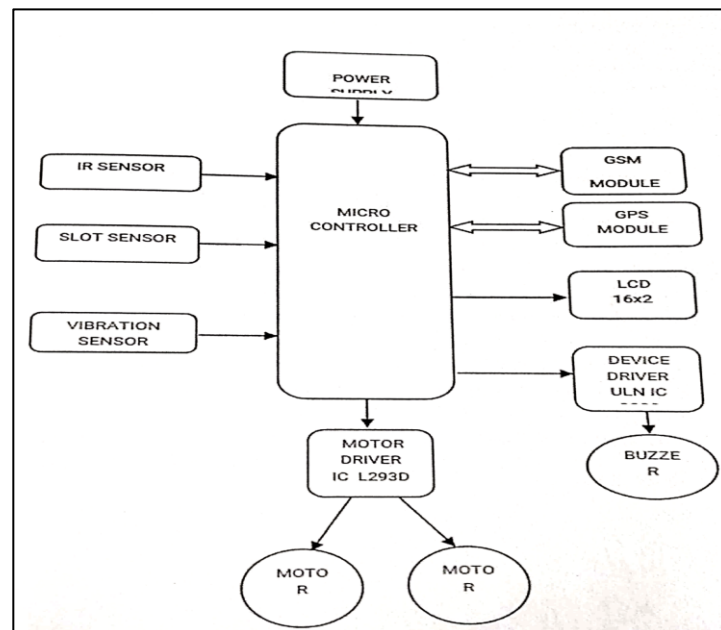


Fig1: Block Diagram

Our circuit requires power supply of +5 volt and +12 volt. Microcontroller requires +5 volt for its operation . Power supply is design by using transformer , bridge rectifier , filters and regulators.

Transformer used is step- down transformer. A bridge rectifier is used which uses diodes to rectify the AC signal . A regulator IC 7805 is used which regulates 5v DC at the output and IC 7812 regulates 12v DC at output.

The block diagram shows basic construction of railway track fault detection system which is used for crack detection . The central component of this project is Microcontroller. The main objective of the project is to define any railway track fault using this system , which can be implemented in by Railway. The proposed of this project is simplify the railway line maintenance and easy to find the fault. The main design of the autonomous track detection vehicle. The current system has railway laborers walking on the railway tracks and detecting

the fault manually .

This requires a lot of time and labor. In some countries railway crack detection is carried out using LDR sensors .In its placed we are using SLOT sensor for railway track crack detection . When the vehicle is powered On, it moves along the model track . The SLOT sensors monitors the condition of the tracks. When a crack is detected by the sensor the vehicle stops at once, and the GPS receiver triangulates the position of the vehicle to receive the Latitude and Longitude coordinates of the vehicle position , from satellites. The Latitude and Longitude coordinates received by GPS are converted into a text message which is done by Microcontroller. The GSM module sends the text message to the predefined number with the help of SIM card that is inserted into the module. Once crack is detected the message has been successfully sent to the number, the vehicle stops its movement. We are using IR sensor to detect obstacle in front of railway. If any obstacle is detected immediately vehicle stops and message will display on LCD and through GSM message will send to the predefined number with the help of SIM card that is inserted in to the module.

IV. REQUIRED COMPONENTS

A. GSM Module



Fig2 : GSM Module

GSM is a mobile communication modern; it is stands for global system for mobile communication (GSM) . The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in world . GSM is an open and digital cellular technology used for transmitting mobile voice and data services at the 850 MHZ , 900 MHZ , 1800 MHZ and 1900 MHZ frequency bands .

B. L293D

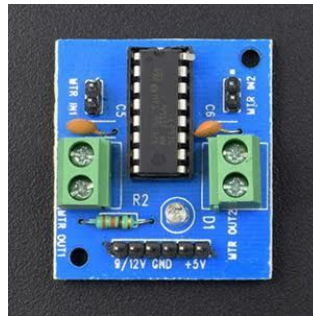


Fig3: L293D Motor Driver

L293D is a typical. Motor driver or motor driver IC which allows DC motor to drive on either direction . L293D is a 16 – pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC . Dual H – bridge motor driver integrated circuit .(IC)

The L293D can drive small and quiet big motors as well , check the voltage specifications at the end of this page for more info .

C. LCD

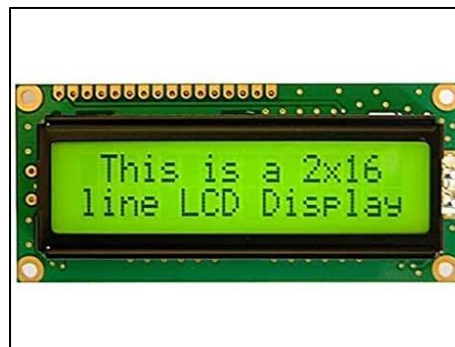


Fig4: LCD Display

Features of 16×2 LCD Module:

1. Operating voltage is 4.7V to 5.3V.
2. Current consumption is 1mA without backlight.
3. Alphanumeric LCD display module, meaning can display alphabets and numbers.
4. Consist of two row can print 16 characters.

D. Slot Sensor.

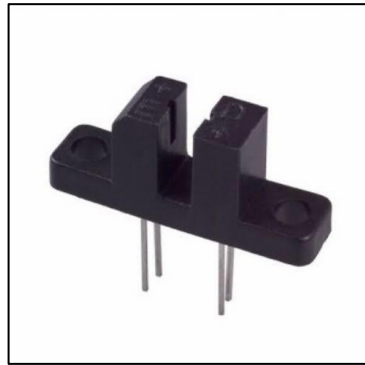


Fig5: Slot Sensor

M8×1 connector Model Number RAL50-IR/32/98. Slot grid sensor with 3-pin , slot sensor are ideal for filling and counting objects in feed devices.

Features:-

- Open frame with wide detection area.
- Optimized for detection of small parts up to 0.5mm.
- Option to suppress stationary objects.
- Detection of very small guided and non-guided parts in free fall.

E. Microcontroller

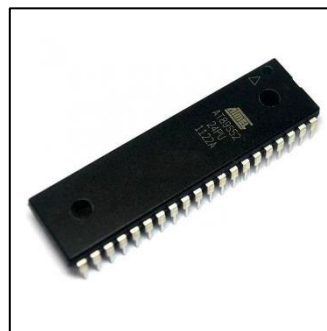


Fig6: Microcontroller

The AT89S52 is a low – power , high performance CMOS 8 – bit Microcontroller with 8K byte of in – system programmable flash memory . The device is manufactured using Atmel's high - density non volatile memory technology and is compatible with the industry – standard 80C51 instruction set and pinout . The on chip flash allows the program memory to be reprogrammed in – system or by a conventional non volatile memory programmer.

V. CONCLUSION

According to the review the current frameworks are tedious as well as uneconomical . The proposed framework isn't just conquered these issues yet in addition further develop exactness and break discovery in rails . It is the most affordable arrangement given to accomplish great



consequences of railroads of our to limit the details of mishaps caused. There by conceivable to save valuable existences of travelers and loss of economy. It likewise sets aside the time and cash for ID of break.

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