ACCIDENT LOCATIONS ON INDIAN ROADS

Team Name: GIRLS ALOUD

Team Members: S. Visaga Varshini and S. Suja

Mentor Name: Dr. S. KALAIVANI

Name of the Institution: B. S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY, CHENNAI.

ABSTRACT

Road transport is the most economical way of travel when compared to all other options. Most people use roads for all of their transportation needs. As a result, the number of traffic-related events, injuries, and fatalities has remained too high. The World Health Organisation reports that 3700 people worldwide die in road traffic accidents per day, or roughly 1.35 million people worldwide every year [1]. Figure 1 shows one such accident happened on Indian road.

Fig 1: Accident on Indian road

The goal of this study is to locate accident-prone locations and examine the variables influencing the distribution of traffic accidents.

INTRODUCTION

Studies and actions to prevent traffic accidents and the harm they do, particularly in recent decades, have grown crucial. In 2021, there were an average of 12.6% more traffic accidents than there were in 2020. Similar to this, the number of fatalities and injuries from traffic accidents rose by 16.9% and 10.39%, respectively. According to a recently released poll, over 1.5 lakh people die on Indian roads each

year, translating to an average of 1130 accidents and 422 fatalities every day or 47 accidents and 18 fatalities per hour. The major causes of road accidents in Indian road during the year 2021 is shown in Figure 2.
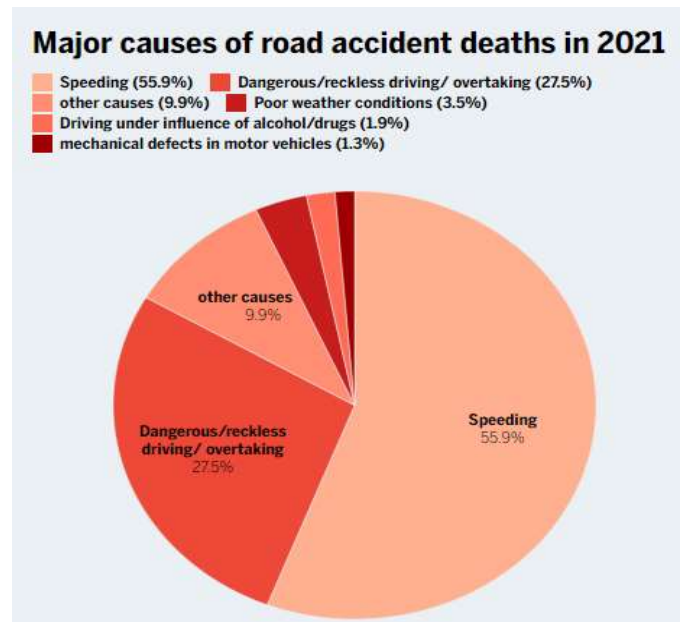

Fig 2: Analysis of Major causes of road accidents in Indian road

Traffic accidents waste time, destroy property, and deplete human resources in society. Modelling accident-prone locations is one of the suggested solutions to the problem of auto accidents because by identifying these locations, accident-causing elements may be found, and their elimination results in a decrease in accidents. Numerous studies have been done in this regard, identifying these points and conducting the requisite analysis on them using official police data. Official data is incomplete and lacking. The issues with using official data can be resolved by leveraging volunteer geographic information to identify accident-prone locations [2]. The utilization of volunteered geographic data in relation to the accidents and their causes is the goal of this study.

METHODOLOGY

Traffic accidents are not uniformly dispersed from the perspective of spatial dispersion. They congregate in one spot in some places, yet this phenomenon might not exist in other places. This occurrence also happens close to highway exit ramps [3]. So, the spatial characteristics of traffic accidents were examined using geographic information system (GIS) technology.

The "BLACK SPOT" is the location where accidents frequently happen. One of the best ways to prevent traffic accidents is commonly considered as the detection, analysis, and treatment of road accident black spots. Therefore, black spots are

identified in this study at various areas throughout Tamil Nadu, and a brief investigation of the black spot is also performed.

- **Name of the place chosen for analysis:** TAMIL NADU
- **Software used:** GIS software named "**QGIS".**

(i) GIS Software

The Geographic Information System (GIS) is a useful tool for visually representing the dark patches. GIS combines technology, software, and information to collect, manage, analyze, and present all kinds of spatially related data. Prioritizing the occurrence of accidents on roads is made easier by the capacity of GIS to combine attribute data with spatial data. The findings can be visually shown and used for planning and decision-making. After that, logical steps can be done to increase safety in the accident-prone areas.

