

INTEL UNNATI GRAND CHALLENGE

SUMMER 2023

TECHNICAL REPORT

ANALYSIS OF ACCIDENT-PRONE AREAS AND AVOIDING  
ROAD ACCIDENTS USING SENSORS IN VEHICLES

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## ABSTRACT:

In this report we have analysed the road accidents in India using GIS (Geographic information system) tools. QGIS (Quantum geographic information system) tool, the study is made with the help of the collected data. Main cause for road accidents is the vehicle fitness. Our report briefly gives you a clear understanding about the usage of the sensors in the vehicles to avoid the road accidents in our day-to-day life.

## INTRODUCTION:

Road accident is one of the emerging threats in a busy country like India. Every day 414 life's lost due to road accidents. India is one of the major accident-prone countries and ranking first in the number of road accident deaths across the 199 countries and 11% road accident leads to death.

## SCOPE AND OBJECTIVES:

- Avoids the drivers to use the phone.
- Keeps the vehicles fit.
- Makes sure the vehicle is not overloaded.
- Guides the driver in accident prone area.
- Makes the vehicle to maintain the speed by alarming and also makes the vehicle slow down.

## PRIOR WORK:

- Several sensors that are listed below is used to check the fitness of the vehicle before starting their journey to their destination.
- Load cell sensor is used to find the force or weight in the tyre and indicates the driver that the vehicle is overload.
- Guides the driver by indicating the pits, highs and lows in the road in an accident-prone area or region.

- AED sensor is used so that when ever the vehicle exceeds the maximum speed. It makes the vehicle to halt and makes the vehicle to maintain the speed.
- When the driver phone gets connected to vehicle through the Bluetooth, the phone notifications won't be shown in their phone but the notification would be shown in the vehicle.

## ANALYSIS TOOLS:

The following technologies were put to work by us for the analysis and presentation of the data.

### LiDAR:

Light Detection And Ranging used in connected in autonomous vehicles. It detects pedestrians. It can navigate the road up to 200 meters. It helps to prevent collisions. It also detects mount and pit between the range.

### AEB:

Autonomous Emergency Braking is a camera-based sensor which is used to control the speed of the vehicle. If the sensor detects any object in low range, it automatically halts or slow the vehicle.

### TPMS:

Tire Pressure Monitoring System can prevent tire burst and unsafe driving condition by checking the tire pressure. If the tire pressure is low then the sensor will indicate by yellow symbol.

### LOAD CELL SENSOR:

Load Cell Sensor is an electro-mechanical sensor used to measure force or weight. It converts input mechanical force to electrical output signal.

## Python:

Various libraries like NumPy, Pandas, Matplotlib, and Seaborn and packages available in this flexible programming language. Python is a popular tool for interactive analysis of data and visualization involves the Jupyter Notebook.

## KEPLER:

Kepler.gl is a high-performance visualization tool. It can be used for visualisation purpose. It supports 2-S and 3-D visualisations. It supports two formats of data.

- CSV-format
- GeoJSON format

Data can be uploaded in three sources-Local file, URL, Sample data.

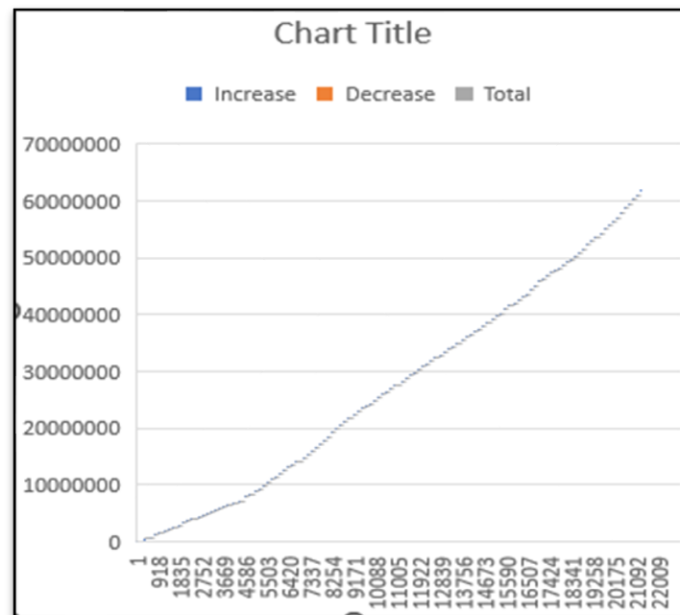
## QGIS ANALYSIS:

QGIS, which stands for Quantum GIS, is a popular open-source GIS software that provides a wide range of capabilities for geospatial data analysis, visualization and editing.



## SPEED COUNT GRAPH:

This graph provides the graphical representation of speed and the count of speed of the vehicles.



## CONCLUSION:

By using the specific sensor to the vehicles can improve the road safety. Thereby the percentage of road accidents in India can be reduced. From our analysis, the emerging road accident trends can be reduced in the future by implementing our project.

## REFERENCES:

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