# SMART SOLUTIONS FOR RAILWAYS

*ABSTRACT*Even with greatest of ideas to avoid railway accidents, many trains accidents still happen worldwide. This paper shares an idea on how to avoid train collision by using an automated control incorporated in the trains. In this proposed paper we have implemented ideas such as pre-crashing using RFID sensor, ultrasonic sensor in-order to choose an array of commands which would run as per the conditional algorithm created in the microcontroller. We would also have a EPM to control the speed of the motor to lessen speed. This system will be more efficient since it was fully automated and also it was cost effective.

INTRODUCTION

We wanted to be apart of our surrounding with some change and advancement so that it can bring the better life of the middle class and lower class people to travel in high secutity and advanced locomotions .the train is one and only most widely used transportion,and not only for this they are used for goods transportion also .Indian railways are not able to facilate the customer properly due to crowded amount of people. Statistics show that the leading cause of death by injury in railways traffic accidents(two train collision each other). There are number of causes for which an accident can occur, some of them are; lack of training for driving or less experinessed, use of mobile phone while driving, unskilled drivers, driving while intoxicated, bad railway tack condition, overloading in tain and negligence traffic management. In this survey paper, we briefly review selected railway accidents detection techniques and propose a solution. Rear end crashes occur mainly due to obstracle and crack in tracks.According to recent statistics, a major percentage of train accidenthappen due to not proper survillance of railway track
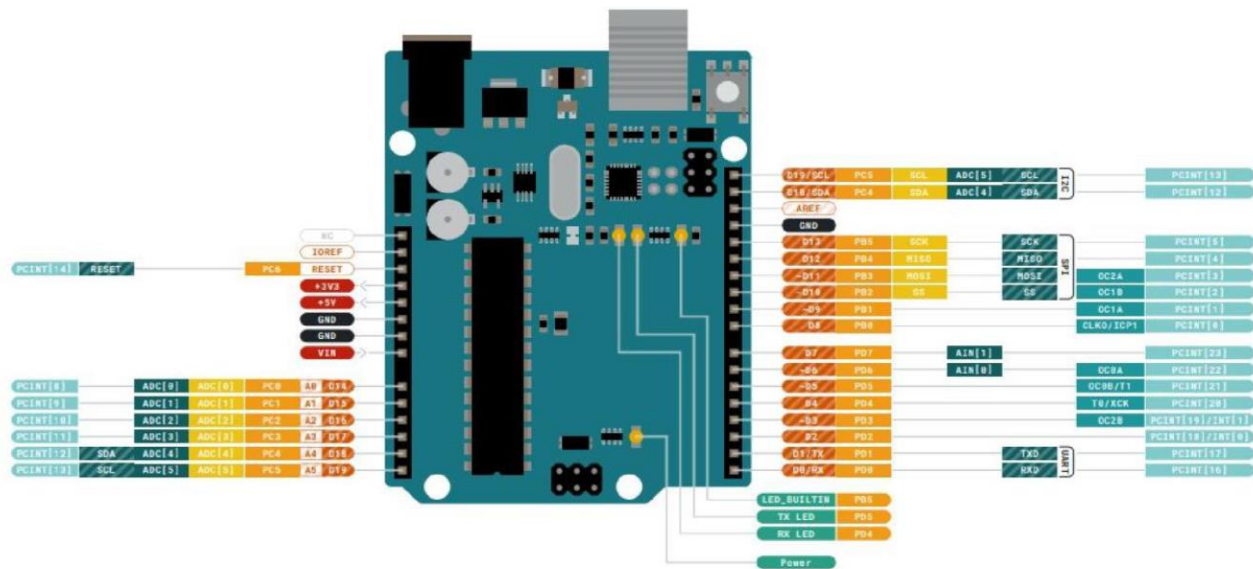
| Ground | | ☑ Digital Pin | | ■ Analog | | ⚠ **MAXIMUM** current per I/O | **VIN** 6-20 V input to the board. |
| Power | | ☐ Analog Pin | | ☑ Communication | | pin is 20mA | |

Make a 3 bit counter with a delay of 500ms in between the count.

Use 3 separate LEDs.

Simulation tool - TinkerCad.

Description :

At 000; LED1 Low LED2 Low LED3 Low

At 001; LED1 Low LED2 Low LED3 HIGH

At 010; LED1 Low LED2 HIGH LED3 Low

...

At 111; LED1 HIGH LED2 HIGH LED3 HIGH

FINAL CODE OF THE PROJECT

```python
# Import common libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
# Import the PyGeohydro libaray tools
import pygeohydro as gh
from pygeohydro
import SSFR, plot
# Use the smart solution for railways(SSFR)
ssfr = SSFR()
# Specify date range of interest
dates = ("2021-12-31", "2022-12-31")
# Filter stations to have only those with proper dates
stations = info_box[(info_box.begin_date <= dates[0]) &
(info_box.end_date >= dates[1])].site_no.tolist()
# Remove duplicates by converting to a set
stations = set(stations)
# Specify characteristics of interest
select_attributes = journey time ,train announcement , waiting
    arrangement ,security in the station, seat
condition
# Initialize a storage matrix
nldi_data = np.zeros((len(flow_data.columns), len(select_attributes)))
# Loop through all gages, and request NLDI data near each gage
for i, st in enumerate(flow_data.columns):
# Navigate up all flowlines from gage
flowlines = NLDI().navigate_byid(fsource = 'nwissite',
fid = f'{st}',
navigation="upstreamTributaries",
```

```
source = 'flowlines', distance = 10)

# Get the nearest comid

station_comid = flowlines.nhdplus_comid.to_list()[0]

# Source NLDI local data

nldi_data[i,:] = NLDI().getcharacteristic_byid(station_comid, "local",
    char_ids = select_attribute
```

Conclusion:

By using this Autonomous vehicle for purpose of railway track inspection and crack detection, it will have a great impact in the maintenance of the tracks which will help in preventing train accidents to a very large extent. The regions where manual inspection is not possible, like in deep coal mines, mountain regions and dense thick forest regions can be easily done using this vehicle. By using this vehicle for the purpose of Railway track inspection and crack detection and automated SMS will be sent to pre-defined phone number whenever the vehicle sensors detect any crack or deformation. This will help in maintenance and monitoring the condition of railway tracks without any errors and thereby maintaining the tracks in good condition, preventing train accidents to very large extent Railway track crack detection autonomous vehicle is designed in such a way that it detects the cracks or deformities on the track which when rectified in time will reduce train accidents