(ii) Data Analysis

This data includes the location of various black spots at **Tamilnadu**

S. No.	NAME OF THE LOCATION	DISTRICT	REASON FOR BEING A BLACK SPOT	NH NUMBER	NUMBER OF FATALITIES
1	Ponnerikarai-white gate	Kancheepuram	Darkplace Poor lighting	NH -4	115
2	V-kaikatti 4 road junction	Ariyalur	Not following traffic rules	NH-226	15
3	Krishnagiri to banglore opp to ameeria petrol bunk	Krishnagiri	Rash Driving	NH-7	14
4	Tea kada bus stop,Urapakkam	Kancheepuram	Speed Breaker	NH-45	25
5	Sriperumbadur west bye-pass	Kancheepuram	Overspeeding of Vehicles	NH-4	24
6	Paranur bus stop-1/2 km	Kancheepuram	Speed breaker,tower lighting requirements	NH-45	49
7	Thirumanur petrol bunk near 30 km	Ariyalur	Rash Driving	NH-227	13
8	Vidya sagar womens college vethanarayanapuram	kancheepuram	Tower lighting requirements	NH-45	138

S. No.	NAME OF THE LOCATION	DISTRICT	REASON FOR BEING A BLACK SPOT	NH NUMBER	NUMBER OF FATALITIES
9	Vandalur signal and new bridge	kancheepuram	Fast Driving	NH-45	65
10	S.P.koil junction around 5km	Kancheepuram	Rash Driving	NH-45	62
11	RC.Chettipathy	Salem	High speed	NH-7	191
12	Thirumalai Samudram	Thanjavur	Poor lighting	NH-67	15
13	Tindivanam Junction	Villupuram	Vehicle Crossing	NH-45	56
14	Jakkampet	Villupuram	Over speed Druken drive	NH-45	77
15	Sendur Road between 4km	Villupuram	Rash driving	NH-45	77
16	Dhamal by-pass	Kancheepuram	Pedestrian crossing	NH-4	27
17	11km-Salem City	Salem	Uncontrolled driving	NH-7	41
18	Pathiri between 5km	Villupuram	Avoiding traffic rules Poor lighting	NH-45	51
19	Mundiyambakkam	Villupuram	Vehicle Crossing Pedestrian crossing	NH-45	50
20	Perumugai	Vellore	Rash driving	NH-43	13
21	Ponnakudi	Tirunelveli	Speed breaker	NH-7	14

S. No.	NAME OF THE LOCATION	DISTRICT	REASON FOR BEING A BLACK SPOT	NH NUMBER	NUMBER OF FATALITIES
22	Ullundhurpet by-pass road from virudhachalam	Villupuram	High speed	NH-45	46
23	Arasur junction by-pass	Villupuram	Fast Driving	NH-45	71
24	Edaikkal	Villupuram	People Carelessness	NH-45	40
25	Thekkalur to palangarai around 18km	Tiruppur	Careless driving	NH-47	47
26	Vishwanthapuram near VG hospital	Coimbatore	Harsh driving	NH-67	63
27	Ukkadam junction	Coimbatore	Disobeying traffic Rules	NH-209	17
28	Kalathur	Cuddalore	Poor lighting	NH-45	76
29	Vaigundam to Sangagiri	Salem	Rash driving	NH-7	75
30	Near TPVM EB office	Sivagangai	People frequently crossing	NH-49	50

EXPERIMENTS AND RESULTS

The procedure to perform the experiment and the results are discussed in this section.

(i) Experimental Procedure

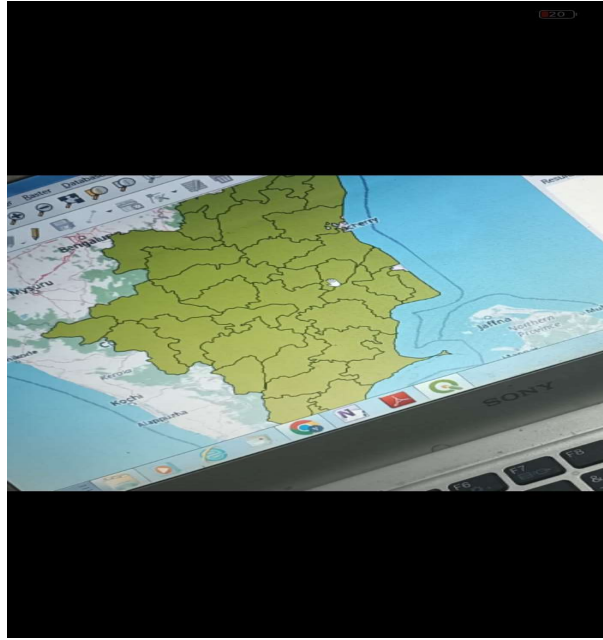**Step1:** Involves inserting Tamilnadu district Map to the Google Map (else OSM).

Fig 3: Inserting Tamilnadu district Map into India Google Map

Step 2: Various data are Collected and Tamilnadu District Map is Highlighted with Blue Border.

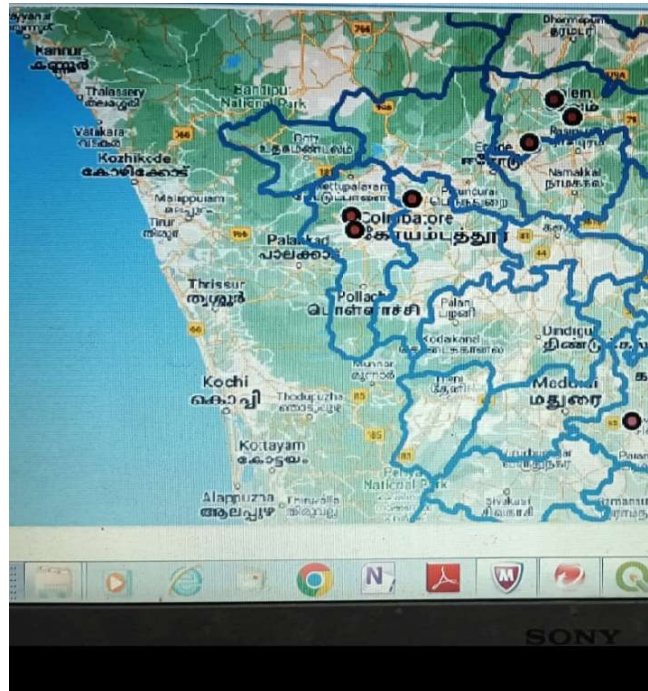Step 3- The Data collected is marked in the map using Various Tools.

Fig 4: Plotting the various black spots

Step 4: Involves Exporting the Map as a picture or pdf of required dimensions to our desired Location.
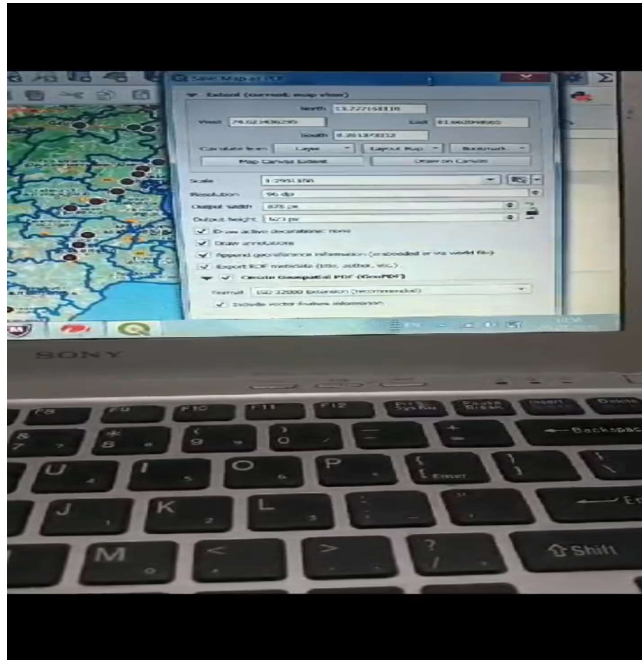

Fig 5: Exporting the project as jpg with specific dimensions

Fig 6: A click of the Team working on the project

Results

The various black spots in Tamilnadu that are marked using the GIS software is shown in the Figure 7.

The blue boundary provided separates Tamilnadu from other states.

🔴 This dot represents the black spots in Tamilnadu for which the exact location is mentioned in the table provided before.

STATE – "TAMILNADU"
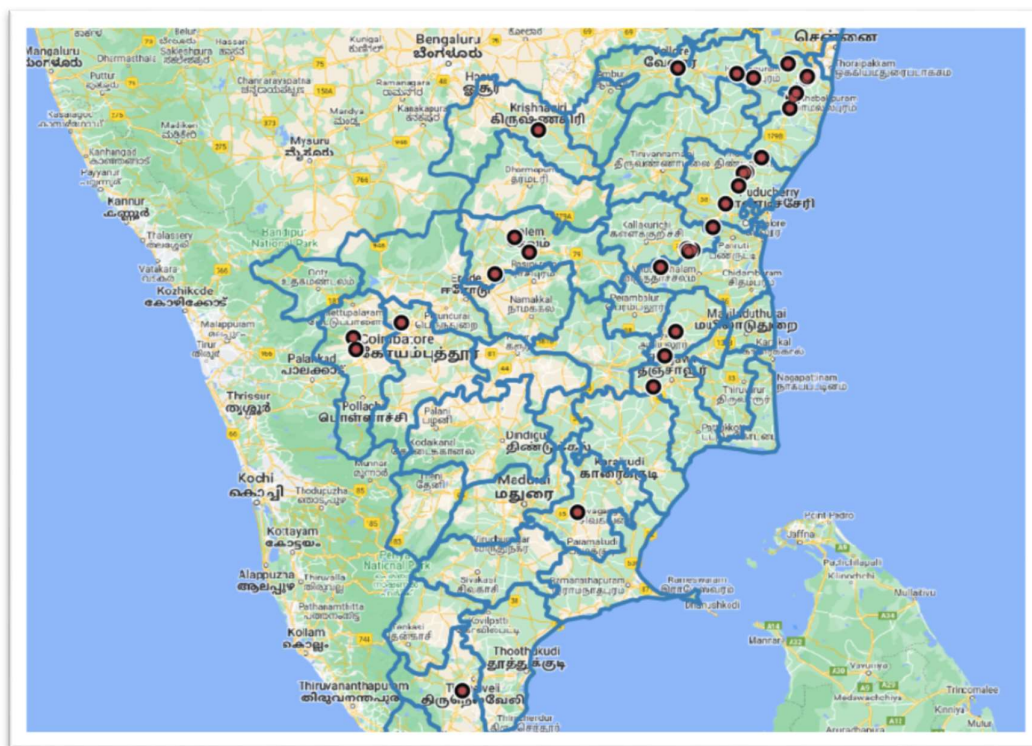
GIS SOFTWARE USED – "QGIS"

Fig 7: Marked locations of blackspots in Tamilnadu by QGIS software.

CONCLUSION

This project identifies locations in Tamil Nadu where accidents have happened frequently. As a result, this study serves as a foundation for identifying Vehicle Crash spots and Unsafe Places that require individuals to pay attention when crossing roads and traveling. This would help Government to fix smart devices in these black spots which would charge fine on travelling beyond the speed limit provided at each locations. As most of the accidents are caused due to rash driving, this would definitely reduce the Accident Rate due to over speeding.

This is already been implemented at few locations in Chennai like Anna Salai (near spencer plaza), Alandur Junction and Old airport road etc. It charges fine for rash driving through the data collected from the vehicle owner's registered mobile number.
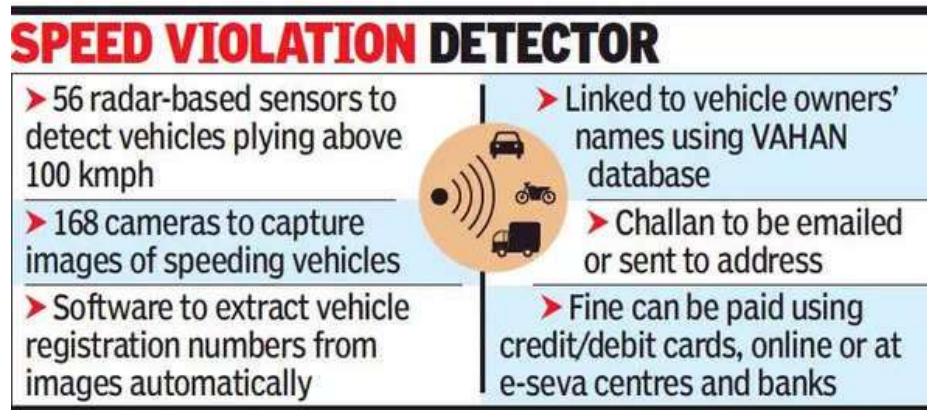

Fig 8: Radar systems launched in Chennai at few locations.

FUTURE WORK

This fundamental study overlooked aspects like time, weather, etc. and just examined the accident locations in Tamilnadu based on the common driving errors. Future study should realize a combination of field tests and simulations based on in-depth analysis of all factors that causes road accidents.

REFERENCES

[1] WHO (World Health Organization). *Global Status Report on Road Safety*; World Health Organization: Geneva, Switzerland, 2018.

[2] Farajollahi, Golnoosh & Delavar, Mahmoud. (2017). Assessing accident hotspots by using volunteered geographic information. Journal CleanWAS. 1. 14-17. 10.26480/jcleanwas.02.2017.14.17.

[3] Ye, Q.; Li, Y.; Shen, W.; Xuan, Z. Division and Analysis of Accident-Prone Areas near Highway Ramps Based on Spatial Autocorrelation. *Sustainability* **2023**, *15*, 7942. https://doi.org/10.3390/su15107942

[4] https://morth.nic.in/

[5] https://eservices.tnpolice.gov.in/CCTNSNICSDC/Index?4 (TN police Official website-Records on accidents in Tamilnadu).

[6] MORTH- Global status report on Road Safety(2013) https://morth.nic.in/sites/default/files/RA_2021_Compressed.pdf